Royal College of Physicians

RCP annual conference

Medicine 2021

Abstracts booklet 1

We would like to thank Boehringer Ingelheim Ltd for their support of this abstract booklet through a medical education grant.

Abstract submissions

We were pleased to receive over 150 abstract submissions to be considered for presentation at Medicine 2020, all of which were of very high quality.

This booklet includes the first round of abstracts approved to be presented as posters at the RCP annual conference, which has been postponed due to COVID-19.

We would like to thank all abstract authors for their patience as we work towards the new dates for our annual conference. Now Medicine 2021, the conference will take place on 7–8 January 2021 at the ICC in Birmingham. All delegate bookings and accepted abstracts have been automatically transferred to the rescheduled conference date. We are pleased to confirm that the poster presentations will be held on Thursday 7 January and the three winning entries will be announced on Friday 8 January.We look forward to seeing you there.

New abstracts focusing on COVID-19

We will be reopening abstract submission to all on 23 April 2020 to focus on COVID-19. We recognise that there will be an influx of ongoing research around the pandemic and want to use our annual conference as a platform for you to share your work with your peers.

Along with the abstracts contained in this booklet, new posters will also be presented at Medicine 2021 and will be eligible for the prizes. New abstracts will again be published in one of the RCP journals as well as in a Medicine 2021 abstracts booklet (booklet 2). As an added bonus, one author will be selected to present their research orally at our COVID-19 session at Medicine 2021.

Find out how to submit an abstract.

If you have any questions, please contact medicine@rcplondon.ac.uk or call +44 (0)20 3075 2389.

The Medicine 2021 team

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CLINICAL

Investigations and management strategies of acute myocardial infarction in young adults (a single centre clinical audit)

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Introduction

Myocardial infarction (MI) is one of the leading causes of death in the world and is generally considered a disease of older people.[1,2] Recent data, however, show that the disease among young adults, though not common, accounts for 1 in 20 of all acute myocardial infarction (AMI) cases.[3–6] The management of this patient cohort has not been well categorised. This study, therefore, audited the investigation and treatment of patients aged ≤45 years presenting with AMI to a tertiary cardiac centre over a 15-year period. The aim was to answer whether all patients underwent invasive investigation, all patients received appropriate secondary preventive drugs, and systematic investigation was undertaken to detect less common causes of AMI in the ≤45 year age group.

Materials and methods

A secondary data analysis method was employed, using the data stored on the MINAP database for 7,455 patients presenting with an AMI to the Royal Sussex County Hospital between 2013 and 2018.[6,7] Patients presenting with a first AMI (5,776) were divided into two groups: Group 1 ≤45 years and Group 2 ≥46 years. Full demographics, risk factors, investigations and treatment were analysed for both groups. In addition, detailed analysis was performed in the last 50 consecutive patients in Group 1 with review of angiographic films, echocardiographic images and medication dosage on discharge.

Results

Of all patients admitted with MI, 376 were ≤45 years old (62% were 41–45, 27% were 36–40 and 11% were 30–35). Eighty per cent had a smoking history, 47.1% had a positive family history of MI and the mean body mass index (BMI) was 29.27 ± 13.07 kg/m^2. The most common previous medical conditions were hypertension (21.3%), hypercholesterolaemia (17%) and diabetes (7.7%). The troponin level was raised in 95.93%, and 75.5% had ST segment elevation on presentation. The commonest culprit lesion was the left anterior descending artery (50%), and 56% had single vessel disease (SVD). The mean left ventricular ejection fraction before primary coronary intervention (PCI) was 46.9 ± 9.5% and on average improved by 10% post-PCI. Only one patient was screened for patent foramen ovale (PFO) using echocardiography with bubble study. Only 16% had been screened for clotting abnormalities. On discharge, 72% of the patients were given all appropriate medication. Twelve per cent had not been given any antiplatelet agent, whereas the most common antiplatelet regimen was aspirin with clopidogrel. The usual prescribed angiotensin-converting enzyme inhibitor / angiotensin receptor blocker was ramipril; 60% received either ramipril 1.25 mg or 2.5 mg. Bisoprolol was the typical prescribed beta blocker; 54% were prescribed bisoprolol 1.25 mg or 2.5 mg. Eighty-four per cent were administered a statin, with the most common prescription (70%) being atorvastatin 80 mg.

Conclusions

Our results show that the majority of young patients with MI underwent appropriate invasive investigations and revascularisation, with 92% having TIMI 3 flow in the culprit coronary lesion post-intervention. Almost all young patients post-MI diagnosis received all appropriate secondary prevention drugs, but contrary to the National Institute for Health and Care Excellence guidelines not all patients received all four types of

preventive drugs, and those who were prescribed these drugs did not receive optimal doses. Furthermore, investigation for clotting abnormalities and PFO had been performed in only a small number of patients.

Conflicts of interest

None declared.

References

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Knowledge, attitude and practice of breast self-examination in Khartoum State, Sudan

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Introduction

Globally, over 400,000 women die annually due to breast cancer.[1] In Sudan, the National Cancer Registry showed that among all the cancer cases documented, breast cancer had an incidence of 25.1 per 100,000 per year.[2] This high incidence is thought to be compounded by late presentation, particularly in Sudan.[3]

Research into breast self-examination (BSE) may help us better understand the patient pathway to presentation and its role in facilitating the early diagnosis of breast cancer. BSE is a practice that aims to positively influence early health seeking behaviour.[4] Although many studies have detailed a link between BSE and early diagnosis of breast cancer, an equal number have failed to do so.[5]

This study was conducted from November 2016 to May 2017. It aimed to determine the knowledge, attitude and practice of BSE among both breast cancer and non-cancer patients, its possible relation to patient-related delay and the stage of breast cancer at diagnosis.

Material and methods

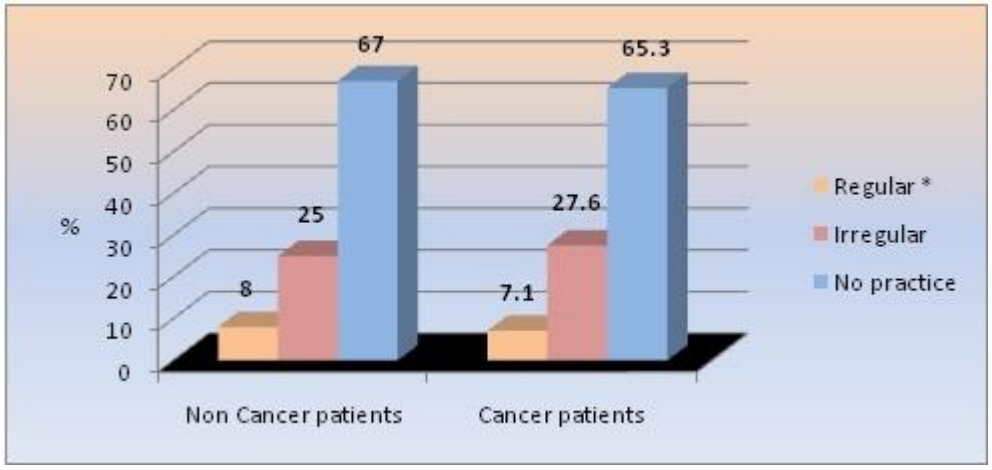
Data were collected from 270 female participants via an interview-administered questionnaire at two institutions: Burj Alamal Breast Clinic and Alban-jadeed Hospital (ABJ) in Khartoum, Sudan. This was a case–control study of 170 breast cancer patients sampled at the breast clinic, while 100 non-cancer patients were selected randomly from the Obstetrics and Gynaecology Department at ABJ Hospital during the same time period.

Results and discussion

The mean age of breast cancer patients was 47.7 (standard deviation (SD) 13.0) years, representing 63% of our study population. The remaining 37% were non-cancer patients with an average age of 34.7 (SD 12.4) years.

Approximately 60% of our study participants were not aware of BSE and 70% did not know the signs and symptoms of breast cancer. When asked about the usefulness of BSE, 58.8% (cancer) and 68% (non-cancer) of our respondents replied positively. Regular BSE practice was found to be at 7.1% and 8% among cases and controls respectively (Fig 1).

Fig 1. Breast cancer and non-cancer patients by breast self-examination practice.

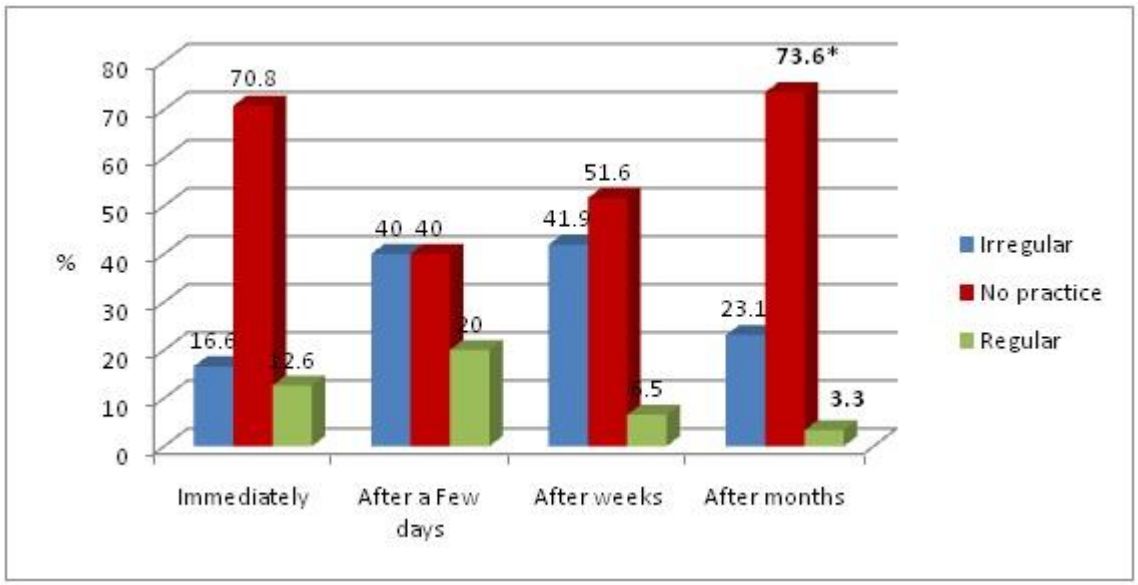


* = once every month

More than half of the breast cancer patients (54%) presented with advanced stage disease. BSE practice was found to be associated with reduced patient-related delays in diagnosis. Those who did not practise BSE took longer to recognise (p=0.000), become aware (p=0.001) and seek medical help (p=0.01) for their breast lump than those who practised regularly (Fig 2).

No correlation was found between BSE and early stage breast cancer (p=0.619).

Fig 2. Relation between breast self-examination and behavioural delay.



* = behavioural delay: the time from becoming aware of a breast illness to deciding to seek help.

Conclusion

The prevalence of BSE practice among women in Khartoum from our sample study was inadequate at 8% and 7.1% for non-cancer and cancer patients respectively, as was their level of knowledge. However, their attitude was positive. We also found that regular BSE may play a critical role in:

- increasing the awareness and perceived susceptibility to breast cancer
- enhancing decision-making and motivation to seek help.

Conflicts of interest

None declared.

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Rhythm control treatment strategies for atrial fibrillation: current consensus and future possibilities

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Introduction

Atrial fibrillation (AF) is a disease of ageing, with a prevalence of 3% among people >20 years of age.[1,2] Around 10–40% of AF patients are hospitalised annually. Budget-wise, direct AF care consumes 1% of total health spending in the UK.[1] AF is the cause of many debilitating conditions such as stroke and other thrombotic disorders.[3]

Materials and methods

A systematic search for evidence was carried out by investigating online resources: MEDLINE, CINAHL, PUBMED, EMBASE, ScienceDirect and HDAS. Terms used in research included 'rhythm control', 'management strategies', 'AAD', 'antiarrhythmic strategies', 'atrial fibrillation', 'AF', 'ablat*', 'non-pharmacological'. A specific search was done through National Institute for Health and Care Excellence (NICE), European Society of Cardiology (ESC), American College of Cardiology (ACC) / American Heart Association (AHA) guidelines as well. Research was limited to the past 10 years to provide more contemporary evidence.

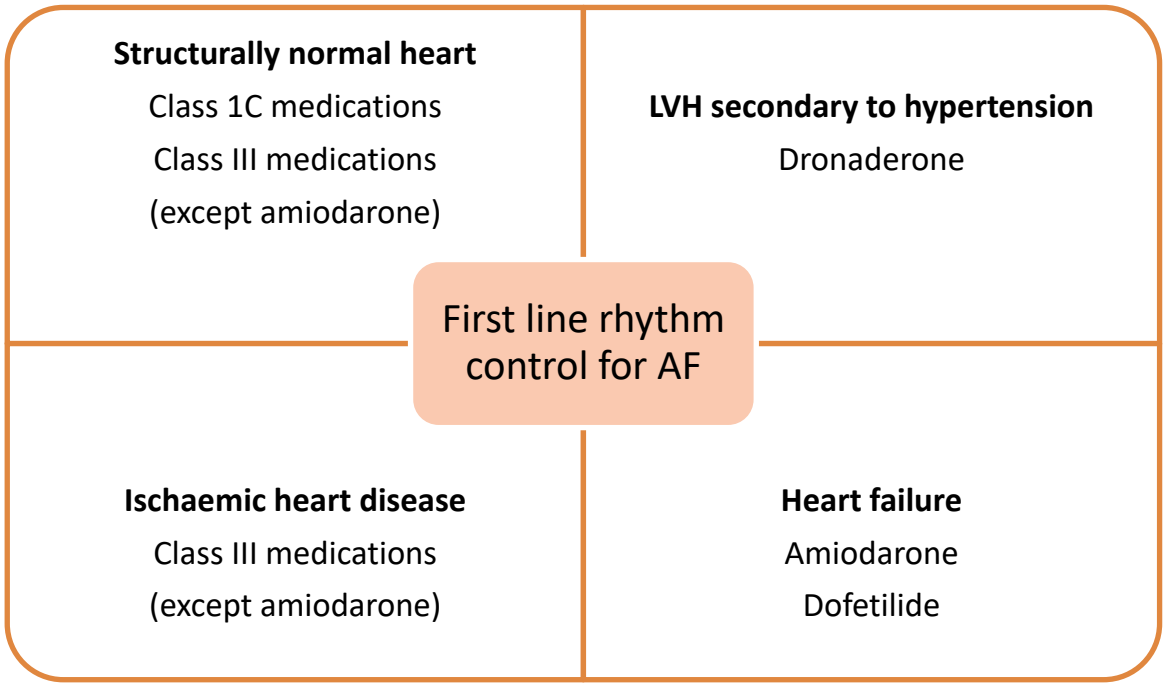
Results and discussion

For infrequent paroxysms, a 'no-drug-treatment' strategy or a 'pill-in-the-pocket' strategy is followed.[4] In heart failure patients, both amiodarone and sotalol are favoured, whereas dronaderone is contraindicated. Also, in ischaemic or structural heart disease, the use of class 1C antiarrhythmic drugs (AADs) is not recommended (Fig 1).[3] Komatsu *et al* noted that disopyramide is more effective for night-time AF while flecainide and pilsicanide are better for daytime episodes. The main challenge with AADs is their adverse effects profile.[5]

Catheter ablation (CA) techniques, when compared with AADs, have better quality of life outcomes and fewer clinical events and are usually recommended after a failed trial of AAD treatment.[3,6,7] There are different techniques for CA but pulmonary vein isolation remains the cornerstone of treatment.[8] The main limitation for CA treatment is its anatomically sinister complications and adverse events.

Surgical ablation (SA), whether open or thoracoscopic, showed better freedom-from-AF profile when compared with CA but with almost double the rate of adverse events.[9] It can have a role in concomitant mitral valve surgery and AF maze operation.[9] The main challenge with SA is the lack of well-conducted randomised trials, and also in the differences between rhythm monitoring protocols which may result in different measured outcomes. Hybrid treatment approaches show promise in tackling AF rhythm therapy.

Fig 1. Rhythm control strategies in atrial fibrillation; second line treatment is catheter ablation and then, if unsuccessful, amiodarone can be started.[10]
Class III medications = dronedarone, dofetilide and sotalol; LVH = left ventricular hypertrophy.



Generally, the consensus of NICE, ESC, ACC/AHA recommends that an initial trial of AADs is followed, if failed or contraindicated, by CA. A surgical approach should be considered if there is a concomitant cardiac surgery or after two failed CA attempts.[3,6,7]

Conclusion

There is no clear best method for rhythm control treatment, which is further complicated by a significant gap in evidence for different ablation and surgical techniques. Although hybrid approaches can give hope for better outcomes, there needs to be more research to determine that potential. Finally, a remarkable opportunity exists for researchers in AF as illustrated in this study, which can be tackled in future research for better clinical outcomes in AF patients.

Conflicts of interest

None declared.

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The use of cardiac magnetic resonance imaging (CMRI) for adult congenital heart disease patients: qualitative comparative review

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Introduction

Grown-up congenital heart diseases (GUCH) are a new field in cardiology due to historically high childhood mortality rates.[1] Compared with 60 years ago, pre-adulthood mortality rates have dropped from 90% to 10%. Once they become an adult, patients with GUCH need follow-up and monitoring of their conditions.[2] Many of them need lifelong monitoring, and thus the need for a reliable imaging modality emerges.

Materials and methods

This study compares different imaging modalities based on their innate characteristics plotted against a virtual ideal test, as well as the different societies' guidelines, utilising a qualitative approach to the comparison. A systematic search for evidence was conducted looking into resources such as PUBMED, EMBASE, ScienceDirect, CINAHL, NICE, ESC, ACC/AHA using Boolean operators with phrases like: 'CMRI', 'GUCH', 'ACHD', 'diagnostic modalities', 'imaging techniques'. After primary selection of included resources, the studies were analysed for inclusion in the body of evidence.

Results and discussion

Cardiac magnetic resonance imaging (CMRI) has no radiation risk but offers lower resolution than computed tomography (CT); it is more time consuming and therefore, more demanding for clinicians and patients.[3] It is less operator dependent than echocardiography which allows for detection of minor changes in serial follow-up assessments mainly for left ventricular volume and function. CMRI is also applicable in pregnancy. On the downside, it is contraindicated in the presence of certain pacemakers, and it cannot be utilised intra-procedurally. CMRI is also prone to artefacts that can be identified through chest X-ray, such as retrocardiac surgical needle in one case.[4]

CMRI is uniquely indicated in right ventricular volume and ejection fraction assessment, as well as for abnormalities in the great vessels and for pulmonary artery conduits.[5] CMRI is rarely done as a first-line test. Usually, it is utilised to answer predetermined morphological and haemodynamic questions of already configured anatomy.[4] Furthermore, the latest developments of 4D-CMRI carry the potential of identifying risk profiles and treating patients before developing clinical manifestations by recognising areas of wall strain and flow patterns.[6]

Conclusion

No single test is perfect for all patients with GUCH all of the time, but CMRI proves to be near perfect when it comes to serial follow-up and definitive diagnosis (Tables 1 and 2). It falls short when faced with ferromagnetic foreign bodies, intraoperative imaging, emergencies, suboptimal patient cooperation, or with vegetations and small thrombi where cardiac CT is superior; and it is more expensive (than echocardiography) to be used for initial patient assessment.

Table 1. Point scoring of different imaging modalities in grown-up congenital heart diseases. The values are based on the research conducted in the study.

	MRI	TTE	CT
Extra-cardiac data collection	+++	+/-	+++
detection of smaller changes (i.e. LV size, …)	+++	++	+++
no radiation exposure	+++	+++	-
non-invasive	+++	+++	+++
operator independent	+++	+	+++
special circumstances: pregnancy	+++	+++	-
Total	18/18	12.5/18	12/18

CT = computed tomography; LV = left ventricular; MRI = magnetic resonance imaging; TTE = transthoracic echocardiography

Table 2. Overall numerical qualitative value for different imaging modalities in grown-up congenital heart diseases.

Imaging modality	Marcotte *et al*[7]	ACC/AHA[8]	This study	Total
MRI	33	14	18	**65**
Echocardiography	26	9	12.5	**47.5**
Cardiac CT	23	12	12	**47**

ACC = American College of Cardiology; AHA = American Heart Association; CT = computed tomography; MRI = magnetic resonance imaging.

Conflicts of interest

None declared.

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Symptomatic knee osteoarthritis and dyslipidaemia

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Background

As a complex multifactorial condition, knee osteoarthritis has been considered as a leading cause of disability. Dyslipidaemia is a metabolic component that can probably play a role in knee osteoarthritis development and comorbidities; however, this relationship is still debated. This study was carried out in order to figure out the prevalence of dyslipidaemia among knee osteoarthritis patients and compare their abnormal serum lipid components with non-exposed individuals.

Patients and methods

A total of 60 patients with knee osteoarthritis and 60 non-exposed (without knee osteoarthritis) individuals were studied in a prospective cohort study that was conducted from March 2018 to May 2019. The patients were chosen from those who were referred to the Rheumatology Division in Sulaymaniyah, the Kurdistan region of Iraq. European League Against Rheumatism and American College of Rheumatology diagnostic and classification criteria and radiographic confirmation for definite osteophytes were utilised to diagnose the primary knee osteoarthritis. Required data were collected using a questionnaire, taking blood samples and conducting several laboratory tests.

Results

The mean age of the patients with knee osteoarthritis was 51.8 years. Female-to-male ratio was 2.1:1. It was seen that dyslipidaemia increased twofold among patients with knee osteoarthritis compared with the non-exposed individuals. Patients and non-exposed individuals were significantly different in terms of dyslipidaemia prevalence ($p<0.013$). Furthermore, all the lipid components were significantly abnormal in those with knee osteoarthritis.

Conclusion

Dyslipidaemia is prevalent among knee osteoarthritis patients, and there is a significant association between knee osteoarthritis and high-density lipoprotein, total cholesterol, low-density lipoprotein and triglyceride. Dyslipidaemia prevention may reduce the development of knee osteoarthritis and cardiovascular comorbidities.

Conflicts of interest

None declared.

Creating a reference guide to improve management of inpatients with influenza and other respiratory viral infections

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Introduction

Seasonal respiratory viruses are a significant cause of morbidity and mortality, and management of inpatients with influenza and other respiratory viruses has important implications for clinical outcomes and patient flow. There is currently no easy-to-access reference guide at Lewisham and Greenwich NHS Trust to guide clinicians on post-exposure prophylaxis, treatment indications or appropriate isolation duration for these patients. Microguide, an application freely available on mobile phones, is a well-established multi-trust platform that guides antibiotic use but has not traditionally been used for respiratory virus management. This quality improvement (QI) project looks to improve clinicians' knowledge base and confidence in managing patients by creating a respiratory virus reference section on Microguide.

Methods

The initial phase used a 10-question survey, aimed at junior doctors in the acute medical team, to gauge current knowledge of management, awareness of currently available resources and enthusiasm for a new reference guide. A clinical reference section was then created on Microguide, using existing trust guidance and Public Health England guidelines as primary resources. The next stage, which is currently in progress, is to update the trust Microguide application so it reflects the new update, and then raise awareness with clinicians. Finally, the survey will be re-performed to see if knowledge-base and confidence in managing patients have improved.

Results

The initial survey was completed by 20 junior doctors at Queen Elizabeth Hospital (Woolwich), who ranged in grade from foundation year 1 to specialty trainee. Of the first eight multiple choice questions pertaining to clinical management of inpatients, six questions were answered incorrectly by over 50% of those surveyed. Question 9, which assessed awareness of current trust guidance, demonstrated that over 70% did not know where to access guidelines. One hundred per cent of those surveyed felt a new reference guide would be helpful to their clinical practice.

The next stage (in progress) is to roll out the updated Microguide application, raise awareness and re-perform the survey.

Discussion

The initial survey suggests lack of knowledge of management of inpatients with influenza and other respiratory virus infections among Lewisham and Greenwich clinicians, unawareness of how to access relevant trust guidance and an enthusiasm for a new reference guide.

I hope to roll out the Microguide update and re-perform the survey by February 2020. Once that cycle is complete, there will be some indication as to whether an updated and expanded Microguide platform is a useful accessory for clinicians in the management of inpatient respiratory virus infections.

Conflicts of interest

None declared.

Missing Edward Scissorhands

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Introduction

A 59-year-old woman presented to the acute stroke service in February 2019 as a thrombolysis call. She had sudden-onset right arm and leg weakness and inability to speak, witnessed by her neighbour who saw her collapsing and called the paramedics. She had a past medical history of multiple ischaemic strokes (right frontal infarct in April 2016, right thalamic infarct in March 2016 and bilateral occipital infarcts in 2011). This was against a background of several cardiovascular risk factors such as hypertension, hypercholesterolaemia, peripheral vascular disease, ischaemic heart disease with tissue aortic valve replacement, autoimmune hypothyroidism and a longstanding smoking history. Her regular medications included dual antiplatelet agents, bisoprolol, amlodipine, atorvastatin, ranitidine and levothyroxine. Clinical examination was consistent with a severe left middle cerebral artery stroke with a National Institutes of Health Stroke Scale (NIHSS) score of 28. Computed tomography (CT) of the head and CT angiography excluded intracranial bleed and a proximal M1 thrombus respectively, hence she was thrombolysed with a door-to-needle time of 46 minutes. She recovered remarkably well from her limb weakness but remained profoundly aphasic.

Materials and methods

An electronic patient records system called Evolve was used to review all previous admissions and clinic attendances for the patient. A picture archiving and communication system and integrated clinical environment were used to look at radiological investigations and blood results respectively.

Results and discussion

This patient had first presented to the stroke service in 2011 with strokes in different vascular territories. It was noted that she had thrombocytopenia and raised creatinine during that episode, as well as at the time of all subsequent strokes (Figs 1 and 2). A thorough workup to find the aetiology of stroke was carried out that included normal carotid Doppler, R-test and transoesophageal echocardiography (TOE). She had negative screening results for thrombophilia, vasculitis and malignancy. Digital subtraction angiography and brain biopsy were both normal. She received steroids empirically on the advice of haematologists. Her platelet counts and renal function improved and atherosclerosis was felt to be the likely cause for her stroke, which was treated conventionally.

Fig 1. Serum creatinine.

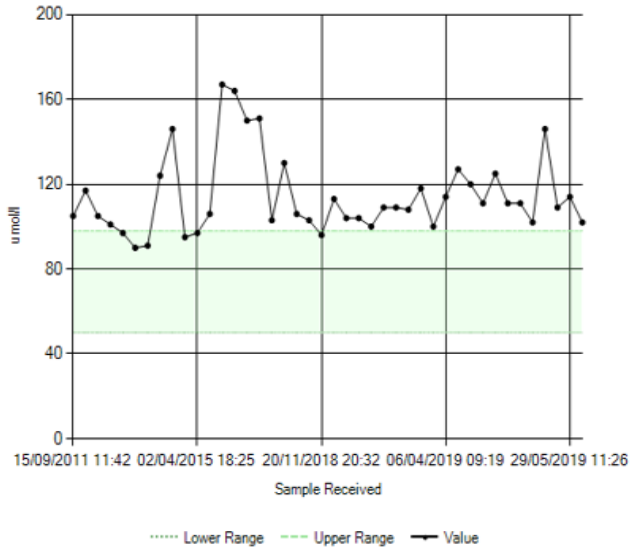
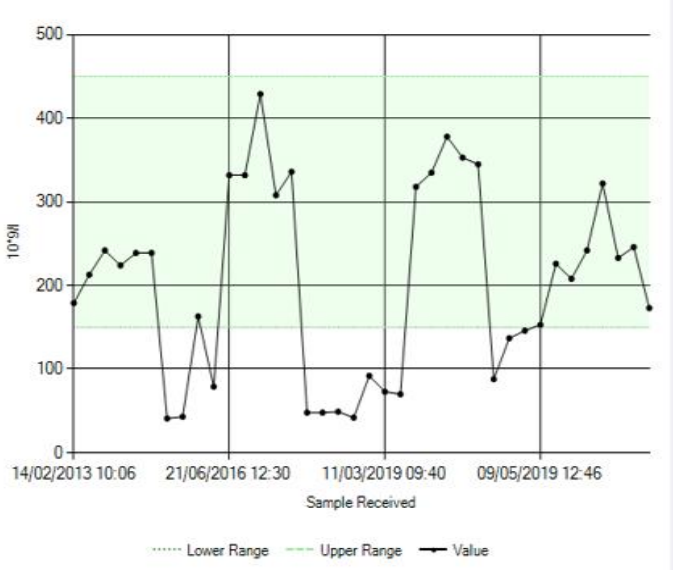


Fig 2. Platelet count.



She re-presented in 2016 with left arm weakness and speech disturbance. Further strokes in multiple territories were identified on brain magnetic resonance imaging (MRI), although not all were symptomatic. Thrombocytopenia and a high creatinine were noted again. Following a review by the nephrology team, she was deemed to have renal vascular disease. She was commenced on dual antiplatelet agents and blood pressure control was tightened.

Following her latest presentation, there was suspicion of this being an unusual case of thrombotic thrombocytopenic purpura (TTP), which is typically associated with high mortality if left untreated. This was confirmed by undetectable ADAMTS13 assay and high inhibitor levels. She had three out of the five features of the TTP pentad and was induced into remission with plasma exchange and immune suppression. Hence the mystery of the missing 'Edward Scissorhands'(ie ADAMTS13), which cleaves von Willebrand factor multimers, thereby preventing haemolysis and formation of micro thrombi, was solved.

Conclusion

This unusual case highlights the diagnostic challenges in a patient with cardiovascular risk factors having recurrent strokes.

Conflicts of interest

None declared.

Acute coronary syndrome in patients with prior coronary artery bypass graft: clinical, angiographic profiles and management practices

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Introduction

Acute coronary syndrome (ACS) among patients with post-coronary artery bypass graft (CABG) is not uncommonly encountered in current clinical practice. This study aimed to investigate the clinical and angiographic profiles and management strategies among post-CABG patients presenting with ACS at a tertiary care cardiac centre in Dhaka, Bangladesh.

Materials and methods

This retrospective observational study included all patients with ACS with a prior history of CABG presenting to our institute and undergoing coronary angiography from February 2015 to October 2019. Data were collected from hospital discharge records and the catheterisation laboratory database and statistically analysed.

Results and discussion

From a total of 591 post-CABG patients who underwent coronary angiography, 223 (37.7%) presented with ACS. The mean age was 62.15 ± 8.28 years and 90.6% of the patients were male. The majority of post-CABG ACS patients presented with non-ST segment elevation myocardial infarction (NSTEMI; 61.9%), with lower proportions presenting with unstable angina (32.7%) and STEMI (5.4%). Male patients most frequently presented with NSTEMI (63.9%), while most female patients presented with unstable angina (52.4%). Overall, 177 (79.9%) of ACS patients were hypertensive, 109 (48.9%) dyslipidaemic, 156 (70%) diabetic, 45 (20.2%) had chronic kidney disease (CKD) and 111 (49.8%) were smokers. Troponin I levels were elevated in 143 (64.1%). Mean left ventricular ejection fraction was 48.31±9.48%. Graft vessel disease was identified as culprit in 124 (60.2%) of cases and native artery in 51 (24.8%). Among those with graft vessel disease, 129 (58.1%) had saphenous venous graft (SVG) lesions, 12 (5.4%) had arterial graft lesions and 15 (6.8%) had both arterial and venous graft disease. The majority of patients (n=143; 64.1%) underwent angiography and graft study by left radial approach, followed by right radial (24.2%), right femoral (11.2%) and left ulnar approach (0.4%). A trend towards more radial intervention was observed as the years progressed. In terms of management strategy, two-thirds of the patients (n=148; 66.7%) were recommended revascularisation by percutaneous coronary intervention (PCI), 69 (31.1%) were treated with optimal medical therapy and five (2.3%) were referred to have CABG carried out again. In total, 93 (41.9%) of patients underwent PCI, of which 82.8% were ad hoc procedures and 17.2% were elective procedures done during the index admission. The PCI target was a native coronary artery in 53.8% and a bypass graft in 37.6%. In 8.6%, PCI was performed to both a native coronary and a graft.

Our study is the largest to date to analyse the management practices of patients with prior CABG who subsequently presented with ACS in Bangladesh. Despite an ongoing debate over the best vascular access site for post-CABG intervention,[1] we found that the left radial approach is reasonable, particularly with experienced operators. As previously noted,[1–3] saphenous venous grafts are notorious to occlusion, with high rates of restenosis. Data and guidelines recommend native artery revascularisation over graft vessel intervention, a practice that was appropriately observed in this study.[3,4]

Conclusion

The most common ACS presentation post-CABG patient population was NSTEMI, although women presented more frequently with unstable angina. Venous grafts were the predominant culprit vessel. PCI

remains the most frequently utilised strategy for revascularisation, with native artery PCI taking precedence over grafts.

Conflicts of interest

None declared.

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Iatrogenic haemothorax – does extra benefit go hand-in-hand with extra risk? A case report and review of literature

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Introduction

Haemothorax is a rare complication of pleural procedures. The national British Thoracic Society (BTS) pleural procedures audit 2015 reports 1% incidence of haemothoraces following pleural aspirations.[1] The BTS guidelines recommend fine-bore needles for procedures wherever possible.[2] Additional considerations include assessment of bleeding risk, including concomitant use of blood thinners. The national guidelines recommend stopping anticoagulants prior to these procedures, though there is no clear guidance regarding antiplatelet agents.[2] Studies indicate that dual antiplatelet therapy (DAPT) offers no additional risk of significant haemorrhage after such procedures. Most have considered aspirin and clopidogrel as standard DAPT.[3] However, over the years more potent antiplatelet agents have been introduced. To our knowledge, few studies have assessed the bleeding risks with these novel agents in non-cardiac situations.

Case presentation

We report on an 87-year-old male with coronary artery disease on DAPT (aspirin and ticagrelor) who underwent an out-of-hours therapeutic pleurocentesis for a right-sided effusion using a Rocket® Chest Aspiration Kit, followed a while later by development of a massive haemothorax. He improved with high-flow oxygen, withdrawal of his DAPT, blood transfusion and a delayed Seldinger chest drain insertion.

Conclusion

The purpose of this report is to alert physicians that novel antiplatelet agents appear to confer an increased bleeding risk, possibly related to their greater therapeutic efficacy. This needs confirmation by clinical trials. In addition, there is a scarcity of objective criteria in British guidelines for performing out-of-hours pleural procedures.[2] Interestingly in our patient, features of haemothorax became evident only some hours following pleurocentesis. A delayed bleed or an ooze might have occurred. This could imply prolonged observation times following such procedures.

Conflicts of interest

None declared.

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A complication of diabetes: easily confused, easily missed

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Introduction

A 60-year-old woman with long-standing type 2 diabetes mellitus (T2DM), hypertension and hypothyroidism presented with progressive pain and swelling of her left thigh for nearly 2 weeks without any fever. She had, without benefit, received courses of several antibiotics on the suspicion of cellulitis prior to presentation at our set-up. Capillary sugar at presentation was >500 mg/dL (28 mmol/L). Examination revealed diffuse swelling over the anterolateral aspect of the upper third of the left thigh, with erythema and tenderness without local hyperthermia. Her HbA_{1c} was 10.7% (93.4 mmol/mol) and her estimated glomerular filtration rate was 30 mL/min/1.73 m^2. Leukocytosis and elevated C-reactive protein prompted further use of antibiotics, again suspecting cellulitis or pyomyositis. However, improvement remained elusive. Poor response to antibiotics, and lack of evidence of pus necessitated further radiological evaluation. Magnetic resonance imaging (MRI) showed necrotic muscle tissue, suggesting a diagnosis of diabetic myonecrosis. She responded to supportive care and adequate control of blood sugar levels and was subsequently discharged. On initial follow-up, she was found to have fair glycaemic control without recurrence of her symptoms. However, she failed to maintain the follow-up beyond 6 months. We sadly learnt later that she had died about a year after her presentation to us.

Discussion

Diabetic myonecrosis or diabetic muscle infarction is a rare complication of long-standing and insufficiently controlled diabetes mellitus.[1,2] It involves ischaemic necrosis of skeletal muscle, and commonly affects the proximal lower limb. A gamut of common differentials causes it to be frequently underdiagnosed.[2,3]

The affected region is painful and occasionally swollen.[1–3] Lab parameters are not reliably consistent.[2] MRI is the investigation of choice.[1–3] Patients generally respond over weeks to supportive therapy and adequate rest.[1–3]

The purpose of this report is to draw the attention of physicians to a rare complication of diabetes mellitus that mimics common diabetes-related conditions and pain syndromes. The crux appears to be a remarkable 5-year mortality, despite apparent complete resolution of the index episode.[2,3]

Conflicts of interest

None declared.

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A case of paraspinal pyomyositis in a healthy young man

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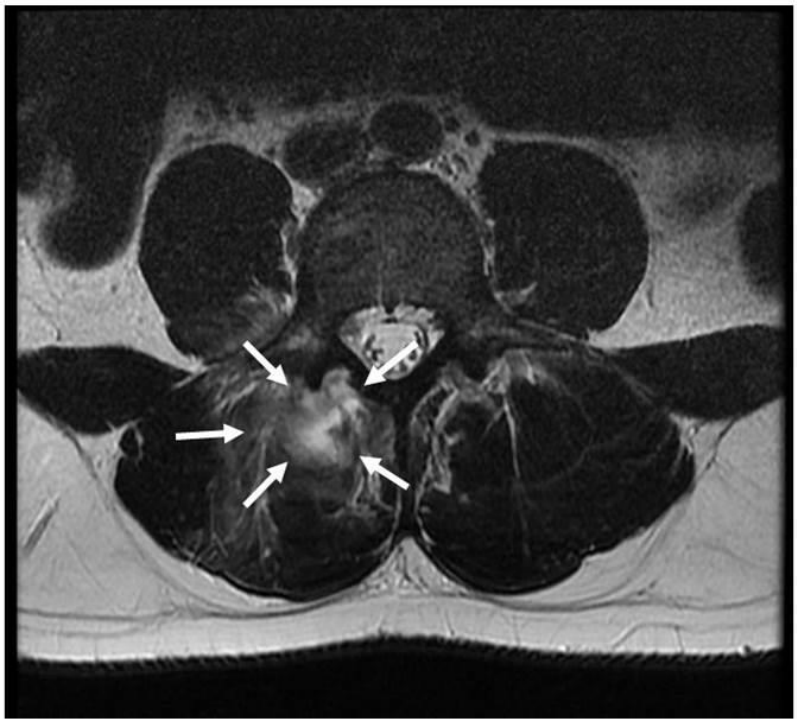
Background

Pyomyositis is a purulent infection of skeletal muscle that arises from haematogenous bacterial spread. It has always been thought to be an infection of the tropics, but has been recognised in temperate climates with increasing frequency.[1] Pyomyositis has also been described among athletes performing vigorous exercise, suggesting the potential role of minor muscle damage in the pathogenesis of the disease.[2,3] Men are more commonly affected than women. Predisposing factors for pyomyositis include immunodeficiency, trauma, intravenous drug use, concurrent infection, malnutrition, diabetes mellitus and malignancy. Diagnosis can be delayed if the affected muscle is deeply situated and local signs are not apparent. Initial serum inflammatory markers may be normal. We describe a case of pyomyositis in an unusual area in a healthy young man.

Case presentation

A 19-year-old man presented with severe back pain and fever. The pain was worse on movement. He had injured his left knee 10 days ago and sustained a minor abrasion while playing a contact sport. He had left knee swelling since then. He was a fit and well individual with no relevant past medical history. Examination revealed a swollen and tender left knee joint with a healing abrasion. Blood tests showed a raised C-reactive protein of 147 mg/L, with normal full blood count and kidney function test. His HIV test was negative, blood glucose levels and creatinine phosphokinase levels were normal. An ultrasound of his kidneys demonstrated normal kidney anatomy but also revealed a post-micturating residual urine volume of 167 mL in the urinary bladder, suggesting urinary retention. Computed tomography of the abdomen and pelvis did not show any abnormality. Magnetic resonance imaging (MRI) of the spine demonstrated an extensive high-signal area in the right-sided paraspinal muscles (Fig 1). Subsequent blood cultures grew *Staphylococcus aureus* sensitive to flucloxacillin. Culture from the left knee aspirate was negative. Echocardiography ruled out endocarditis. He was treated with intravenous flucloxacillin as an inpatient. Follow-up MRI of the spine revealed a smaller area of infection more centred around the right facet joints of the third and fourth lumbar vertebral bones, consistent with resolving pyomyositis but residual lumbar facet joint septic arthritis. He was treated with intravenous ceftriaxone on an outpatient basis for 8 weeks thereafter.

Fig 1. Magnetic resonance imaging of the lumbar spine showing an abscess in right paraspinal muscle.



Conclusion

Pyomyositis predominantly affects the muscles of the lower limbs, although it can also involve muscles of the upper limb, trunk and spine. *Staphylococcus aureus* is the commonest bacterial cause of pyomyositis, followed by group A streptococci infection.[4] MRI is the optimal imaging technique. It is highly sensitive for muscle inflammation and frank abscess, and can demonstrate the extent of tissue involvement. Image-guided percutaneous drainage is an option for many patients and can be useful both to secure a microbiological diagnosis and as a therapeutic measure when combined with antimicrobial therapy. The duration of antimicrobial therapy should be tailored around clinical and radiographic improvement.[5] Our patient was healthy and had no predisposing risk factors for the pyomyositis, which occurred distant from the site of initial trauma.

Conflicts of interest

None declared.

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Evaluation of the impact of sedative medication in patients admitted with a fractured neck of femur

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Introduction

For a patient who falls and sustains a fractured neck of femur, it can be a devastating experience. The instances of falls can be increased if the patient is prescribed a sedative or an anticholinergic medication.

Over recent years, internationally a number of authors have produced papers which have highlighted the increased risk to this cohort of patients in relation to falls and medication.[1–3] The overall conclusion of these papers is that caution should be taken in the prescription of these classic drugs in relation to the cohort patients, in order to lower the risk of falls.

Method

As part of the local orthogeriatric service that is delivered within the trust, the lead clinician was aware that a number of the patients who were at high risk of falls could also be using sedative or anticholinergic medication, and that this was perceived as one of the main contributing factors to the patient's fall, and subsequently leading to the fractured neck of femur.

As a result, an internal audit was undertaken, which looked at 50 randomly selected patients who had been discharged from the trust, following an internal fixation of a fractured neck of femur, (hemiarthroplasty, dynamic hip screw), within a 1-month period. Within the demographics was also recorded the age range of the cohort patients and the male–female split. These patients were audited against four criteria which were:

- Was the patient prescribed a sedative or an anticholinergic medication prior to admission?
- The class of drug that was prescribed
- The 4AT score on admission
- Was the sedative or an anticholinergic medication discontinued at time of discharge?

Results

It was noted that the age range of patients within the cohort was 60–96 years, with a 34:66% male–female split. It was found that 12% (n=6) of the patients studied were currently prescribed sedative or an anticholinergic medication prior to their admission; of these, the most prevalent medication was benzodiazepines, followed by other medication such as amitriptyline and morphine, which could be considered as contributing to the patient's fall due to their sedative nature.

The cognitive assessment for these patients was a 4AT assessment, which was used during their stay. It was noted that 40% (n=20) of the patients had a degree of cognitive impairment which may be associated with the use of sedative or an anticholinergic medication.

Following the medication review for these patients, 50% of the six patients had their sedative or anticholinergic medication discontinued at the time of discharge; for the other 50% it was felt that there was no increased risk to the patient from taking these medications on discharge.

Conclusion

In conclusion, this group of patients remain at a high risk of falls, which may be increased by sedative or an anticholinergic medication. Therefore, as part of the overall assessment, this type of medication should be reviewed and discontinued where appropriate in order to reduce the overall falls risk.

Conflicts of interest

None declared.

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Audit of NICE compliance with warfarin for non-valvular atrial fibrillation on admission to healthcare for older people wards in a university teaching hospital

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Introduction

Traditionally warfarin has been mainly used for stroke thromboprophylaxis in patients with atrial fibrillation, but direct oral anticoagulants (DOACs) are increasingly being used as they have improved safety profiles with comparable efficacy. Recent data from the National Reporting and Learning System have uncovered safety incidents related to anticoagulation, predominantly warfarin, contributing in excess of 10% of all medication errors.[1] Our department recently witnessed a number of safety incidents including high-level investigation related to anticoagulation, predominantly warfarin. The National Institute for Health and Care Excellence (NICE) recommends reassessing anticoagulation choice for patients on warfarin with poor anticoagulation control, indicated by any of the following:

- two international normalised ratio (INR) values <1.5 or >5 or one INR value >8, within the past 6 months
- Time in therapeutic range (TTR) <65%.

Materials and methods

Eighty-eight patients on warfarin were initially screened between August and December 2018. After excluding younger patients (<65 years), warfarin for any other indication etc, 50 patients were included in the audit. Data were collected retrospectively through review of medical notes on the DHR (digital health records) and review of their INR over the previous 6 months to record any significant deviations outside of the therapeutic range as per NICE guidance. TTR over the past 6 months was calculated using the Rosendaal method.

Results and discussion

The median age was 83 years. 29/50 (58%) patients had TTR <65%; 32/50 (64%) patients had unstable INRs; 31/50 (62%) patients had warfarin continued on discharge despite TTR <65% or unstable INRs. Only 11 patients had both TTR >65% and stable INRs as per NICE guidance. Importantly, 39/50 (78%) should have DOAC instead of warfarin as per NICE guidance.

Conclusion

Our study demonstrates poor compliance with NICE guidance regarding warfarin for non-valvular atrial fibrillation in older patients. Reasons for this include polypharmacy, comorbidities, illness, malnutrition etc. We found that the majority of older patients on warfarin should be offered DOAC instead as they offer improved safety profiles with comparable efficacy. The results of this audit have been presented and widely disseminated to our department. A re-audit is planned within the next 6 months to assess improvement.

We suggest that geriatricians proactively review the appropriateness of warfarin prescription and consider a DOAC in preference to warfarin in all older patients.

Conflicts of interest

None declared.

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Anti-HER2 therapy-associated cardiotoxicity in breast cancer patients: analysis of real-world data from a UK cancer centre

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Introduction

Cardiac adverse events are a recognised toxicity for patients with breast cancer receiving anti-human epidermal growth factor receptor-2 (HER2) therapy.[1] Large phase III clinical trials have shown an incidence of left ventricular ejection fraction (LVEF) decrease >10% of 7.1–18.6% and overt heart failure of 1.7–4.1%.[2,3] Retrospective analyses from large registries such as the Surveillance, Epidemiology and End Results (SEER) and Cancer Research Network have reported an even higher incidence of heart failure at 41.9% and 20.1%, respectively.[4,5] We conducted a retrospective analysis to evaluate the incidence of cardiac adverse events for patients receiving anti-HER2 therapy at St Luke's Cancer Centre (SLCC) and Ashford and St Peter's Hospital (ASPH). The aims of the study were to provide real-world data on cardiotoxicity with anti-HER2 therapy and to evaluate adherence to the cardiac surveillance protocol.

Materials and methods

Patients with breast cancer receiving anti-HER2 therapy between June 2018 and June 2019 at SLCC and ASPH were included in the analysis. Data on patient demographics, chemotherapy and anti-HER2 therapy details, and LVEF values were obtained from the systemic anti-cancer therapy electronic prescribing system and patient records.

Results and discussion

One hundred and twenty-three female patients were analysed; the median age was 56 years (range 29–82 years); 25 (23.8%) patients had at least one cardiac comorbidity, with hypertension being the most common; 66% of patients were treated with curative intent; 40% of patients received combined anthracycline–taxane chemotherapy, while 60% received only taxane-based chemotherapy; 55.3% received dual anti-HER therapy with pertuzumab and trastuzumab, while 44.7% were treated with trastuzumab alone. The median number of anti-HER2 therapy doses was 16 (range 3–93). An asymptomatic decrease in LVEF was recorded in 33 patients (26.8%). Of these, 19 patients had a decrease in LVEF >10 points below baseline, six had an LVEF decrease to <50% and eight had both a decrease in LVEF >10 points and <50%. The median time from start of treatment to LVEF decrease was 5 months (range 2–36 months). At the time of reporting, the LVEF of 22 patients (66.7%) had recovered to baseline. There were no cases of symptomatic heart failure. Three patients had delays in their treatment due to the LVEF drop and two stopped treatment early. LVEF decrease was more common in patients receiving palliative treatment (35.7% vs 22.5%) and anthracycline chemotherapy (28.3% vs 24.6%). No association was found between LVEF decrease and cardiac comorbidity or type of anti-HER2 therapy. Adherence to the cardiac surveillance protocol was 76.7%. The most common deviation from protocol was a delay in the cardiac function assessment at 4 months.

Conclusions

In this real-world analysis of cardiotoxicity with anti-HER2 therapy, the incidence of significant cardiac adverse events and interruption or discontinuation of therapy was very low, confirming the safety of this treatment modality. Asymptomatic decrease in LVEF was associated with palliative treatment intent and anthracycline-based chemotherapy. Adherence to the cardiac surveillance protocol is important, as the majority of LVEF decreases occur within the first 5 months of therapy and are potentially reversible with appropriate interventions.

Conflicts of interest

None declared.

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Diabetes and neurology: hemichorea–hemiballism in hyperglycaemia

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Introduction

Diabetes affects a large proportion of the population, with the incidence rising. It also has a wide range of complications. We describe here an uncommon neurological complication of poor diabetic control. Prompt recognition of this condition is essential to improve the outcome.

Case presentation

A 71-year-old Chinese man with longstanding diabetes presented with a 4-day history of progressively worsening uncontrollable continuous non-rhythmic right upper limb movements which resolved during sleep. One week prior, his general practitioner noted poor glycaemic control and started him on sitagliptin. Two days later, he reported right shoulder tingling, gradually spreading down the right arm. This was followed, a few days later, by right hand involuntary movements, gradually affecting his entire right upper limb. The patient visited a Chinese medicine practitioner who performed acupuncture and cupping, eventually presenting to hospital after no improvement.

His past medical history included hypertension, hypothyroidism and type 2 diabetes mellitus with poor control, partially due to refusal of insulin because of needle phobia. His regular medications included metformin 500 mg bd, sitagliptin 25 mg od, amlodipine and levothyroxine.

Neurological examination showed right upper and lower limb involuntary movements consistent with hemichorea–hemiballism (HCHB). Blood tests including full blood count, coagulation, liver and kidney function, bone profile and C-reactive protein (CRP) were normal. His blood sugar was 42.4 mmol/L (range 3.0–7.7) with ketones of 0.8 mmol/L (0.6–1.5) and serum osmolality of 297 mOsm/kg (275–295) with Osm gap 12.0 mOsm/kg (<10). His HbA_{1c} was 141 mmol/mol (20–41).

Computed tomography (CT) of the head showed unilateral left striatum faint hyperdensity, with sparing of the internal capsule and with no mass effect, suggestive of HCHB due to hyperglycaemia. Subsequent magnetic resonance imaging (MRI) of the brain was normal.

Intensive glycaemic control was started with insulin. He was treated with clonazepam 500 µg three times a day (tds), to be uptitrated to 1 mg tds. He improved and was discharged, with diabetic clinic follow-up and plan to start risperidone.

Discussion

HCHB presents as continuous involuntary high-amplitude movements affecting one side of the body. HCHB is a rare syndrome with a prevalence of less than 1/100,000; the majority of individuals affected are Asian women in their 7th decade.[1] The increased incidence in Asian populations suggests a genetic predisposition.[2] Ischaemic/haemorrhagic stroke is the most common cause of HCHB, followed by non-ketotic hyperglycaemia. Other aetiologies are shown in Table 1.[3]

The pathophysiology of HCHB due to hyperglycaemia (also known as C-H-BG: chorea, hyperglycaemia, basal ganglia syndrome) is still uncertain. One suggested mechanism is disruption of the blood–brain barrier (BBB) and transient ischaemia of vulnerable neurons caused by hyperviscosity-related hyperglycaemia. Additionally, hyperglycaemia may also impair cerebral autoregulation, causing anaerobic metabolism activation and depletion of gamma-aminobutyric acid (GABA), the main striatal inhibitory neurotransmitter.[2] Interestingly, HBHC may present a few weeks after blood glucose levels are controlled, suggesting a delayed reaction to severe hyperglycaemia.

Table 1. Less common causes of hemichorea–hemiballism

Primary/inherited	Secondary/acquired
Wilson's disease	Vitamin B12 deficiency
Multiple sclerosis	Vascular
Huntington's disease	Autoimmune
Motor neurone disease	Endocrine
Demyelinating disease	Drugs
	Brain trauma or tumour
	Toxins

The majority of described cases have a good prognosis. In conclusion, a low threshold in screening for hyperglycaemia in HCHB, even when there is no known history of diabetes,[4] is essential, as prompt diagnosis and management may significantly improve the outcome.

Conflicts of interest

None declared.

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Clinical value and cost saving of therapeutic drug monitoring of infliximab in adult patients with inflammatory bowel disease

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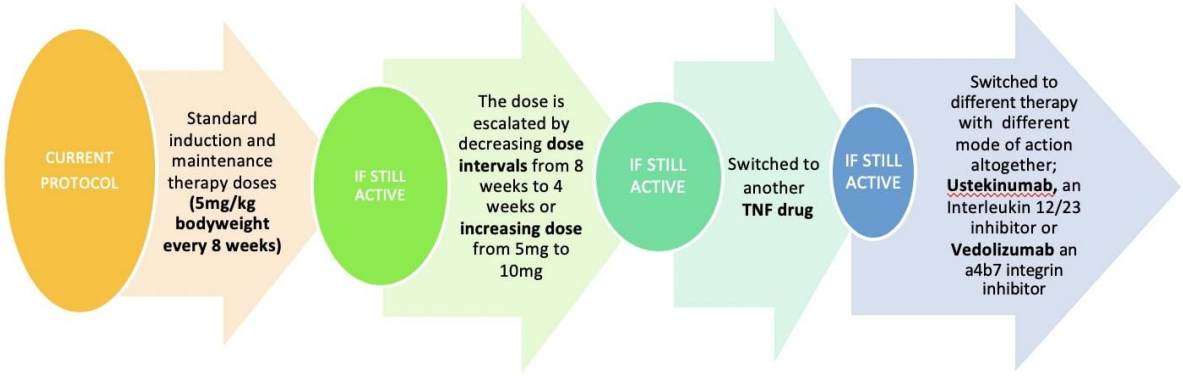
Introduction

Infliximab (IFX) is very effective in active inflammatory bowel disease (IBD) but up to nearly 50%[1] of patients will lose response or experience attenuated response to IFX due to fluctuating drug levels or formation of antibodies to IFX (ATI). There is growing evidence of the efficacy of therapeutic drug monitoring (TDM).[2–4] Currently, the National Institute for Health and Care Excellence (NICE) does not recommend routine TDM in the NHS. Fig 1 shows current practice in the UK.

Fig 1. Therapeutic drug monitoring: current practice in the UK.



Aims and methods

Our primary objective was to assess the clinical and cost effectiveness of IFX TDM in IBD. We retrospectively analysed 122 IFX drug levels and 89 ATI levels of 85 patients (Table 1).

Patients were allocated to three groups based on the intent of TDM: maintenance group (MG) – proactive TDM on patients with quiescent IBD, secondary loss of response group (SG) – reactive TDM on active patients with established primary response to IFX, and post-induction group (PG) – TDM at week 14 post-induction. In each group, patient baseline characteristics were assessed to construct a global assessment of patient state (active, remission or responding to drug) prior and after TDM-led patient management for efficacy of IFX. Cost of IFX (Inflectra) was £123.50 (+VAT) per 100 mg while cost of TDM (IDKmonitor ELISA kit) was £45 per drug level assay and £45 per ATI assay. Calculations were done comparing TDM with empirical IFX dose escalation and switching of drug.

Table 1. Infliximab and antibodies to infliximab levels

Total number of patients	**85**
Age, mean, years (SD)	39.13 (±14.25)
Sex, male, n (%)	54 (64)
Weight, mean, kg (SD)	76.13 (15.54)
Previous/current smoker, n (%)	25 (29)
Family history of IBD, n (%)	6 (7)
Crohn's disease, n (%)	62 (73)
Ulcerative colitis, n (%)	23 (27)

Previous surgical treatment, n (%)	**26 (31)**
Stricturoplasty	7 (8)
Subtotal colectomy	5 (6)
Ileocaecal resection	8 (9)
Fistula resection	2 (2)
Small bowel resection	3 (4)
Right hemicolectomy	6 (7)
Abdominoperineal resection	1 (1)
Emergency laparotomy	2 (2)
Previous immunosuppressive drugs, n (%)	
Azathioprine	79 (93)
Methotrexate	18 (21)
Ciclosporin	3 (4)
Adalimumab	6 (7)
6-mercaptapurine	14 (16)
Tacrolimus	1 (1)
Combination therapy at the time of drug level	**46 (54)**
Number of drug levels done per patient, n	
One	57
Two	22
Three	3
Four	3
Mean CRP at baseline, mg/L (SD)	
Active (n=69)	14.03 (±21.39)
Remission (n=53)	4.73 (±5.86)
p value	0.001
Mean haemoglobin at baseline, g/L (SD)	
Active (n=69)	134.31 (±14.32)
Remission (n=53)	140.56 (±13.24)
p value	0.007
Mean calprotectin at baseline, pg/g (SD)	
Active (n=69)	270.56 (±341.43)
Remission (n=53)	58.8 (±123.70)
p value	0.013

CRP = C-reactive protein; IBD = irritable bowel disease; SD = standard deviation.

Results and discussion

In MG (n=51), 10 (20%) were de-escalated or stopped IFX and maintained in remission and 41 (80%) IFX were continued. The mean IFX level was 1.89 vs 4.34 mg/L (p=0.06), and mean ATI 85.10 vs 9.22 IU (p=0.0007), respectively in the two subgroups. The 20% (n=10) of patients were maintained in remission for a mean of 12.2 months (range 3–30 months) and were previously on IFX for a mean of 61.7 months (range 20–132 months). In the 80% of patients (n=41), two became active after de-escalation, two became active despite having therapeutic IFX, 36 remained in remission and one patient's status was unknown after stopping IFX (not included in cost savings calculation). Potential cost savings in MG were £669 per person per year (17% savings). In SG (n=63), 21 (33%) patients switched drug or had surgery post-TDM and in 42 (67%) IFX dose was escalated or maintained. The mean IFX levels were 2.24 vs 3.48 mg/L (p=0.19), mean ATI 74.90 vs 10.29 IU (p=0.0005) respectively in the two subgroups. Sixteen of 21 patients improved with change of drug (eight in remission, two active, three unknowns) showing a 76–90% efficacy post-TDM.

Twenty-eight of 42 from the IFX dose-escalated SG subgroup improved (12 in remission), 12 patients were still active and two unknowns. Cost savings for SG group were £318.61 per person (13% savings). In PG, two of eight achieved remission and six of eight remained active and their mean IFX level was 2.2 vs 0.8 mg/L (p=0.09) and mean ATI 0 vs 16.7 IU (p=0.22) respectively. Cost savings were £607 per person in the PG group.

Conclusion

IFX TDM in IBD is clinically useful and has saved costs in all three patient groups, with the proactive TDM in post-induction and maintenance group benefiting the most.

Conflicts of interest

None declared.

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The importance of skin biopsies: Sweet syndrome as a differential for 'acute painful red rash' in a patient with normal neutrophils and polymyalgia rheumatica on glucocorticoids

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Introduction

Cutaneous lesions and skin rashes are commonly encountered on the acute take in acute medical units. Sweet syndrome (SS) is an uncommon inflammatory disorder, originally described as 'acute febrile neutrophilic dermatosis' by Sweet.[1] There are numerous aetiological associations reported and it can be classified as classical, malignancy-associated or drug-induced.[2] SS is frequently accompanied by leukocytosis, particularly neutrophilia. SS is characterised by the abrupt appearance of painful, oedematous and erythematous papules, plaques or nodules on the skin. This case emphasises the importance of utilising multidisciplinary team members and their skills such as skin biopsy, in order to achieve the right diagnosis and right treatment in a common presenting complaint.

Materials and methods

A 76-year-old woman with polymyalgia rheumatica, large vessel vasculitis, myelodysplasia and polycythaemia rubra vera presented with a painful red rash. Her current treatments included prednisolone 5 mg, hydroxychloroquine and regular venesections. The rash appeared as episodic, painful multiple red spots with a haemorrhagic and bruised appearance. She was otherwise systemically well, with no oral ulcers, joint pain or swelling. On examination she was found to have erythematous painful patches around the shin, foot, calf and a further warm painful lesion on the shoulder resembling erythema nodosum. Her cardiorespiratory and abdominal examination was normal. She was initially treated as having a possible vasculitis flare, and her prednisolone was increased to 15 mg.

Results and discussion

Initial investigations showed mild anaemia, but normal neutrophils, platelets, liver and renal function. Her erythrocyte sedimentation rate (ESR) was 5 mm/h and C-reactive protein 10 mg/L. Although her antinuclear antibodies test was negative, her extractable nuclear antigen screen was incidentally Ro-positive. Her dsDNA, anti-neutrophil cytoplasmic antibodies, cryoglobulins, anti-cyclic citrullinated peptide and rheumatoid factor were negative. Her C3, C4 and serum electrophoresis were normal.

Given the wide differentials for an acute, painful erythematous rash, the persistence of symptoms despite an initial increase in prednisolone and an essentially normal immunology screen, an urgent skin biopsy was arranged to further elucidate whether the rash was vasculitic or a mimic. Dermatologists performed the biopsy, which showed neutrophil and lymphocyte infiltrate with perivascular accentuation and focal leukocytoclasis within the dermis and subcutaneous adipose tissue. There was no evidence of frank vasculitis. These clinical and histological features were in keeping with the clinical impression of SS, a common vasculitis mimic.

She was subsequently started on high-dose prednisolone 40 mg once daily, to which she had a good response and did not relapse.

Conclusion

Acute erythematous rashes are a common in secondary care, and anecdotally result in diagnostic conundrums. This case highlights the importance of identifying the need for dermatology input and skin

biopsy in diagnosing challenging cases. In this patient, a skin biopsy proved beneficial in excluding vasculitis. Furthermore, the biopsy provided evidence for the diagnosis of SS despite the absence of raised peripheral neutrophils. General physicians may benefit from greater dermatology in-reach advice and access to skin biopsy techniques in order to improve patient outcomes, as shown in this case.

Conflicts of interest

None declared.

References

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A peculiar case of thrombotic thrombocytopenic purpura associated with falciparum malaria and successfully treated with plasma exchange

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Case presentation

A 50-year-old woman was admitted to hospital 3 weeks prior with acute febrile illness. She was diagnosed and treated for falciparum malaria and then discharged. Following discharge, the patient developed altered sensorium, oliguria and seizures. She was admitted to another hospital where she was diagnosed with sepsis and uraemic encephalopathy. She was treated with intravenous antibiotics and dialysed, then discharged. She was readmitted to the same hospital on the following day with seizures and agitation. She was started on anti-epileptics. As there was no improvement in her mental status after 10 days, the patient was transferred to our hospital. The patient was observed to have high-grade fever, agitated behaviour, ongoing seizures and oliguria. She was investigated and found to have anaemia; raised creatinine and urine analysis showed plenty of red blood cells. No malarial parasite was detected in the peripheral smear. Pan-cultures were negative. Cerebrospinal fluid analysis was normal. Imaging studies like chest X-ray, ultrasonography of the kidney, ureter and bladder and magnetic resonance imaging of the brain were normal.

Discussion

The patient was reviewed with all investigations and found to have a pentad of fever, anaemia, thrombocytopenia, kidney injury and neurological involvement, raising suspicion about thrombotic thrombocytopenic purpura (TTP). To confirm the diagnosis, the patient was further evaluated. Lactate dehydrogenase was raised significantly and haptoglobin was reduced, suggestive of intravascular haemolysis. Peripheral smear showed occasional schistocytes, indicating microangiopathy. This confirmed the diagnosis of TTP.

Conclusion

The patient was started on plasmapheresis and steroids. In total, five plasma exchanges were given. After the third plasma exchange, neurological improvement was seen. Haematological improvement was seen after the fifth plasma exchange. The patient responded favourably to the treatment. The patient was discharged on oral steroids after a full recovery.

Conflicts of interest

None declared.

Hypercalcaemia management in a district general hospital

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Introduction

Hypercalcaemia is a common finding in inpatients. Acute hypercalcaemia can be life-threatening and thus proper work-up is pivotal for correct assessment of the underlying cause and management. The European Guidelines 2016[1] were used to assess the investigation and management of patients with hypercalcaemia.

Aim

We undertook a study to assess the appropriateness in work-up, diagnosis and management of patients with hypercalcaemia.

Materials and methods

This was a retrospective study. Patients diagnosed with hypercalcaemia between November 2017 and December 2018 admitted to a district general hospital across different medical and surgical specialties were included in the study. Data were obtained from medical records for symptoms of hypercalcaemia, location of patient in the hospital, biochemical and laboratory tests (including adjusted serum calcium (SCa)), and data on patients' management were obtained from the case notes.

Results and discussion

Of the 50 patients included in the study, 17 were male with a mean age of 76.1 years. The majority of patients (n=43; 84%) had mild hypercalcaemia (SCa 2.67–2.9 mmol/L); moderate hypercalcaemia (SCa 3.0–3.4 mmol/L) was found in five patients (10%) and severe hypercalcaemia (SCa ≥3.5 mmol/L) in three patients (6%). Thirty-one patients (62%) demonstrated symptoms of hypercalcaemia. All patients had renal function assessed on admission, phosphate was measured in 98%, parathyroid hormone (PTH) in 19 (38%) patients and vitamin D in 32%. Electrocardiography (ECG) was done in 24%, and one patient had ECG changes. Of the patients who had PTH measured, 52% had high PTH levels, 31% had low PTH and 15% had normal PTH levels. Of those with high/normal PTH, 76% were referred to an endocrinologist. 16% of patients had known malignancy. 6% of patients with low PTH had malignancy. Of the patients with malignancy, PTH and vitamin D were not done in 12%. Management varied within the group: 14% of patients received intravenous fluids, bisphosphonates were given to 8%, steroids to 8%, and 2% received dialysis. 74% had repeat adjusted SCa measured after 24 hours. No patient had 24-hour urine calcium. Management of hypercalcaemia was appropriate in 60% of patients. Only 12% had follow-up with endocrinology.

Conclusion

Guidelines were poorly followed for inpatients in a district general hospital for the assessment and management of hypercalcaemia. Training of healthcare professionals is essential so that guidelines are followed to deliver the best care to patients with hypercalcaemia.

Conflicts of interest

None declared.

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Cell population data-driven acute promyelocytic leukaemia flagging through artificial neural network predictive modelling

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Introduction

A targeted and timely offered treatment can be of benefit for patients with acute promyelocytic leukaemia (APML). The current study made use of potential morphological and immature fraction related parameters (cell population data) generated during complete blood cell (CBC) counting, through artificial neural network (ANN) predictive modelling for early flagging of APML cases.

Materials and methods

We collected classical CBC items along with cell population data (CPD) from the haematology analyser at diagnosis of 1,067 patients with haematological neoplasms. For morphological assessment, peripheral blood films were examined. Statistical and machine learning tools, including principal component analysis (PCA), helped in the evaluation of predictive capacity of routine and CPD items. Then ANN predictive modelling driven by the selected CBC items was developed to identify the hidden trend by increasing the predictive accuracy of these parameters in differentiation of APML cases.

Results and discussion

We found a characteristic triad, based on a lower (53.73) platelet count (PLT) with a decreased/normal (4.72) immature fraction of platelet (IPF) with the addition of significantly higher (65.5) deoxyribonucleic acid / ribonucleic acid content-related neutrophil (NE-SFL) parameter in patients with APML compared with groups of patients with other haematological neoplasms. On PCA, APML showed exceptionally significant variance for PLT, IPF and NE-SFL. Through training of ANN predictive modelling, our selected CBC items successfully classified the APML group from non-APML groups at a highly significant (0.894) AUC value with a low (2.3%) false prediction rate. Practical results of using our ANN model were found to be acceptable, with values of 95.7% and 97.7% for the training and testing datasets respectively. We propose that the triad of PLT, IPF and NE-SFL could potentially be used for early flagging of APML cases in the haematology–oncology unit.

Conclusion

ANN modelling driven by CBC items is a novel approach that substantially strengthens the predictive potential of CBC items, allowing clinicians to be confident of the typical trend raised by these studied parameters.

Conflicts of interest

None declared.

Prevalence, indication and duration of proton pump inhibitor use in patients from unselected admissions

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Introduction

Proton pump inhibitors (PPIs) are inhibitors of gastric acid secretion and are among the most commonly prescribed drugs worldwide. Although they are effective for treatment and prevention of peptic ulcer disease and eradication of *Helicobacter pylori*, there is growing evidence of adverse effects associated with PPI use. These include gastric cancer, chronic kidney disease, hyponatraemia and hypomagnesaemia, nosocomial pneumonia and recurrent *Clostridium difficile* infections. The National Institute for Health and Care Excellence (NICE) has published guidelines on gastro-oesophageal reflux disease and dyspepsia, recommending the indications and length of treatment with PPIs. The aim of this audit was to evaluate the prevalence of PPI use, whether indication and duration was documented and explore reasons to explain the findings.

Methods

A retrospective analysis of unselected admissions of all adults lasting ≥24 hours to University Hospitals Coventry and Warwickshire NHS Trust was carried out. Elective, day case, obstetrics and gynaecology admissions, and patients without a discharge summary were excluded. Pharmacists routinely carry out medicines reconciliation for all inpatients to confirm and record pre-admission medication history. Pharmacy systems and discharge summaries were used to confirm pre-admission and discharge use of PPIs, which was then compared. Electronic notes were further examined to look for indication and duration of PPI use. Finally, an online questionnaire, designed to assess the current practice of reviewing the use of PPI and to evaluate doctors' understanding of indications of PPI use, was sent to all doctors in the hospital.

Results

A total of 899 patients were discharged over five consecutive weekdays; after exclusions, 463 patients were eligible; 176 (38%) had a PPI prescription on discharge, of whom 149 (85%) were already on a PPI pre-admission and 27 (15%) were started on a PPI in hospital. Documentation of a new prescription of PPI on discharge summaries was done in 33% of the patients; indication for PPI was documented in 33% and duration of treatment in 22%. Of the 287 (62%) patients discharged without a PPI, 280 (98%) were not on a PPI on admission and only seven patients had their PPI discontinued in the hospital.

Median (interquartile range) earliest documented prescription to PPI use was 3 (<1–6) years. Thirty-nine per cent of patients admitted on PPI had a documented indication; oesophagitis (n=19; 31%), concurrent NSAID/steroid use (n=11; 18%) and gastritis (n=10; 16%) were the top three indications. Forty-five per cent of patients who took a PPI had an endoscopy; the median (interquartile range) was within the past 2 (<1–5.5) years.

One hundred doctors from all grades completed the questionnaire and 35% admitted to routinely reviewing the indication for PPI for inpatients. The correct reported duration of NICE-approved indications was low and ranged from 3% to 56%.

Conclusion

Over one-third of all patients admitted were prescribed a PPI, the indication and duration for which was not documented in most and the proportion in whom PPIs were stopped was very small. Numerous factors may be responsible for the low deprescribing rate of PPIs, including a lack of knowledge of NICE guidelines among doctors that may be contributing to their higher long-term use.

Conflicts of interest

None declared.

Cost-effectiveness of patency capsule test prior to wireless capsule endoscopy

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Introduction

Capsule endoscopy is a non-invasive technique intended for studying the small bowel and/or colon. It uses a small wireless camera to take pictures of the digestive tract. Although it is a safe procedure, it is possible for a capsule to become lodged in the digestive tract. A patency capsule is a pre-test that is now widely used prior to wireless capsule endoscopy (WCE) to reduce the incidence of capsule retention.[1] The objective of this study is to evaluate the cost-effectiveness of the patency capsule test prior to WCE and to see whether selective use of it, by using an algorithm, is a cost-effective strategy.

Materials and methods

Patients who underwent the WCE and patency test between March 2016 and January 2018 were identified using the electronic endoscopy database. Electronic records and imaging were reviewed to assess indications, complications and outcomes. The Leeds Teaching Hospitals NHS Trust (LTHT) algorithm was used for selecting patients with high-risk features, suitable for patency capsule prior to WCE. High-risk features included known or suspected Crohn's disease, previous abdominal surgery, abdominal pain being the predominant symptom or those without prior abdominal imaging. Differences between the group who had a patency test and the group who did not were analysed using Fisher's exact two-tailed test.

The 2016/2017 NHS tariff codes were used to calculate the direct costs associated with the procedure, radiological imaging, and treatment of associated complications.[2] We reviewed whether the application of an algorithm to select high-risk patients is beneficial both in terms of outcome and cost-effectiveness.

Results and discussion

A total of 214 (female (f) = 124; male (m) = 90) patients were referred for WCE in this period. Patients with a high risk of retention based on our algorithm had a patency capsule prior to WCE n=66 (f=33; m=33), while 148 (f=91; m=57) proceeded straight to WCE.

A significant proportion of patients given a patency capsule were being investigated for small bowel enteropathy or Crohn's disease ($p<0.001$), while those with iron deficiency anaemia or obscure gastrointestinal (GI) bleeding generally went straight to test ($p<0.001$).

We identified 24 (f=16; m=8) false-positive results with patency capsules, with additional investigation costs of £1,956. Two (f=1; m=1) true positive results with patency capsules had radiological interventions costing £238 and did not have WCE.

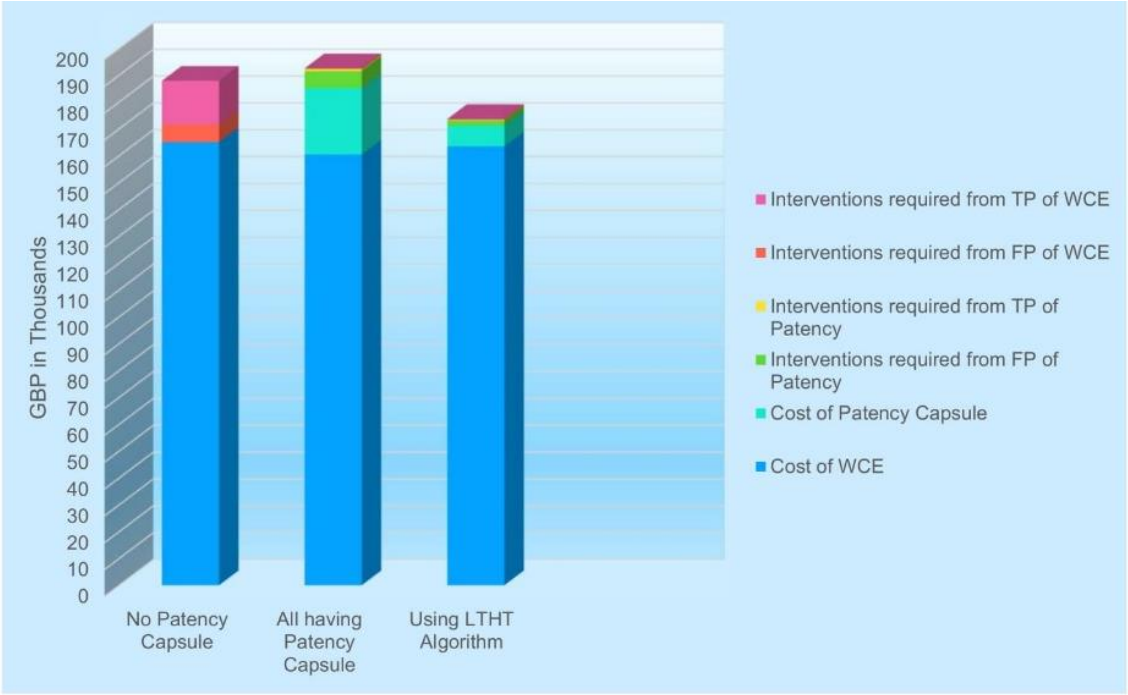
By applying our algorithm of selecting high-risk patients, we showed that the cost per patient for a WCE was £811. This was cost-effective when compared with avoiding the use of patency capsules (£877 per patient) or using patency for all referrals prior to WCE (£899 per patient; see Table 1 and Fig 1).

Table 1. Cost-effectiveness of using a patency capsule with applied algorithm

		Scenario A		Scenario B		Scenario C	
	Average cost per patient (£)	Patients - no. (%)	Cost (£)	Patients - no. (%)	Cost (£)	Patients - no. (%)	Cost (£)
Patency capsule	*116*	66 (31)	7,656	214 (100)	24,824	0	0
Interventions required from FP of patency	*81.50*	24 (36)	1,956	77 (36)	6275	0	0
Interventions required from TP of patency	*119*	2 (3)	238	6 (3)	714	0	0
Cost of WCE (-TP patients)	*771*	212	163,452	208	160,368	214	164,994
Interventions required from FP of WCE	*31*	10 (5)	310	10 (5)	310	88 (41)	6617
Interventions required from TP of WCE (eg. surgical complications, imaging)	*2,710*	0	0	0	0	6 (3)	16,260
Total			**173,612**		**192,491**		**187,871**

Scenario A = using The Leeds Teaching Hospitals NHS Trust algorithm to select patients for patency prior to wireless capsule endoscopy; Scenario B = all patients referred for wireless capsule endoscopy also have patency capsule; Scenario C = all patients straight to wireless capsule endoscopy without patency capsule.

Fig 1. Costs in total for 214 patients in GBP (£)



Conclusion

Using a selective approach to the use of patency capsules is cost-effective when compared with other strategies and saves between £66 and £88 per patient despite having a high rate (36%) of false-positive tests.

Conflicts of interest

None declared.

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A case of nasal mass, skin ulcers and inflammatory joint pain: granulomatosis with polyangiitis versus lymphoma

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Introduction

We report a case of a 62-year-old woman presenting with a 6-month history of inflammatory joint pain in hands, knees and feet, a 3-month history of recurrent sinusitis and 'facial cellulitis', and a 2-month history of lower limb skin lesions. On examination, a soft tissue mass was eroding through the right nasal cavity. Multiple necrotic-looking ulcers were evident on her lower limbs, including on pressure points. There was mild synovitis affecting small hand and foot joints.

Investigation and diagnosis

Initial blood investigations revealed no cytopenia, but persistently raised C-reactive protein despite ongoing antibiotic treatment. Urine dipstick was negative. Magnetic resonance imaging revealed severe sinonasal mucosal thickening and a sinonasal mass with right intraorbital extension, associated with right orbital and facial cellulitis. Computed tomography (CT) with contrast of her head/sinuses revealed an enhancing, infiltrating tissue at the ethmoid air cells, nasal cavity, right orbit and nasopharynx. There was no evidence of intracranial spread. CT of the chest, abdomen and pelvis were unremarkable.

Our differential diagnoses were lymphoma, granulomatosis with polyangiitis (GPA) or IgG4 disease. Microbiology screening was negative for HIV, hepatitis B and C, and tuberculosis. The patient was also reviewed by haematology, and pictures of her skin lesions were discussed with dermatology. She was trialled on a 3-day course of pulsed intravenous methylprednisolone for likely GPA. Immunology screening ultimately revealed perinuclear anti-neutrophil cytoplasmic antibodies (pANCA) positivity, with negative myeloperoxidase (MPO), proteinase 3 (PR3) and antinuclear antibodies. The nasal mass was biopsied, and bloods were sent for immunophenotyping.

Dermatology's opinion of the skin lesion pictures was that they were consistent with necrotising vasculitis, in keeping with GPA / polyarteritis nodosa, with a characteristic necrotic centre and cherry red ulcerated peripheral rim. A skin biopsy was arranged.

However, in the meantime the nasal biopsy results were reported, revealing the diagnosis of natural killer (NK) cell lymphoma and the patient was transferred to a tertiary centre for ongoing treatment.

A case of nasal mass secondary to GPA (PR3 positive) has been previously reported by Spanuchart *et al*, and given the varied manifestations of the disease, GPA is an important differential to exclude in such cases.[1] However, as shown in our case, mass lesions along the midline are more suggestive of lymphoma rather than vasculitis, as previously reviewed by Pakalniskis *et al*, and a high index of suspicion should be kept.[2] Finally, perhaps more importantly, our case has highlighted the fact that cutaneous lymphoma can mimic necrotising vasculitis, so histological confirmation is strongly recommended in future similar cases.

Conflicts of interest

None declared.

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Multiple embolic strokes in a young woman

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Introduction

The list of the possible stroke aetiologies among young adults is extensive. Cerebral vascular abnormality and cardiac embolic causes are the main differentials, with the latter accounting for one-third of strokes in young adults. We present a young woman with multiple embolic strokes.

Case presentation

Our patient was a 44-year-old woman. She was known to have hypertension and chronic kidney disease. She had also been admitted to our hospital 1 year earlier with chest pain, left bundle branch block (LBBB), and minimally elevated troponin and had no significant coronary artery disease on her coronary angiography. On the most recent admission, she presented with headache and dizziness. She was hypertensive with no fever, no neck rigidity or photophobia and with normal neurological and other systemic examination. Computed tomography (CT) of the brain was done followed by lumbar puncture, and both were clear. Brain magnetic resonance imaging (MRI) showed multiple small infarctions on both cerebral hemispheres, with a clinical impression of likely multiple embolic strokes.

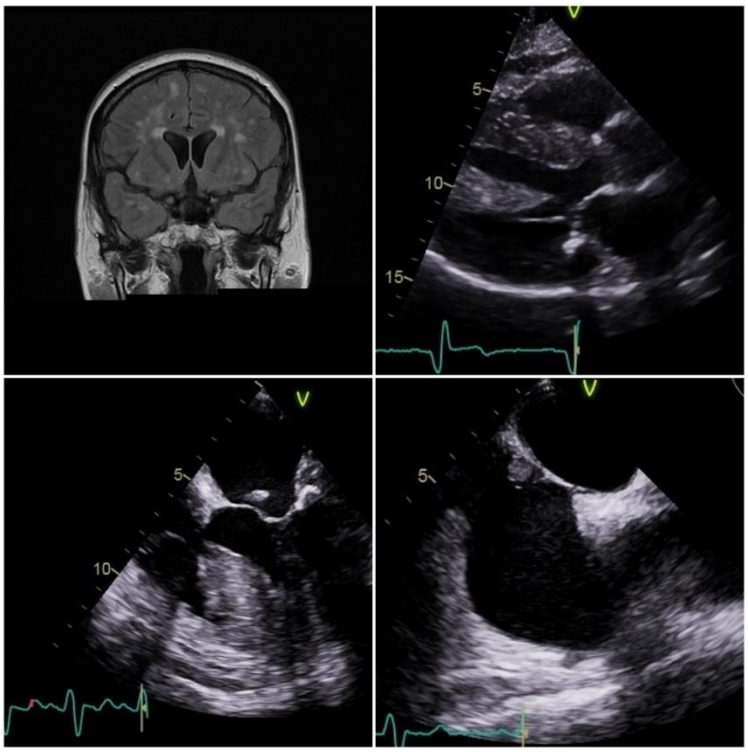
An echocardiography showed left ventricular hypertrophy (LVH), normal systolic function, thickening of both mitral valve leaflets with a small mobile mass attached to the anterior mitral valve leaflet. A transoesophageal echocardiography confirmed a small echo-dense mobile mass attached to the anterior mitral valve leaflet, as well as an accidentally discovered right atrial mass attached to the interatrial septum of unknown aetiology with no evidence of patent foramen ovale.

Urgent cardiac MRI showed a 13×10 mm mass within the inferior aspect of the right atrium with no late gadolinium enhancement (LGE), raising the possibility of a thrombus; however, myxoma could not be ruled out. It showed also a 7×4 mm mass along the atrial aspect of the anterior mitral leaflet with LGE (Fig 1). This could not be assessed due to its small size. There was LVH with the LV mildly dilated with preserved systolic function. It showed also mild LGE within the basal inferolateral wall, suggesting possible myocarditis.

Looking at all the results, there was no clear pathological correlation between both masses and the clinical impression was embolic strokes related to the left side mitral mass and an accidentally discovered right atrial mass, with a possibility of right atrial myxoma as a dual pathology. An urgent referral for surgical removal of the masses in the right atrium and from the mitral valve was then made. Histopathological examination revealed the right atrial mass was an organising thrombus and the mitral valve mass showed neutrophilic collection, fibrin, fibro-elastic fragments and a picture suggestive of inflammatory scarring and no organisms were detected.

Our patient had chronic kidney disease of no clear aetiology, multiple embolic strokes with a mitral valve mass, right atrial thrombus and evidence of focal myocarditis. A provisional working diagnosis of systemic lupus erythematosus (SLE) was made with sterile mitral valve vegetation (Libman–Sacks endocarditis). Her antinuclear antibodies (ANA) and dsDNA were negative and her Lupus anticoagulant was positive on one occasion. She was started on oral anticoagulation and was referred for renal biopsy to confirm the diagnosis, but the patient did not attend follow-up.

Fig 1. Top left: brain magnetic resonance imaging showing multiple bilateral embolic strokes. Top right: left ventricular hypertrophy with hypertrophied papillary muscles. Bottom left: anterior mitral leaflet mass. Bottom right: right atrial mass attached to the interatrial septum.



Discussion

ANA-negative SLE has been infrequently described in the literature over the past 30 years. One of the causes of negative ANA in SLE patients is persistent proteinuria with renal loss of immunoglobulins, as in our case.

Our patient had an open-heart surgery which was probably unnecessary given the position of the mass, which is atypical of myxoma, and it could be postponed pending full investigation and probably a trial of anticoagulation. However, as in most right atrial masses, there are usually diagnostic confusions (and surgical approach appeared to be the safest strategy).

Conflicts of interest

None declared.

A rare case of recurrent paradoxical embolisation

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Introduction

The reported incidence of paradoxical embolisms is relatively low, forming less than 2% of systemic arterial embolisation with patent foramen ovale (PFO) as the identified cause in more than 90% of the cases. We present an interesting case with recurrent paradoxical embolisation, despite taking anticoagulation medication.

Case presentation

A 55-year-old woman who had a background history of treated breast cancer with no other significant medical history presented to our hospital with shortness of breath and pleuritic chest pain. She was suspected to have pulmonary embolism (PE) which was proven by computed tomography pulmonary angiography (CTPA) to be massive bilateral PE. The patient was then given thrombolysis being haemodynamically unstable with a rapid satisfactory response. She was discharged on lifelong anticoagulation medication given that the PE was unprovoked.

During the following few weeks, the patient had increasing dysphasia. She had magnetic resonance imaging (MRI) of the brain that showed no vascular abnormality and showed a hyperintense focal area in the peripheral aspect of the left parieto-temporal lobe, suggesting haemorrhagic stroke with a neurologist impression of ischaemic stroke with secondary haemorrhage (Fig 1 top).

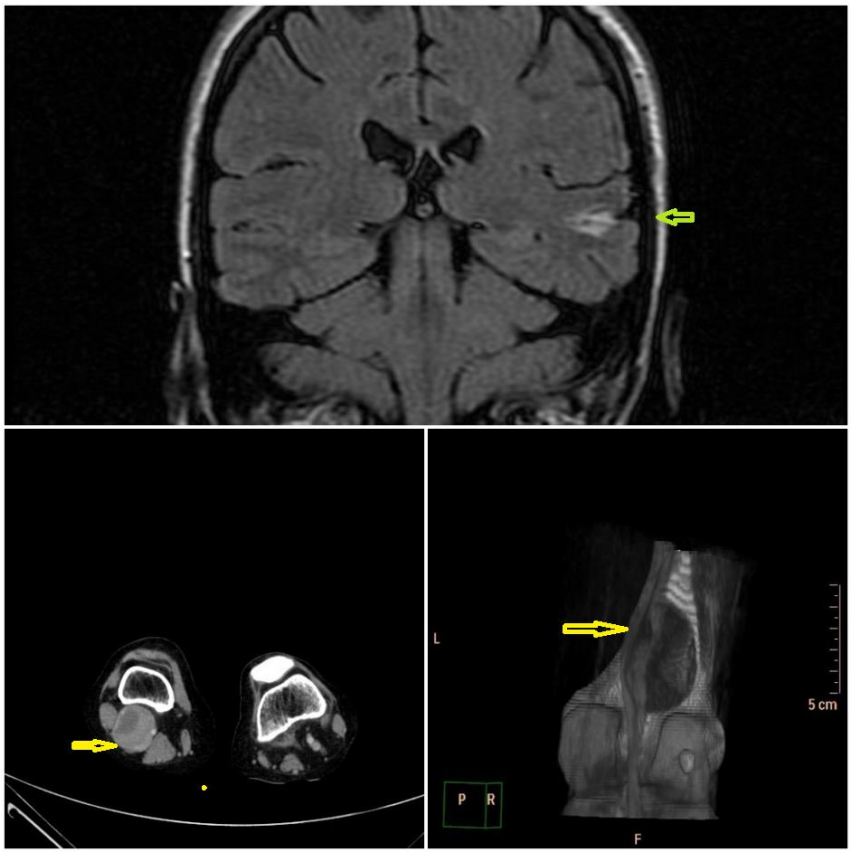
Transthoracic then transoesophageal echocardiography (TOE) was performed and confirmed a PFO with minimal right to left flow on Valsalva and with no visible defect on TOE. A diagnosis of paradoxical embolisation was made and a decision not to close the PFO was made, given that the patient would be on lifelong anticoagulation.

Our patient was stable for about 1 year when she represented with a middle cerebral artery stroke in evolution, as evidenced by a CT of the brain, and she also had symptoms suggestive of PE. This was confirmed with a CTPA, despite the patient being properly anticoagulated with warfarin with an international normalised ratio of 2.5 on admission. The patient had rapid complete recovery and a second paradoxical embolisation was confirmed, despite being well anticoagulated.

A CT of her abdomen and pelvis as well as a CT venography of both lower limbs were done and a right popliteal vein aneurysm (14×30×54 mm) filled with a thrombus was accidentally discovered (Fig 1 bottom).

Ligation of the popliteal vein aneurysm (PVA), which is the most likely substrate, was carried out by the vascular surgeon. PFO closure was also undertaken given a second paradoxical embolic stroke. The patient was stable on further follow-up for the past few years.

Fig 1. Top: parieto-temporal haemorrhagic stroke. Bottom: yellow arrows indicate right popliteal vein aneurysm with thrombus.



Discussion

PVAs are rare, with the actual incidence not known as they are usually small and asymptomatic. Cases with paradoxical embolisation secondary to PVAs are very rarely reported and to our knowledge, a recurrent paradoxical embolisation secondary to PVA was not reported before.

In our case, the exact time-related pathology between each attack of PE and the corresponding cerebrovascular accident is not clear. The patient had worsening dysphasia over 1–2 weeks after thrombolysis for PE and while on warfarin. The discovered PFO has no resting right to left flow and we assumed that the increased right-side pressure secondary to PE might have caused an increase in the right to left shunting, facilitating the passage of thrombi to the left atrium.

In our case there was a delay in discovering the potential substrate as there were no investigations done to diagnose the cause of the first PE. We aim to increase awareness about one of the rarest causes of paradoxical embolisation.

Conflicts of interest

None declared.

Correlative study of various discrimination indices for screening of beta thalassaemia trait

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Introduction

Anaemia affects about 800 million people worldwide. Major contributors are iron deficiency anaemia (IDA) and thalassaemia trait. Thalassaemia (Greek for 'sea blood') is so called because it was first discovered around the Mediterranean coast and usually affects people originating from this area and to a lesser extent Chinese, Asians and African Americans.[1] It is important to differentiate between thalassaemic and non-thalassaemic microcytosis as both conditions share many overlapping characteristics.[2] This study aimed to find out the best discrimination index to screen for thalassaemia trait cases, so that they can be subjected to haemoglobin electrophoresis for confirmation to reduce the diagnostic cost and disease burden on society.[3]

Material and methods

This was a 2-year prospective study. Six hundred and ten cases of microcytic hypochromic anaemia were selected. A complete blood count and general blood picture were carried out and seven discrimination indices were calculated, then subjected to iron studies / alkaline haemoglobin electrophoresis accordingly.

Results and discussion

The highest sensitivity was noted by the Shine and Lal index (88.16%). The highest specificity was noted by the Mentzer index (88.0%). Youden's index was found to be highest for the Shine and Lal index. As observed, the Shine and Lal index and Mentzer index can be safely relied on for cost-effective mass screening of microcytic hypochromic anaemia. Although the cut-offs of the indices are already set, they are all based on European/American Standards. Therefore, the cut-off values need to be revised to achieve the best combination of sensitivity and specificity taking into account the demographics and prevalence of nutritional anaemia, which varies from region to region. The presence of subclinical infections and latent inflammatory disorders can falsely alter the serum iron profile analysis, therefore suggesting that we probably need to redefine the cut-off for serum ferritin levels in our population on a larger level. The patients with silent β-thalassaemia trait (βTT), who exhibit near-normal haematological parameters and normal haemoglobin A2 (HbA_2) levels, are easily missed if not subjected to genetic studies.[4]

Conclusions

In an era of rising cost consciousness, prevention is the most effective way for controlling β-thalassaemia. Efficient diagnostic approaches that can rule in or out diseases with sufficient accuracy during mass screening so that the testing is minimised are particularly welcome. Though HbA_2 estimation is the gold standard for diagnosing βTT, in developing countries the Shine and Lal index, Mentzer and red blood cell distribution width index (RDWi) have good discriminative function based on sensitivity, specificity and Youden's index.

Conflicts of interest

None declared.

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Life-threatening Epstein–Barr virus (EBV)-related hepatitis in a renal transplant patient

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Case presentation

We report a case of Epstein–Barr virus (EBV)-related hepatitis in a young renal transplant patient. He developed end-stage renal failure in 2011 secondary to hypertension. He was EBV-negative and received an EBV-positive kidney from his mother in 2012. He received standard immune suppression with basiliximab followed by prednisolone, tacrolimus and mycophenolate mofetil (MMF). His post-transplant course was uneventful.

In August 2015 he developed mildly raised alanine aminotransaminase (ALT) of 93 IU/L (5–41). His doxycycline was stopped (recently started due to acne) and his ALT improved to 59 IU/L in December 2017. An EBV viral load of 253,858 IU/mL (5.4 log) was detected. A staging computed tomography (CT) was negative for post-transplant lymphoproliferative disorder (PTLD) and his MMF was halved to 250 mg twice daily. He had a further rise in ALT and EBV titres and had a liver biopsy in April 2018, showing acute EBV-related hepatitis. At this stage his MMF was stopped and he was given a trial of oral valgancyclovir, but it made no difference in 2 weeks of treatment.

In July 2018, he had a relentless rise in EBV viral load to >2,000,000 IU/mL (6.35 log) and acute liver failure (bilirubin 176 µmol/L, ALT 523 IU/L and alkaline phosphatase (ALP) 939 IU/L). His tacrolimus was stopped and prednisolone increased to 20 mg once daily. A repeat CT and another liver biopsy did not show evidence of PTLD, but confirmed florid hepatitis due to EBV. He was negative for hepatitis A, B, C, E, adenovirus, HIV and cytomegalovirus.

At this stage he developed transplant dysfunction, probably secondary to hepatorenal syndrome or rejection. We did not perform a renal transplant biopsy as in case of rejection we were unable to increase his immune suppression due to florid EBV viraemia. He became anuric and dialysis dependent. EBV mainly infects B cells, therefore we treated him with four doses of anti-CD20 monoclonal antibody (rituximab) at 375 mg/m^2. His liver functions recovered, his transplanted kidney began to function and he stopped dialysis after 7 weeks. At this stage he was commenced on low-dose tacrolimus, aiming for a level between 3 and 5 µg/L.

In January 2019 his EBV titres went up again to 938,000 IU/mL with increases in ALT, ALP and gamma-glutamyl transferase (GGT). Another CT and a positron emission tomography (PET) did not show evidence of PTLD. Therefore, he was given only one dose of rituximab. This has led to reduction in EBV viral load and normalisation of liver function tests.

This is a first report of EBV-related acute hepatitis in a renal transplant recipient. Acute hepatitis in the context of EBV infection is usually a self-limiting illness; however, this case was complicated by the need for immune suppression for maintaining renal transplant function. B-cell lysis with rituximab leads to a significant reduction in EBV viral load and may have a preventive role in future development of PTLD.

Conflicts of interest

None declared.

Atypical presentation of Addison's disease

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Abstract

Hyponatraemia is a relatively common electrolyte problem encountered in hospitalised patients and it carries significant morbidity and mortality. It is challenging to spot the exact cause of hyponatraemia especially when it is associated with multiple comorbidities, such as hypothyroidism, obesity and lymphoedema. We present a case of hyponatraemia in a patient with known hypothyroidism and lymphoedema. Initially the patient was fluid restricted, considering hypervolemic hyponatraemia due to lymphoedema and hypothyroidism, but following a continued drop in sodium levels, the diagnosis was reconsidered. Thorough examination showed hyperpigmentation which directed the measurement of cortisol levels. That resulted in a diagnosis of Addison's disease and rapid recovery of the patient occurred after steroid replacement.

Case presentation

An 81-year-old woman presented with a complaint of generalised weakness and lethargy for 3 weeks. She had a background of hypothyroidism, osteoarthritis, bilateral long-standing lymphoedema and tuberculosis. Her initial bloods showed the following levels: sodium (Na) 114 mmol/L, potassium 4.8 mmol/L, urea 6.7 mmol/L, creatinine 83 µmol/L and thyroid stimulating hormone 31 mIU/L, T4 was 8 pmol/L. She was managed with fluid restriction based on lymphoedema secondary to hypothyroidism developing due to poor compliance with thyroxine. Her Na levels failed to improve, but rather worsened to 112 mmol/L on the second day post-admission. Her serum and urine osmolalities were 248 mOsmol/kg (low) and 360 mOsmol/kg, respectively. On closer examination she had tanning of the skin, and her 9am cortisol level was low (238 nmol/L). A short Synacthen test was arranged and showed no improvement at all after 15, 30 and 60 minutes post-Synacthen injection. A diagnosis of Addison's disease was further supported with computed tomography of the abdomen that showed bilateral adrenal calcification post-infection. She was treated with intravenous hydrocortisone and made a rapid recovery. Thyroxine was started from the next day. Her Na improved to 118 mmol/L and later to 124 mmol/L. Her adrenocorticotrophic hormone (ACTH) level came back as high (108 ng/L) and confirmed the diagnosis of Addison's disease.

Discussion

To diagnose hyponatraemia, the first step is to confirm hypotonic hyponatraemia by serum osmolality, followed by assessment of the volume status and urine osmolality. In our patient, assessment of her volume status was complicated due to lymphoedema. And under substitution of levothyroxine could have contributed to hyponatraemia.

The usual initial management for hyponatraemia is fluid restriction, which is not helpful in hypocortisolism where aldosterone deficiency leads to increase urinary excretion of Na, which results in a decrease of intravascular volume. Hypotension and decreased cardiac output cause an increase in secretion of antidiuretic hormone (ADH) from posterior pituitary to absorb more water, leading to further reduction in Na concentration. There is no negative feedback to suppress ADH from the low level of cortisol, hence fluid restriction alone doesn't improve the serum Na level and hydrocortisone replacement is needed to improve the Na level.

The most common cause of Addison's disease is autoimmunity in the UK, although tuberculosis is still the leading cause worldwide.

Learning points

- In hyponatraemia, serum osmolality, urine osmolality and urine Na should be tested, then assess the volume status of the patient to identify the cause of hyponatraemia.
- If the patient is not responding to fluid restriction, Addison's disease should be considered.
- Tuberculosis is the most common cause of Addison's disease worldwide, although autoimmune causes are common in the UK.

Conflicts of interest

None declared.

When a crisis hits: bilateral adrenal haemorrhage – a case report

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Introduction

We present a case of adrenal insufficiency secondary to bilateral adrenal haemorrhage (BAH) caused by heparin-induced thrombocytopenia (HIT).

Case presentation

A 76-year-old woman was admitted with a distal femur fracture. This was managed surgically with a gamma nail and she made a good postoperative recovery. Postoperative venous thromboembolism (VTE) prophylaxis was with subcutaneous dalteparin 5,000 units daily. She remained in hospital for ongoing rehabilitation with the aim to discharge her directly home.

On day 5 of her inpatient stay, she developed a urinary tract infection which was managed with oral antibiotics. She then developed non-specific, generalised, severe abdominal and chest pain. Initial clinical examination was unremarkable, as were electrocardiography and chest X-ray. Laboratory parameters were normal including a high-sensitivity troponin. Subsequent surgical review noted that she had raised blood pressure (>200 mmHg systolic). Abdominal computed tomography (CT) revealed a 3 × 2 cm left supra/para-renal retroperitoneal mass. Hypertension persisted and she developed a low-grade fever (37.5°C) associated with confusion and a reduction in consciousness level. The following day she developed delirium and collapsed due to profound postural hypotension. Magnetic resonance imaging (MRI) of the adrenal glands was performed, which showed a new right-sided adrenal mass and an unchanged left-sided mass; concern was raised for adrenal haemorrhage. CT pulmonary angiography demonstrated a small subsegmental pulmonary embolus. CT of her head was normal.

Blood tests showed a platelet count of 53 × 10^9/L (admission count 233), a sodium of 128 mmol/L (admission 139 mmol/L) but a stable haemoglobin and potassium. There were rising inflammatory markers. She was discussed with the haematologists, who requested a D-dimer (raised at 72,514 ng/mL) and fibrinogen (normal at 3.0 g/L). The causes of the new thrombocytopenia were reviewed and the possibility of HIT was raised. Her 4T score, a validated tool for assessing pre-test probability for HIT,[1] was 7 which confirmed a high possibility for HIT. HIT enzyme-linked immunosorbent assay (ELISA) was positive. Her dalteparin was stopped and she was commenced on subcutaneous fondaparinux.

Random serum cortisol was assayed due to the bilateral adrenal changes on CT and marked postural drop. This was low at 32 nmol/L and a short Synacthen test (SST) showed no adrenal function. She was commenced on hydrocortisone and made a rapid recovery. She was discharged home with endocrine follow-up. Her drug allergies were updated to include heparin.

Subsequent MRI demonstrated complete resolution of the adrenal haemorrhage, but repeat SST showed no improvement in adrenal function.

Discussion

HIT is a known cause of thrombocytopenia, but it subsequently causing BAH is less recognised. Case reports demonstrate that common signs and symptoms are non-specific but can include abdominal pain, confusion and low-grade fever.[2–5] HIT is more common with unfractionated heparin and following orthopaedic surgery,[4,5] although it can happen with low molecular weight heparin[2,4,5] or spontaneously.[3]

HIT can be easily missed and is therefore important to consider in an acutely unwell and deteriorating patient with thrombocytopenia. Furthermore, BAH should feature as a differential diagnosis of thrombotic complications following HIT.

Conflicts of interest statement

None declared.

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One night in Venus, a lifetime with Mercury

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Introduction

Syphilis is known as the great mimicker in medicine because its non-specific symptoms can resemble many other diseases. It can often be overlooked by clinicians who only see syphilis infrequently. Syphilis is easy to cure in its early stages, but if left untreated, people can be left with debilitating complications.

The disease should be considered in all patients with multiple unexplained clinical presentations.

Materials and methods

A 54-year-old man with non-simultaneous indeterminate symptoms was seen by several medical specialties. He had a battery of investigations, which did not explain his symptoms.

He had headaches, which were treated as possible giant cell arteritis and a florid maculopapular rash, which was diagnosed as drug-related rash. His tongue ulcer had an unremarkable biopsy.

Six months from the onset of his first systemic symptom, he developed a relative scotoma in his vision. Examination findings were consistent with acute syphilitic posterior placoid chorioretinitis (ASPPC). Subsequent serology testing confirmed the diagnosis of syphilis.

His collective symptoms were reviewed in light of his new systemic diagnosis.

Results and discussion

The patient was treated with steroids and anti-treponemal medications (procaine benzylpenicillin and probenecid).

Diagnosing the patient before the disease progresses to its later stage has given him a better prognostic outlook.

Conclusion

This case highlights the importance of having a low threshold for investigating for syphilis in patients with multiple unexplained symptoms, and extends the context of ASPPC as a rare manifestation of syphilis.

Concise medical history taking helps in pointing to the relevant investigations and earlier diagnosis. Optimal management of syphilis involves multidisciplinary team input.

Conflicts of interest

None declared.

The Lewisham and Greenwich idiopathic intracranial hypertension cohort: a retrospective study

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Introduction

Idiopathic intracranial hypertension (IIH) is a syndrome of raised intracranial pressure without hydrocephalus or mass lesion and normal cerebrospinal fluid (CSF) constituents. Incidence and prevalence of IIH are rising, and this is anticipated to have a significant economic impact on healthcare systems.[1] We reviewed the Lewisham and Greenwich NHS Trust experience of IIH over the past 6 years. We sought to characterise a cohort of patients and explore the admissions rate, assess the influence of medical and psychiatric comorbidities and determine the health economic impact of IIH.

Methods

We systematically searched the hospital database for new diagnoses of IIH from 2013–19 across hospital sites at the Lewisham and Greenwich NHS Trust. IIH was defined using the modified Dandy criteria.[2] Data were collected retrospectively and included patient demographics, body mass index, number of admissions for IIH, visual assessment at diagnosis and most recent follow-up, treatment, and medical and psychiatric comorbidity. Cost analysis was based upon NHS tariff values for the time of admission.

Results and discussion

A total of 47 new diagnoses of IIH were identified from 2013–19. The average age of patients was 29 years and 96% were female (45/47). The number of new cases in 2018 was 3.5 times higher than in 2013.

There were 120 admissions for 36 patients. Eleven patients were managed as outpatients. Nineteen patients (40%) were admitted on more than one occasion, consistent with a national rate of 38%.[3] The annual number of admissions rose by a factor of 22 from 2013 to 2019 (1 to 22). The annual relapse rate was 1.75. The mean length of stay was 8.61 days, four times greater than the national average of 2.7.[3]

The most common medical comorbidities were gynaecological (21/47; 45%) and respiratory (12/47; 25%) conditions. A psychiatric history was present in 38% (18/47) of patients.

More than half of the patients required therapeutic lumbar puncture in addition to medical therapy (55%). The average number of therapeutic lumbar punctures was 2.62. Two patients (4%) were referred for CSF diversion procedures. Only 8.5% (4/47) of patients reported an intolerance or non-compliance to medication. Thirteen patients (28%) had a history of medication use associated with causing IIH.

The mean body mass index was 37 kg/m^2. Weight loss was reported by 17% (8/47) of patients. Only 15% (7/47) of patients were referred to a dietitian.

Ophthalmology assessment was available for 39 patients. Of these, 77% (30/39) had papilloedema on initial presentation. This resolved on the most recent ocular assessment in 43% (13/30). The average initial visual acuity was measured at 6/7.5. The most recent average visual acuity was 6/6.

The annual hospital costs of IIH rose 50 times over a 6-year period, from £1,316.78 to £66,879.14.

Conclusion

The number of new cases of IIH is rising. Admission rates are rising yearly. This is unlikely to improve with the global obesity epidemic. These findings highlight the unmet need for an efficient pathway to reduce admissions and focus on prevention.

Conflicts of interest

None declared.

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Psychogenic stridor: an overlooked cause of acute stridor in the acute medical unit?

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Introduction

Acute onset stridor is an alarming presentation for acute physicians, leading to high suspicion of organic pathology with immediate management directed towards the suspected diagnosis. One of the uncommon and overlooked causes of stridor in younger people is a vocal cord dysfunction, also called psychogenic stridor. It is often underappreciated and misdiagnosed in clinical practice, leading to overtreatment with unnecessary medications and development of significant side effects. A couple of those presentations were encountered in our acute medical unit and how they were managed is discussed here.

Case presentations

Case 1

A 21-year-old woman was admitted with acute onset stridor following a 3-day history of sore throat and failure to respond to initial general practitioner management with oral steroid and salbutamol inhaler. She had a background history of anaphylaxis to nuts, allergy to penicillin and bilateral tonsillectomy.

On examination she was mildly tachycardic, tachypnoeic and pyrexic, but normotensive and had no desaturation with predominately inspiratory stridor.

She reported similar features when she had had an anaphylaxis reaction in the past, but denied eating nuts/nut products and taking over-the-counter medications. She was treated for a possible anaphylaxis reaction by giving a stat dose of intramuscular adrenaline, injection of hydrocortisone, antihistamine, salbutamol nebuliser and adrenaline nebuliser. Her symptoms failed to improve and she became more tachycardic with chest discomfort. Electrocardiography (ECG) showed sinus tachycardia (130 beats per minute) with no ischaemic changes.

An urgent ear, nose and throat (ENT) assessment with flexible nasendoscopy excluded organic pathology. Arterial blood gases, routine blood tests and chest X-ray were unremarkable, as was her peak flow meter reading. A diagnosis of vocal cord dysfunction with viral illness was made. She improved with supportive management.

Case 2

A 24-year-old man, generally fit and well, was admitted with a 1-day history of dry cough and intermittent stridor. He was not in distress but observations showed tachycardia, and saturation was 98% on 1 L oxygen. He was able to complete a sentence, but there was obvious stridor. Chest examination revealed good air entry with no wheeze. Full otolaryngological examination by ENT was normal. The chest X-ray, ECG and blood tests were unremarkable.

Due to his stridor, a stat dose of adrenaline nebuliser was given but reactionary tachycardia and chest discomfort were observed, which later settled on stopping the treatment. After having further ENT review for ongoing intermittent stridor, he was diagnosed with a dysfunctional vocal cord. He was reassured and discharged.

Discussion

Psychogenic stridor is sometimes difficult to treat as it is misdiagnosed and overlooked. Thorough history taking, physical examination and direct visualisation of the upper airway are crucial to rule out the organic causes. The treatment for psychogenic stridor is supportive management with reassurance.

Conclusion

There have been previous case reports in the literature where vocal cord dysfunction was mistakenly treated as asthma. Our two cases add to the growing evidence of the importance of early recognition and correct diagnosis of psychogenic stridor so as to prevent significant iatrogenic complications.

Conflicts of interest

None declared.

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Mechanisms of exertional angina in patients with normal coronary arteries

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Background

Forty per cent of patients undergoing angiography to investigate exertional chest pain have normal coronary arteries. While described for nearly half a century, this condition has remained a mechanistic enigma.[1–2] Diminished coronary blood flow augmentation to a pharmacological vasodilator, or coronary microvascular dysfunction (MVD), portends a greater risk of major adverse cardiovascular events.[3–4] However, patients report symptoms during physical exercise, and the response to pharmacological 'stress' and physical exercise differ in the healthy heart.[5] Moreover, it is unclear whether MVD is confined to the coronary circulation or a generalised disorder in myocardial and systemic blood flow during stress.

Aims

To identify whether patients with MVD have abnormal coronary blood flow during physical exercise, generalised systemic endothelial dysfunction and abnormal global myocardial blood flow during stress.

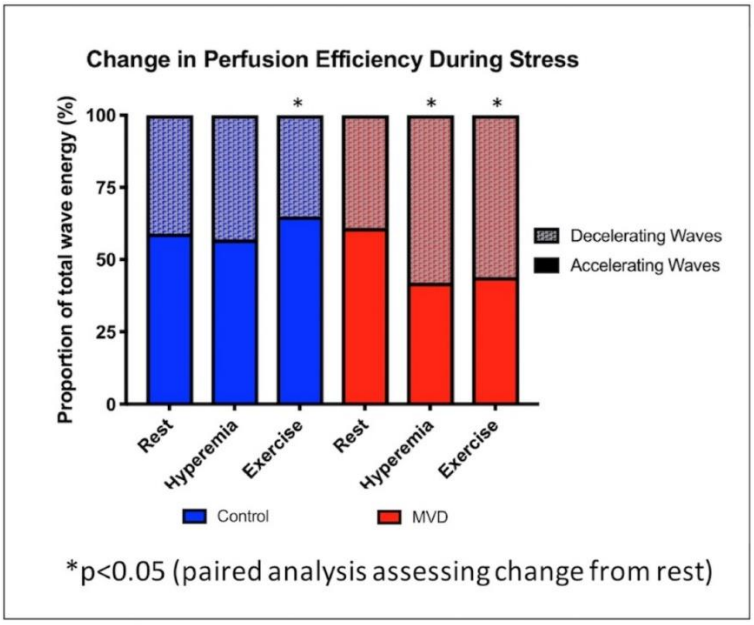
Method

Patients with angina and unobstructed coronary arteries underwent simultaneous acquisition of intra-coronary pressure and flow during rest, supine bicycle exercise and pharmacological vasodilatation with adenosine (hyperaemia), in the catheter laboratory. Coronary flow reserve (CFR) was calculated as hyperaemic coronary blood flow (CBF) / resting CBF.[6] Wave intensity analysis quantified the proportion of accelerating wave energy (perfusion efficiency), a measure of the dynamic interaction between the contracting myocardium and interweaving coronary vasculature during the cardiac cycle, or cardiac–coronary coupling.[5] Forearm blood flow ratio (FBF) was assessed to acetylcholine and N^G-monomethyl-L-arginine (L-NMMA) infusions, an endothelial-dependent dilator and nitric oxide synthase inhibitor.[7] Global myocardial blood flow and subendocardial:subepicardial perfusion ratio (endo/epi) were quantified using 3-Tesla cardiac magnetic resonance imaging (MRI) during hyperaemia and rest; inducible ischaemia was defined as hyperaemic endo/epi<1.0.[8] Myocardial perfusion reserve (MPR) was calculated as hyperaemic myocardial blood flow / resting myocardial blood flow.[9] Patients were classified as having MVD if CFR<2.5 and controls if CFR≥2.5, with researchers blinded to the classification.[10]

Results

A total of 95 patients were enrolled (57±10 years, 81% women); 52 were classified as having MVD and 43 as controls. Microvascular resistance (MR) and CBF during peak exercise were similar in MVD and controls (4.5±1.6 vs 4.7±1.6 mmHg/cm/s and 30±10 vs 27±8 cm/s; p=0.68 and p=0.15). However, patients with MVD had higher systolic blood pressure and rate–pressure product (172±29 vs 155±29 mmHg and 20,486 vs 17,550 beats per minute*mmHg; both p=0.02). From rest to stress coronary perfusion efficiency improved in controls, whereas a paradoxical reduction occurred in those with MVD (59±11% to 65±14%; p=0.02 vs 61±12% to 44±10%; p<0.001; Fig 1). Patients with MVD had attenuated FBF augmentation to acetylcholine and exaggerated reduction to L-NMMA (3.6±1.8 vs 4.5±2.0 and 0.53±0.14 vs 0.78±0.09; p=0.02 and p<0.001). Those with MVD had a higher rate of inducible myocardial ischaemia and reduced MPR (22% vs 82% and 2.0±0.4 vs 2.7±0.5; both p<0.001).

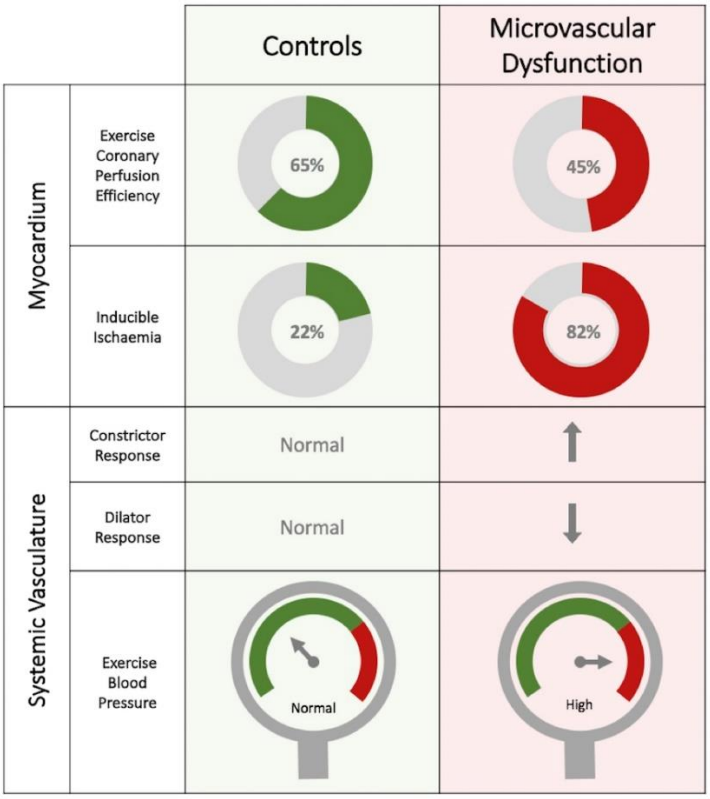
Fig 1. Changes in coronary perfusion efficiency (a measure of cardiac–coronary coupling) from rest to stress. MVD = microvascular dysfunction.



Conclusions

Compared with controls, MVD is associated with abnormal cardiac–coronary coupling during exercise, systemic endothelial dysfunction and hypertension with resultant increased myocardial oxygen demand. These pathophysiological changes act in concert to produce global myocardial ischaemia during stress and may underlie the higher incidence of cardiovascular morbidity observed in this population (Fig 2). The nitric oxide synthase pathway may represent a novel therapeutic target and should be the subject of future work; currently no disease-modifying therapy exists specifically for MVD.

Fig 2. Summary of cardiac and systemic responses to stress in microvascular dysfunction compared with controls.



Conflicts of interest

None declared.

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Sinus venous thrombosis: a rare complication of varicella zoster virus

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Introduction

Varicella zoster virus (VZV), a ubiquitous deoxyribonucleic acid (DNA) virus, is one of eight known human herpesviruses. Primary infection occurs via aerosols from skin vesicles from an infected person with varicella or zoster, resulting in the characteristic disseminated rash of varicella. VZV is also known to cause vasculopathy. It is associated with productive viral infection in arteries, as evidenced by the presence of multinucleated giant cells, herpesvirus particles, VZV DNA and VZV antigen in arteries.[1] Autoantibodies to phospholipids and coagulation proteins (during or after varicella) may play a role in the occlusion of cerebral arteries.[2]

Case presentation

We present a case of a 36-year-old man who developed extensive cerebral venous sinus thrombosis following primary VZV infection. The patient present to the emergency department (ED) with a 12-hour history of upper and lower limb weakness which was associated with severe headache. There was no swallowing difficulty or vision changes. However, the patient reported that he had chickenpox 1 week prior, for which he used topical lotion. On examination, the patient had a muscle power score of 1 out of 5 in his left upper and lower limb; the rest of the neurological examination was normal. He was also found to have some fresh lesions and some crusted lesions over trunk, upper and lower limbs. An immediate computed tomography (CT) with contrast was carried out, which showed filling defect in the superior sagittal sinus confluence, both transverse and left sigmoid sinuses consistent with dural venous sinus thrombosis (Fig 1). Neurology and infectious disease consultations were carried out. The patient was started on intravenous acyclovir and therapeutic dose subcutaneous enoxaparin. Magnetic resonance imaging (MRI) was undertaken the following day, which confirmed the same findings of dural venous sinus thrombosis (Fig 2). On day 3 of hospitalisation, the patient started to regain power in his left upper and lower limb. He was moved to the rehabilitation ward where he received intensive rehabilitation. After 2 weeks the patient was discharged with normal power in his left upper and lower limb. We recommended subcutaneous enoxaparin for a total of 6 months.

Fig 1. Computed tomography of the head (arrow showing dural sinus thrombosis).

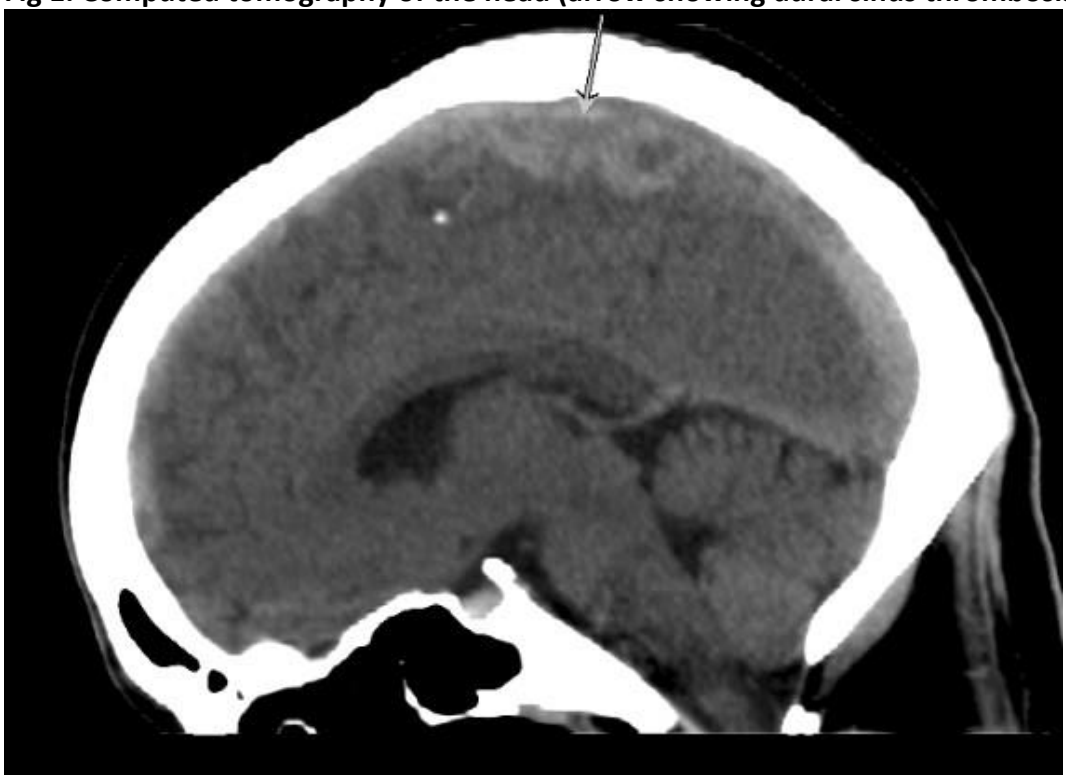
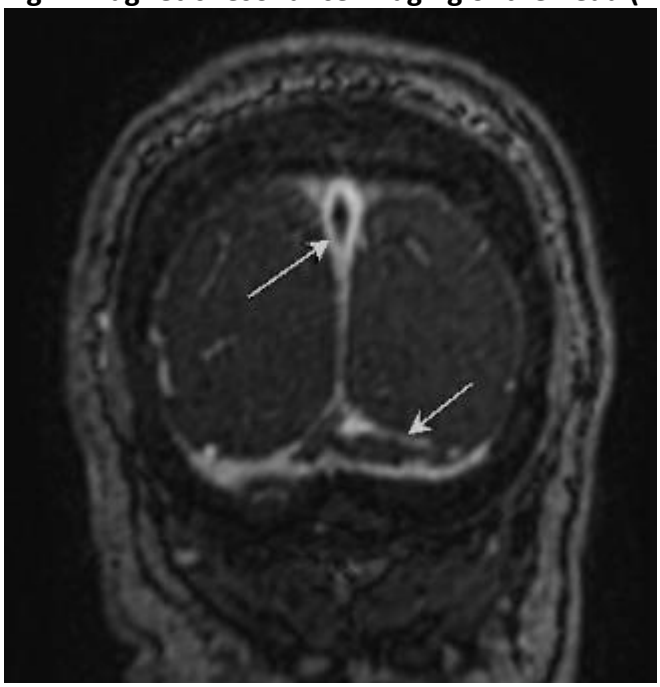


Fig 2. Magnetic resonance imaging of the head (white arrows showing dural sinus thrombosis).



Conclusion

We report on this case to raise awareness among clinicians so that this rare complication of primary VZV can be recognised in a timely manner and managed immediately, as this can be lifesaving.

Conflicts of interest

None declared.

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Association of critical illness scores (q-SOFA and APACHE) and multimorbidity in patients admitted to internal medicine step down units

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Introduction

A large number of patients worldwide have multimorbidity (two or more chronic diseases). In the past few decades, the prevalence of multimorbidity has been rising steeply and managing such patients is a challenge.[1] The majority of these patients are admitted to step down units or SDUs (rather than intensive care units). Mortality among these patients is around 10%, so it is important to assess the severity of illness to guide prognosis. There are various scoring systems developed in this context to calculate the severity of illness.[2] These scoring systems aim to help physicians estimate disease severity, identify possible outcomes and prepare them for the appropriate management.[3] We aimed to determine the level of illness by using two different scoring systems: the quick Sequential Organ Failure Assessment Score (q-SOFA) and Acute Physiology and Chronic Health Evaluation (APACHE).

Methods

We carried out a cross-sectional analytical study which included adult patients aged >18 years admitted to SDUs at the Aga Khan Hospital in 2016. Data were acquired for a sample of 1,191/3,500 patient records, and data for 1,002/1,191 patients were included in the study. Data on demographics, comorbid conditions, admitting diagnosis, laboratory investigations, mortality and readmission to SCU from the ward/emergency room was recorded. APACHE II was used, comprising 12 physiological variables, age and chronic health evaluation. Q-SOFA utilises blood pressure, respiratory rate and the Glasgow Coma Scale (GCS) to calculate the severity of critical illness.

Results

The study included 1,002 patients with a mean (standard deviation (SD)) age of 62.2 (16.5) years; 493 (49.2%) were men and 923 (92.1%) were full-code (ie they had given permission for resuscitation, intubation and ventilator support). These 1,002 patients had major comorbidities and included 549 (54.8%) with diabetes, 708 (70.7%) with hypertension, 282 (28.3%) with ischaemic heart disease (IHD), 109 (10.9%) with chronic obstructive pulmonary disease (COPD) / asthma and 263 (26.2%) with chronic kidney disease.

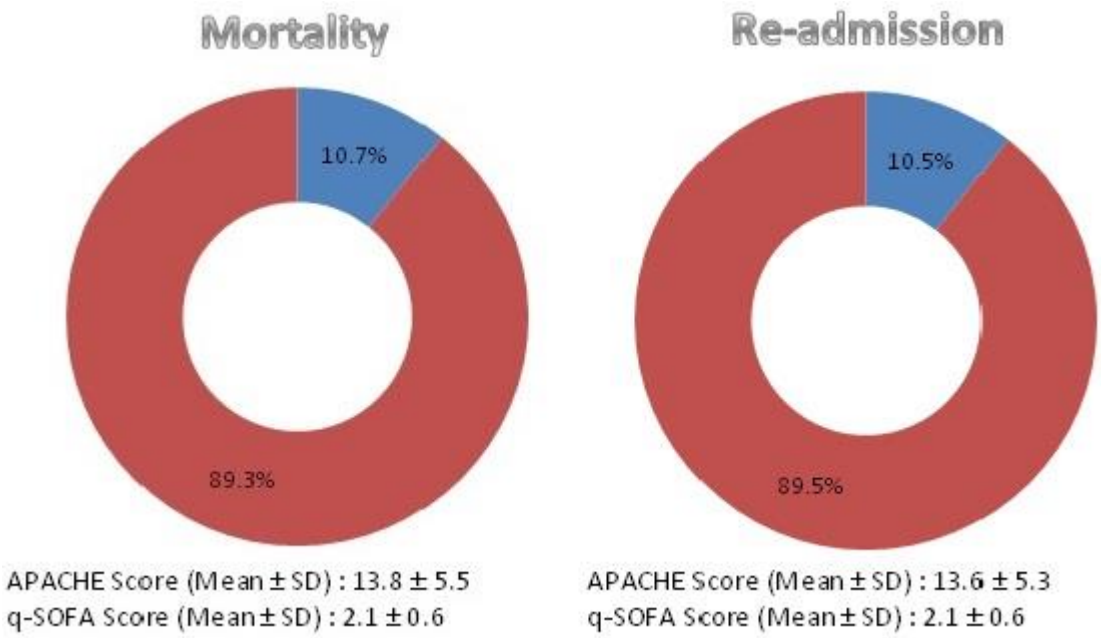
Multimorbidity was found in 888 patients (88.8%). Comparison of q-SOFA with multimorbidity showed a mean score of 1.8 with SD of 0.6 in multimorbid patients, with a mean score of 1.8 with SD of 0.6 in non-multimorbid patients (p=0.940). Comparisons of APACHE II with multimorbidity showed a mean score of 13.1 with SD of 5.1 in multimorbid patients, with a mean score of 7.4 with SD of 4.7 in non-multimorbid patients (p-value 0.000). See Table 1 and Fig 1.

Table 1. Top five admitting diagnoses in 2016 in the internal medicine step down unit with their mean scores

Diagnosis	n=1,002 (%)	q-SOFA	APACHE II
		Mean±SD	Mean±SD
Acute kidney injury or chronic kidney disease	399 (39.8%)	1.8±0.6	14.7±4.8
Pneumonia	291 (29.0%)	1.8±0.6	12.7±5.1
Urinary tract infection	211 (21.1%)	1.8±0.6	13.4±5.1
Pulmonary oedema / heart failure	171 (17.1%)	1.7±0.6	14.2±5.2
Sepsis / septic shock	159 (15.9%)	1.9±0.6	13.6±5.2

q-SOFA = quick Sequential Organ Failure Assessment Score; APACHE = Acute Physiology and Chronic Health Evaluation.

Fig 1. Mortality and readmission scores using APACHE and q-SOFA.



Conclusion

APACHE had a direct association with multimorbidity when compared with q-SOFA. Patients with multimorbidity had a high APACHE score, indicating that they were at higher risk of mortality. We conclude that APACHE is a better predictor of illness in patients admitted to SDUs.

Conflicts of interest

None declared.

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A rare case of confusion

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Case presentation

An 87-year-old woman, previously fully independent, was admitted to the oncology ward with a myriad of symptoms: bilateral hearing impairment, dizziness, unsteadiness, inability to walk, weakness and confusion for 2 weeks. She had a history of urothelial bladder cancer with predominantly liver and nodal involvement. She had transurethral resection of a bladder tumour in 2016 and completed adjuvant radiotherapy and chemotherapy, which comprised standard gemcitabine and carboplatin. Unfortunately, her cancer progressed and she was started on pembrolizumab in April 2018; mid-scan she showed good response to treatment by RECIST criteria.

Clinical examination revealed slightly reduced power in her lower limbs and bilateral hearing impairment. Blood test results were unremarkable except for mild hyponatraemia (130 mmol/L). Inflammatory markers were not high. Measurements of serum glucose, thyroid function test, hydroxycobalamin, folate, calcium, cortisol and arterial blood gas were normal. Computed tomography (CT) and magnetic resonance imaging (MRI) of her head did not show any significant pathology. A neurologist gave a differential diagnosis of metastasis to skull base and hearing apparatus, viral or immunotherapy-related encephalitis and non-convulsive status epilepticus. Intravenous acyclovir and methylprednisolone (5 days) were started empirically.

On further neurological tests, electroencephalography (EEG) showed mild encephalopathy but no features of epileptic activity or encephalitis, and lumbar puncture showed high cerebrospinal fluid (CSF) protein (1.6 g/L) and low glucose (0.7 mmol/L). In culture, no organism was grown. Extended viral PCR and an autoimmune encephalitis screen were negative. Unfortunately, cytology showed atypical cells consistent with malignant meningitis. Immunohistochemistry revealed that both cytokeratin (CK) AE1/3 and CK7 were positive. CK20 and S100 were negative. Tumour cells were consistent with metastatic carcinoma cells and compatible with cells from her known bladder cancer.

After a lengthy discussion with the patient's family, we adopted a best supportive care approach as the prognosis is guarded, especially with involvement of the central nervous system. This case illustrates that diagnosis of carcinomatous meningitis can be difficult, as the heterogeneous nature of presentation often delays the diagnosis.[1,2]

Conflicts of interest

None declared.

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Pneumonia in a young adult, a cause not to be missed

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Case presentation

A 19-year-old man was admitted to the acute medical unit overnight with 2 days' history of cough, fever and shortness of breath. He did not have any other symptoms or signs. He was treated as having community-acquired pneumonia with intravenous benzylpenicillin and clarithromycin. He was previously fit and healthy without any significant past medical problems apart from two episodes of chest infection, which had been treated with courses of oral antibiotics in the general practitioner clinic.

On examination, he was very dyspnoeic and hypoxic. A chest X-ray (CXR) showed left lower lobe consolidation with reduced lung volume on that side. In short period of time, he became more and more hypoxic and needed high-flow oxygen. Hypoxia was out of proportion to pneumonia in a young fit man. He had no history of immobility, no recent operation or calf swelling. Computed tomography of his thorax showed a collapsed left lower lobe and a tumour mass obstructed at the distal end of the left bronchus. Subsequently, the patient had bronchoscopy and the tumour mass was resected. Histology showed it to be a carcinoid tumour. Retrospectively, he did not have any symptoms of carcinoid syndrome. His left lung was completely re-expanded after tumour resection and he was discharged. Unfortunately, repeat bronchoscopy showed regrowth of the tumour mass and eventually he had a left pneumonectomy.

This case highlights the need to think about an underlying cause in a patient with recurrent chest infections / pneumonia, not to miss lung collapse in CXR with reduced lung volume and to find out the reason if a patient is hypoxic disproportionately to the current problem.

Conflicts of interest

None declared.

Eosinophilic granulomatosis with polyangiitis (Churg–Strauss syndrome) masquerading as acute coronary syndrome

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Case presentation

A 74-year-old man with a history of ankylosing spondylitis presented with a 5-day history of feeling generally unwell. He complained of burning retrosternal chest pain, cough productive of white sputum, shortness of breath, confusion, fevers and fatigue. He also mentioned seeing transient flashing lights. On examination, he had bibasal crackles on auscultation and splinter haemorrhages on his fingernails and toenails. Investigations revealed raised inflammatory markers, a raised white cell count (notably with a high eosinophilia), a raised troponin and D-dimer. Electrocardiography (ECG) showed incomplete right bundle branch block with left axis deviation and a chest X-ray was normal.

Initially, the patient was treated according to the acute coronary syndrome (ACS) protocol and was transferred to the coronary care unit. Following admission, he was investigated for infective endocarditis, but serial blood cultures were negative and echocardiography found no vegetations. Further investigations excluded parasitic infections and autoimmune conditions. The patient later developed slurred speech and decreased coordination. Computed tomography (CT) of his head showed a small low attenuation area in the right superior frontal lobe, reported as likely recently established ischaemic infarcts. CT of his chest/abdomen/pelvis excluded localised infections and occult malignancy, but showed a small pericardial effusion, pre-existing ankylosing spondylitis and bibasal pulmonary collapse/consolidation. Autoimmune screening showed a weak/moderately positive result for perinuclear anti-neutrophil cytoplasmic antibodies (pANCA) and a raised IgG. The diagnosis was eosinophilic granulomatosis with polyangiitis (EGPA) and the patient was treated with pulsed doses of intravenous methylprednisolone followed by oral prednisolone.

Background

EGPA (Churg–Strauss syndrome) is a rare autoimmune anti-neutrophil cytoplasmic antibody (ANCA)-associated vasculitis. According to the Revised International Chapel Hill consensus conference nomenclature of vasculitides (2012), it is defined as an eosinophil-rich and necrotising granulomatous inflammation often involving the respiratory tract, and necrotising vasculitis predominantly affecting small- to medium-sized vessels, associated with asthma and eosinophilia.[1,2] The condition is a multisystem disorder and therefore often has non-specific presentations and multi-organ involvement. Typically, it has three stages of symptoms: the allergic stage, the eosinophilic stage and the vasculitic stage. These phases do not always occur sequentially and individuals may not develop all three phases. Phases last from 6 months to two years.[3] There are few described cases of EGPA with cardiovascular presentations; manifesting as an ACS, acute myocarditis and cardiogenic shock, isolated cardiac tamponade, eosinophilic endomyocarditis with rapidly progressive diastolic dysfunction, the formation of apical thrombosis of both ventricles and ventricular tachycardia.[4] The Lanham criteria and the American College of Rheumatology criteria are used for diagnosis, but blood tests are diagnostically useful. pANCA is positive in 40–60% of cases, eosinophilia is common but transient and elevation of IgG4 is also common.[5,6] Treatment involves corticosteroids and cyclophosphamide (for remission induction), azathioprine and methotrexate (for remission maintenance) and B-cell depletion with rituximab has shown promising results for remission induction.[1]

Conclusion

EGPA is a rare autoimmune condition with non-specific presentations and multi-organ involvement. Eosinophilia, raised inflammatory markers and raised pANCA can be the clues for diagnosis, but raised troponin and D-dimer tests are sometimes misleading.

Conflicts of interest

None declared.

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An atypical tension pneumothorax

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Introduction

Eosinophilic oesophagitis is a rare and chronic inflammatory disorder, with spontaneous oesophageal rupture reported in a handful of anecdotal case reports. We present an unusual case of delayed tension pneumothorax following occult oesophageal rupture, posing a significant diagnostic conundrum.

Abstract

A 29-year-old man with eosinophilic oesophagitis and asthma presented with chest pain and vomiting. Several hours later he developed loin to groin pain, pyrexia and renal angle tenderness. A urine dipstick was positive for blood and his inflammatory markers were significantly elevated. A chest X-ray (CXR) was unremarkable. Computed tomography (CT) urography excluded a calculus; however, it demonstrated left-sided consolidation with a small effusion. He was treated with antibiotics empirically. Over the next 48 hours, his inflammatory markers continued to rise. He developed sudden-onset dyspnoea and pleuritic chest pain associated with tachycardia and tachypnoea. A repeat CXR revealed a tension pneumothorax, requiring immediate needle decompression followed by chest drain insertion. This immediately drained 900 mL purulent fluid with a pH of 7.2. CT of the thorax revealed a gas and fluid collection in the mediastinum, possibly secondary to oesophageal rupture communicating with the pleural space. A barium swallow test demonstrated a leak at the gastroesophageal junction and he was transferred for surgical closure of the rupture.

Discussion

Although a tension pneumothorax can develop instantaneously at the time of oesophageal rupture, this case highlights the importance of considering oesophageal rupture as a cause of tension pneumothorax in any patient with a hydropneumothorax with persistent non-haemorrhagic drainage.

Conflicts of interest

None declared.

Primary effusion lymphoma (PEL) in a renal transplant patient

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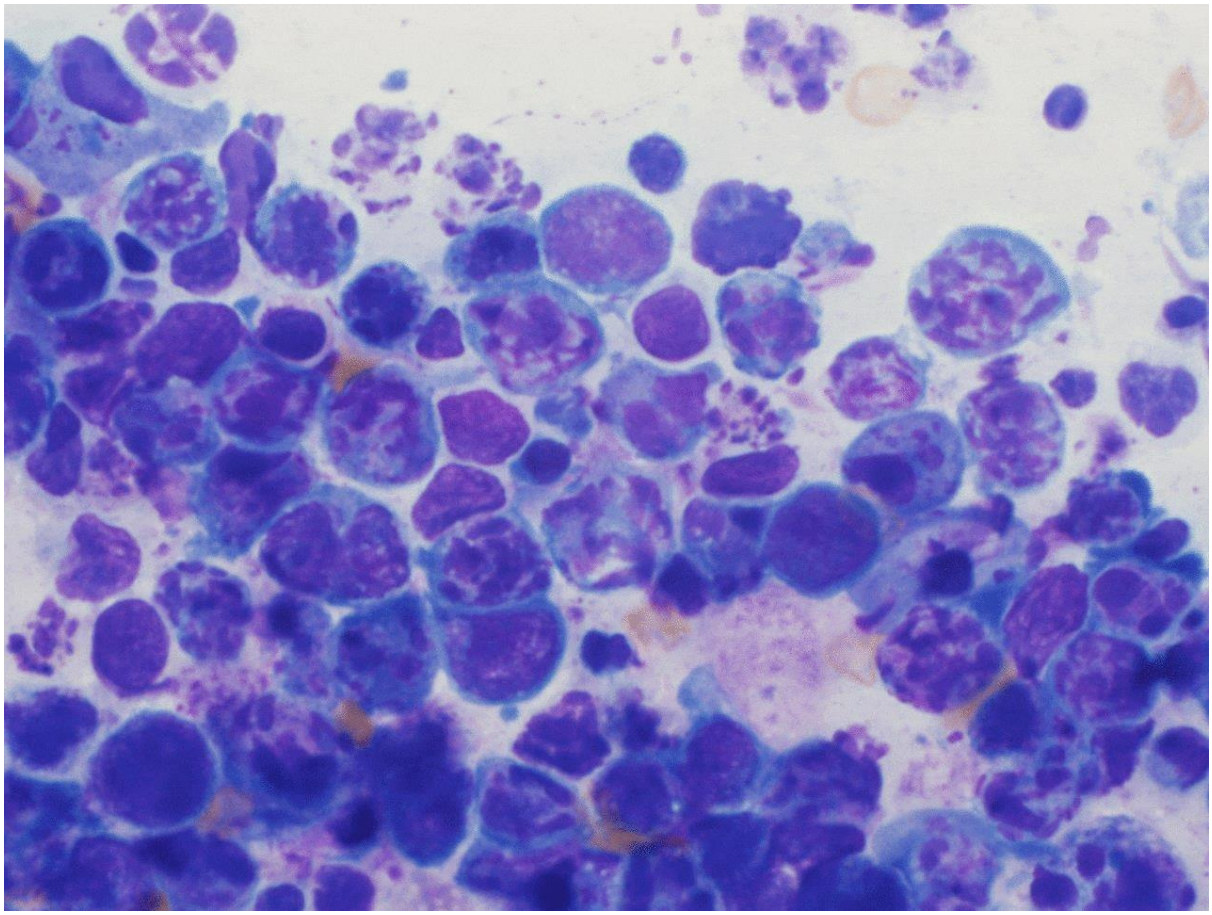
Introduction

Primary effusion lymphoma (PEL) is a lymphoma of large B cells that primarily presents as effusions without a tumour mass.[1,2] PEL occurs in immunodeficient states such as acquired immunodeficiency syndrome (AIDS) or with use of immunosuppressant medications, and is associated with human herpesvirus-8 (HHV-8) and Epstein–Barr virus (EBV).[2,3] We report a case of primary effusion lymphoma 15 years after renal transplant, presenting as exudative ascites.

Case presentation

An 81-year-old African woman presented with a history of weight loss and abdominal distention of 2 weeks' duration. The patient underwent renal transplantation 15 years ago; the aetiology of her renal failure was hypertension on immunosuppressant agents including mycophenolate mofetil and cyclosporine. She also has a history of heart failure with preserved ejection fraction, persistent atrial fibrillation on apixaban, hypertension, dyslipidaemia and severe pulmonary arterial hypertension. The patient had been treated with right-sided thoracentesis for pleural effusion 2 years prior to presentation; cytology was suggestive of high-grade lymphoproliferative disease. She was lost to follow-up for further workup since then. Physical examination was positive for ascites, with no palpable masses, lymph nodes or other significant findings. Lab tests showed normocytic normochromic anaemia, mild neutropenia and hyperosmolar hyponatraemia; polymerase chain reaction test was negative for HIV, cytomegalovirus (CMV) and EBV. Computed tomography (CT) of her neck/chest/abdomen and pelvis were consistent with ascites in all abdominal quadrants; no solid masses were reported. Ascitic fluid was exudative on analysis, with peritoneal protein of 68 g/L and lactate dehydrogenase of 2,559 IU/L. Bacterial and tuberculosis cultures of ascitic fluid were negative. On cytology, lymphoma cells were found to be positive for multiple immunohistochemical stains including CD38, CD30, epithelial membrane antigen (EMA) and HHV-8, but negative for CD138, CD20 and PAX-5. An EBV-encoded small ribonucleic acid (EBER) chromogenic *in situ* hybridisation study was negative. Concurrent flow cytometry showed an abnormal B-lymphoma population positive for CD45 and CD38, and negative for B, T and myeloid markers. Fig 1 shows a cytospin of the paracentesis fluid, showing a large, pleomorphic lymphoma cell with basophilic cytoplasm. Based on the above histopathological and flow cytometry findings, PEL was diagnosed. A plan of management was discussed in the presence of the patient's family, haematology and internal medicine teams; the family was aware of the nature of the disease, and the poor prognosis associated with it. Active versus palliative care was discussed with risks and benefit of treatment explained. The patient opted for palliative management as per family preference, with no further investigations or treatment to be pursued.

Fig 1. Cytospin of the paracentesis fluid (Giemsa stain; original magnification x 100; oil immersion).



Conclusion

This case is a rare presentation of PEL presenting as exudative ascites in the setting of immunosuppression in an organ transplant recipient from the development of an HHV-8 infection. This highlights the importance of considering PEL as a possible diagnosis in HIV-seronegative older patients receiving long-term immunosuppressant medications.

Conflicts of interest

None declared.

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A case of left bundle branch block with chest pain but negative troponin: a prompt for dilated cardiomyopathy?

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Introduction

Chest pain with left bundle branch block (LBBB) on electrocardiography (ECG) is an alarming presentation in the acute medical unit, even without a rise in troponin. If acute coronary syndrome is unlikely, it is advised to consider common but overlooked differential diagnoses of LBBB such as dilated cardiomyopathy (DCM). The following case, which we came across in the acute medical unit, was a reminder to do so.

Case presentation

This previously well man in his mid-40s presented with a 1-week history of intermittent central chest pain, which was of a dull ache in nature with no radiation, exacerbated on exertion and by sitting forward. There was no report of preceding prodromal viral illness, no common cold- or flu-like symptoms and no shortness of breath. He had no previous cardiac problems and had never reported chest pain before. He was an ex-smoker and admitted to occasional use of recreational drugs, but no evidence of consistent exposure to cardiotoxic materials. There were no cardiac problems of note in his first-degree relatives and his exercise tolerance was then essentially normal. On clinical examination, he was relatively hypotensive and bradycardic, but results were otherwise unremarkable. An ECG revealed LBBB with sinus rhythm, no evidence of ischaemia. Troponin was negative two times and blood results were not remarkable, apart from a cholesterol of 5.6 mmol/L.

A chest X-ray unveiled a borderline-enlarged heart and subsequent echocardiography revealed a severely dilated left ventricle (LV) with dimensions of 7.6 cm, along with a dilated left atrium and globally severely impaired left ventricular ejection fraction (LVEF) of 20%. For this, he was started on beta-blocker and angiotensin-converting enzyme (ACE) inhibitors. Echocardiography was repeated 1 month later, and showed no improvement in LV systolic function. Meanwhile, it was arranged for him to have a cardiac magnetic resonance imaging (MRI) to find out the underlying cause of DCM, and screening of his first-degree relatives was initiated.

Discussion

A 2016 cohort study illustrated that LBBB commonly presents with dyspnoea (30%) followed by chest pain (25%).[1] In addition, a quarter of patients were found to have DCM on echocardiography.[1] Evidence of LBBB having a negative impact on LVEF in the long term, subsequently leading to DCM, was also reviewed. A retrospective study revealed that almost 10% (9.8%) of patients with LBBB with preserved LVEF subsequently developed a significant decline in LV systolic function to an LVEF of approximately 32% over 4–5 years.[2] In terms of management of reduced LVEF in patients with LBBB, cardiac resynchronisation therapy (CRT) plays a more beneficial role (35% of patients in the study sample experienced an improved LVEF >50% post-CRT) compared with optimal medical therapy (only 6% of patients in the study sample benefited from improvement of LVEF after 3 months).[3]

Conclusion

Whenever ischaemic aetiology is unpromising, it is equally important to consider LBBB-associated non-ischaemic cardiomyopathies, as they can be overlooked and associated with underlying significant LV systolic dysfunction with subtle clinical features. Appropriate and timely specialist input will make a monumental difference to the patient's safety and quality of life, particularly in the long run.

Conflicts of interest

None declared.

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Thinking inside the box: have we underestimated cardiac rehabilitation?

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Cardiac rehabilitation (CR) is a comprehensive secondary intervention programme offered to select cardiac patients in order to educate them on their condition, modify cardiovascular risk factors and improve functional capacity.

There is a large body of evidence demonstrating the extensive benefits of attending a CR programme with significant reduction in cardiac morbidity and mortality, reduction in cardiac symptoms, enhanced psychosocial wellbeing and improved health-related quality of life. Despite this well-documented data, nationally only 50% of all eligible patients participate in CR. The reasons for this are multifactorial and include both patient and clinician factors.

While CR specifically targets the barriers to essential lifestyle changes that patients experience post-cardiovascular event, the emphasis remains heavily on medical management and invasive intervention alone.

This poster aims to summarise the proven benefits of CR, identify barriers to referral and attendance and offer suggestions to optimise CR uptake and delivery.

In summary, we urge clinicians to 'think inside the box' when approaching the management of patients with cardiovascular disease, providing greater emphasis on lifestyle changes and effective deliverance of structured CR programmes which form the foundation of good prognostic outcomes for such patients.

Conflicts of interest

None declared.

Tocilizumab-induced pulmonary fibrosis in a patient with rheumatoid arthritis

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Introduction

Interstitial lung disease (ILD) is a well-known extra-articular manifestation in patients diagnosed with rheumatoid arthritis (RA). The cardinal symptom of ILD is dyspnoea. There are several drugs which have been implicated in the development or exacerbation of ILD. Disease-modifying antirheumatic drugs (DMARDs) which cause drug-induced ILD are TNF alpha inhibitors and conventional DMARDs like methotrexate. However, interleukin 6 (IL-6) inhibitor-induced ILD is very rare and systematic literature revealed only a few cases of this type.

Materials and methods

This case report is about a patient with RA who developed severe acute pneumonitis after treatment with tocilizumab. An 82-year-old woman who had seropositive RA for 20 years was commenced on tocilizumab due to poor response to other DMARDs. She developed progressive worsening shortness of breath following the third infusion of tocilizumab. She was initially treated for possible community-acquired pneumonia and since there had been worsening of symptoms she was admitted to hospital. On admission she was dyspnoeic at rest and oxygen saturation was 88%. Chest examination revealed bi-basal fine crepitation.

Results and discussion

Chest X-ray showed increased pulmonary interstitial markings throughout both lungs. Inflammatory markers were moderately high. Septic screening, including blood and sputum culture, was negative. She was treated with several intravenous antibiotics and her symptoms did not respond. Chest high-resolution computed tomography (CT) showed bilateral extensive predominantly subpleural honeycombing with traction bronchiectasis. She was commenced on oral prednisolone 40 mg daily and her symptoms improved with steroid treatment. Tocilizumab was withheld and low-dose prednisolone continued. Serial chest X-rays showed resolution of interstitial markings and showed normal appearance following 10 months of the last tocilizumab dose. According to the literature, drug-induced ILD commonly develops within the first 20 weeks after initiation of therapy and old age is an added risk factor.[1,2] Both features were seen in this case.

Conclusion

This case highlights the importance of considering drug-induced ILD in patients with worsening of shortness of breath particularly of the new agents such as IL-6-inhibiting biologic DMARDs.

Conflicts of interest

None declared.

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Acute visual loss without concurrent headaches due to ultrasound-negative, biopsy-proven giant cell arteritis

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Introduction

Giant cell arteritis (GCA) is a vasculitis caused by immune cascades resulting in vascular inflammation, remodelling and vessel occlusion, and therefore a cause of arteritic anterior ischaemic optic neuropathy.[1] Characteristically, it is accompanied by headaches, jaw claudication, scalp tenderness and constitutional symptoms. This case represents an atypical presentation of GCA, with sudden vision loss in the absence of concurrent characteristic symptoms.

Materials and methods

An 82-year-old Caucasian woman presented with blurring and greying of her peripheral visual fields in the right eye. She later returned home due to extended wait times in emergency department, and opted to return in the morning. Overnight her symptoms progressed to acute total visual loss and she re-presented. On admission she had no other symptoms and was thus reviewed by ophthalmology. She had right optic disc swelling and vision limited to hand movements only. On further history, she mentioned a 6-week history of temporal tenderness, pain on brushing hair, polymyalgia and weight loss. Interestingly, these symptoms had resolved 2 weeks prior spontaneously, and she had not sought medical help for these as she was unaware of their importance. On repeat examination, she was noted to have reduced right temporal artery pulsation. Despite the atypical presentation, and given the acute vision loss, she was treated with a 3-day course of pulsed intravenous methylprednisolone.

Results and discussion

Inflammatory markers were raised (C-reactive protein (CRP) 44 mg/L, erythrocyte sedimentation rate (ESR) 81 mm/hr). Computed tomography (CT) of the head showed no ischaemia or haemorrhages. An ultrasound doppler of the temporal arteries revealed reduced size and flow of the right temporal artery, but no inflammation or focal arterial wall thickening. However, this was performed while on immunosuppression. Given the sight loss, a temporal artery biopsy (TAB) was undertaken. This showed active, chronic transmural inflammation and periarterial fibrosis with giant cells within the internal elastic lamina. This confirmed GCA and the patient was switched to oral glucocorticoids. Her inflammatory markers reduced (CRP 6 mg/L, ESR 28 mm/hr) and at 4-week follow up there was no relapse or contralateral vision loss.

Conclusion

This case provides several learning points for general physicians. GCA is a common life-changing disease seen on the acute take, resulting in irreversible visual loss. 1) Visual complications of GCA merits high-dose glucocorticoid therapy, as do features predicative of visual loss such as diplopia, jaw claudication and temporal artery abnormalities. 2) Resolution/absence of typical symptoms do not rule out disease activity, nor the risk of visual sequelae, as this patient developed rapid vision loss despite the absence of concurrent temporal headache, polymyalgia or scalp tenderness. 3) It is paramount to enquire regarding the characteristic symptoms of GCA, both past and present, in patients presenting with sudden vision loss. 4) Although temporal artery ultrasound provides a quick, non-invasive method for identification of GCA whilst an inpatient, TAB can remain positive for up to 6 weeks following the initiation of immunosuppressant therapy.[2] 5) Performing TAB in those with a negative ultrasound increases the sensitivity and specificity of GCA diagnosis,[3] and thus should be arranged for prior to discharge.

Conflicts of interest

None declared.

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Using serum albumin to predict frailty in the vascular perioperative patient

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In recent years there has been a growing interest into measuring frailty in surgical patients, and its potential impact on morbidity and mortality. Specifically, frailty scores can be used to identify patients early in their admission to ensure prompt referral to perioperative physicians or geriatricians. Our local perioperative medicine team (led by acute, renal and geriatric physicians) have recently started to work alongside the vascular surgeons to care for emergency and elective inpatients. There is now robust evidence to demonstrate that more frail vascular patients undergoing revascularisation procedures have an increased risk of poor outcomes, namely death and needing to progress to limb shortening surgery.[1] These studies also explore the concept of biomarkers of frailty. Serum albumin is of particular interest to us. As a small team, one of the initial challenges we faced was determining which patients we should review.

We performed an Edmonton Frailty Score on new admissions to the vascular ward. We have collected a test data set of 2 months' worth of patients (n=33). Each patient had their age, frailty score and albumin on admission recorded. The Edmonton score for each patient was calculated by the same two doctors in collaboration. Serum albumin was measured within 24 hours of admission, and always before any surgical intervention.

There was no correlation between age and frailty. There was also no correlation between age and albumin on admission (Fig 1). When frailty was plotted against albumin, a clear negative correlation emerges (Fig 2).

Fig 1. Patient age plotted against serum albumin on admission (n=33).

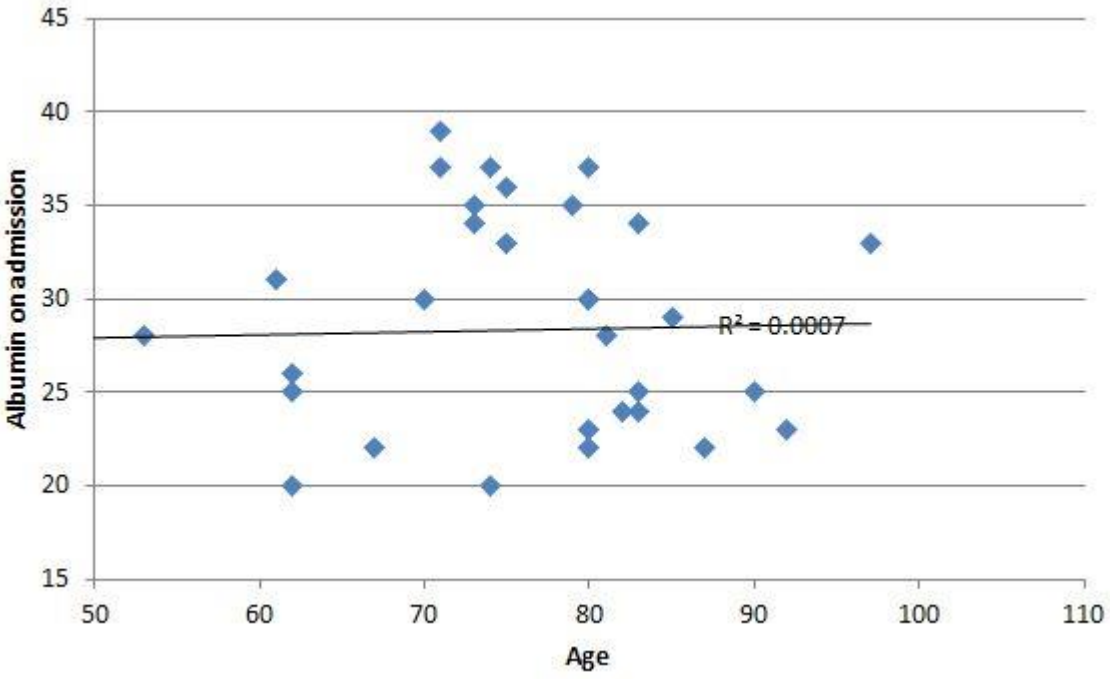
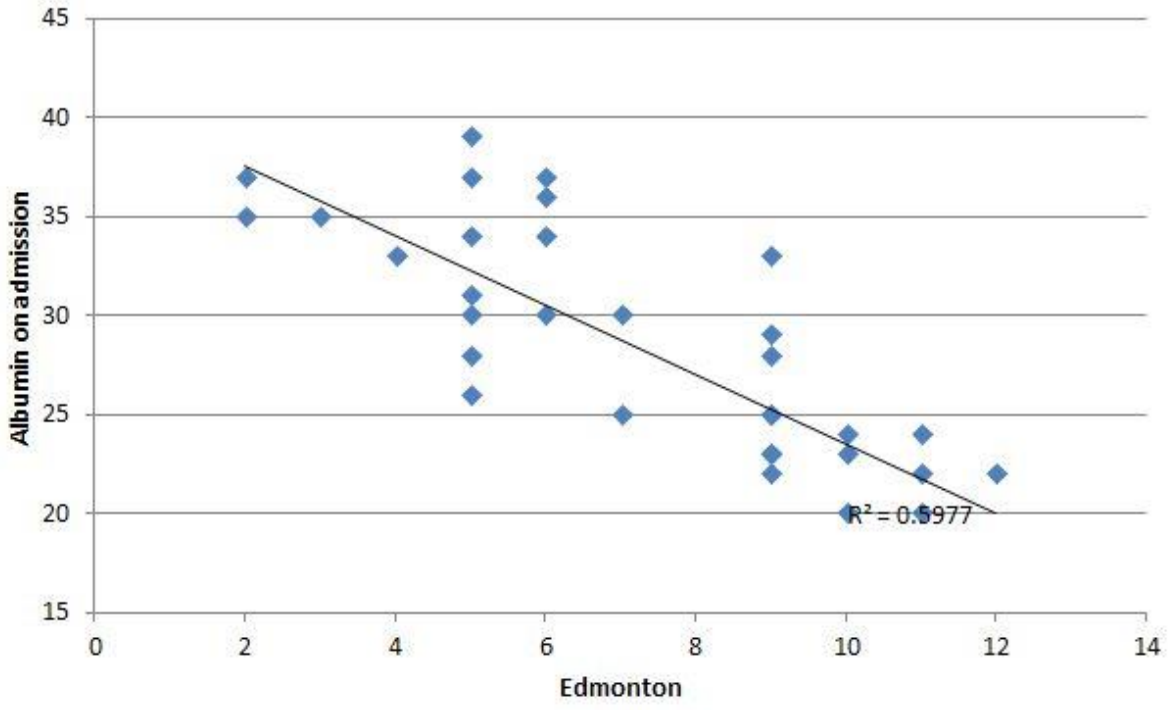


Fig 2. Edmonton Frailty Score plotted against serum albumin on admission (n=33).



We continue to collect data on all new admissions to the vascular surgery ward. We are also collecting similar data for major trauma, hip fracture and emergency general surgery patients. We aim to identify if serum albumin can be used as a surrogate marker of frailty and whether this can accurately predict which patients will benefit from comprehensive medical review or geriatric assessment, in addition to usual surgical care.

Conflicts of interest

None declared.

Reference

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A case report of glycogen storage disorder in an adult

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Background

Glycogen storage disorder (GSD) is a rare cause of chronic liver disease especially in the adult population comprising of many different subtypes. This results from absence of enzymes which are involved in converting glycogen compounds to glucose, and this subsequently results in accumulation of glycogen in tissues. Among the various subtypes, GSD III is one of the most common subtypes, inherited as an autosomal recessive disease accounting for 2.3 in 100,000 children in the United States per year.

Case presentation

We present a case of 25-year-old man with 3-month history of jaundice, generalised malaise, weight loss, chronic abdominal pain and inability to concentrate. He was normally fit, drinking socially and denied taking any medications including recreational drugs. There was no significant family history of liver disease.

On examination, he was pale, jaundiced with noticeable full cheeks, with below-the-average height. There were many bruises and purple striae. Liver was not palpable; spleen was just palpable on deep palpation. There was no ascites and no other stigmata of chronic liver disease nor proximal myopathy. Random blood sugar was 4.6 mmol/L.

His initial liver function test showed bilirubin of 101 µmol/L with normal enzymes, albumin 25 g/L, clotting test showed prothrombin 22 seconds and international normalised ratio (INR) of 1.8. Full blood count showed pancytopenia with normal reticulocyte count and raised lactate dehydrogenase (LDH). Blood film showed left-shifted neutropenia with thrombocytopenia with red cell anisopoikilocytosis with occasional target cells. There was no fragmentation. Bone marrow biopsy was unremarkable. Alpha fetoprotein was slightly raised while carcinoembryonic antigen, CA199, CA153 and human chorionic gonadotrophin were normal. All autoantibody screens were normal with negative viral screening. Total iron binding capacity and serum iron were raised but ferritin and copper were normal.

Ultrasound showed splenomegaly with a small low-attenuation liver lesion. Hence, he had liver magnetic resonance imaging and computed tomography of the liver triple phase to further evaluate the lesion; this confirmed cirrhosis with dysplastic nodules and splenomegaly. Liver biopsy was performed afterwards and revealed significant glycogen load in hepatocytes on special stains but there was no evidence of increased iron, amyloid deposition, copper-associated protein nor evidence of alpha 1 anti-trypsin deficiency.

He was then referred to liver team for further monitoring and management.

Discussion

GSD III is a very rare cause of jaundice and median age of presentation is within the first year of life. The most common presentations include full cheeks, hypertriglyceridemia, hypoglycaemia, immunodeficiency, intellectual disability, short stature and myopathy. Typically, GSD should be suspected when three main clinical features are present: hepatomegaly, hypoglycaemia, and elevated liver enzymes and creatinine kinase. This condition is diagnosed by histology and genetic testing.

Unfortunately, there is no specific treatment for this condition. The aim of the treatment is to alleviate symptoms by maintaining euglycaemia. This can be obtained by frequent meals high in carbohydrates. There is risk of malignant transformation and overt liver failure.

Conclusion

In conclusion, although GSD mostly presents in childhood, there can be rare exceptions to this. Timely diagnosis, interval monitoring and timely management can prevent serious complications like overt liver failure and hepatocellular carcinoma.

Conflicts of interest

None declared.

The placebo effect of direct current cardioversion on atrial fibrillation: myth or fact

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Introduction

Atrial fibrillation (AF) is the most common type of arrhythmia across the world, with an estimated prevalence of 2% in the UK population.[1] Therapeutic strategies such as medications and AF ablation are used to achieve symptomatic improvement in patients with AF. In our clinical practice, a significant number of patients report symptomatic improvement after direct current (DC) cardioversion. It is as yet unclear as to how much of the purported benefit is due to just a placebo effect. This project aimed to identify the perceived placebo effect of DC cardioversion.

Methods

A retrospective observational study has been undertaken locally by examining case notes from 100 patients who underwent DC cardioversion from February 2016 to March 2017, which included follow-up data for 24 months.

Results

Eighty-three AF patients and 17 atrial flutter patients were involved in this project (Table 1). Rate control had been achieved before DC cardioversion in all patients. These patients were prescribed anticoagulant (direct oral anticoagulant (DOAC) or warfarin) for at least 4 weeks before DC cardioversion. AF related symptoms were assessed at the follow-up clinic following DC cardioversion. Based on the reported symptoms, we collected and analysed symptoms as written in the clinic letter then categorised these into two different groups; improved or not improved. Two patients died and one patient did not attend for follow up. The data for 10 patients did not clearly state the patient symptoms or were not available due to not following up in the clinic letter.

Following DC cardioversion, 48 patients (48%) achieved sinus rhythm whereas 49 patients (49%) remained in arrhythmia (AF or flutter) at the 24-month follow-up point.

In the sinus rhythm group, 38 patients (79.6 %) reported symptom improvement in relation to the AF-related symptoms. Surprisingly, in the other group, a group of patients who were still reverted to AF, 16 patients (32.65%) mentioned improved AF-related symptoms following DC cardioversion.

Table 1. Summary of results

	Number of patients	Percentage
Sinus rhythm (n=48)		
Improved	38	79.16
Not improved	5	10.41
No data	5	10.41
Atrial fibrillation/flutter (n=49)		
Improved	16	32.65
Not improved	28	57.14
No data	5	10.20

Conclusions

Although this study is a subjective and retrospective project, it highlighted that DC cardioversion has a positive impact on patient symptoms, whether rhythm control is achieved or not. By offering DC cardioversion, there will be nearly 50% chance of getting back to sinus rhythm at the 24-month follow up. It is expected to improve clinical symptoms in four out of five people in whom sinus rhythm is achieved. Even if they revert back to AF or flutter, one in three patients have improved symptoms following DC cardioversion. These findings may be useful in the management of patients suffering from AF-related symptoms who have already achieved rate control.

Conflicts of interest

None declared.

Reference

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Rapid access neurology: a 2-year evaluation of 'hot clinics' in a tertiary neuroscience centre

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Introduction

Patients with neurological symptoms account for 10–20% of acute medical admissions.[1] Early neurologist contact for this cohort improves diagnostic outcomes, reduces length of stay and avoids diagnostic procedures.[2] The rapid access neurology clinics ('hot' clinics) at St George's Hospital (SGH), London, are part of an innovative hyperacute neurology service that aims to reduce the burden of unnecessary admissions to the acute medical take.[2] Future-proofing of such services require a proactive approach to how they are being utilised. We analysed this in greater detail.

We analysed referrals to the hot clinics from August 2016 to July 2018, assessing the performance of the second year compared with the first. We then identified inappropriate referrals to the clinic to assess how resources might be optimised in the future. This will be of relevance to others who wish to replicate our model.

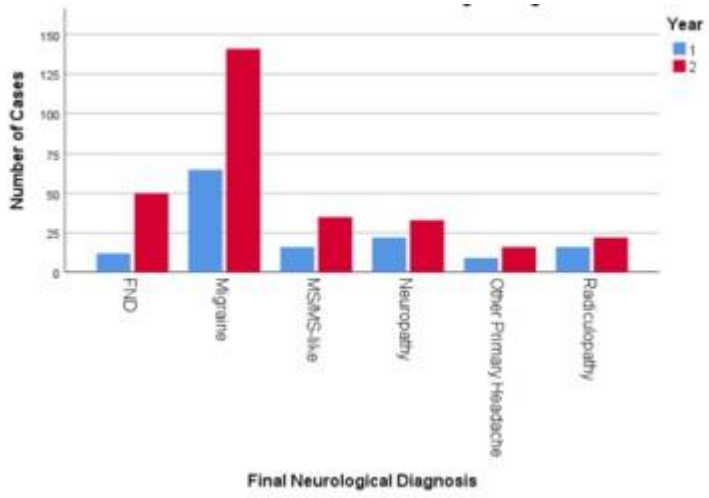
Materials and methods

Two years of hot clinic appointments between 1 August 2016 and 31 July 2018 were analysed. This included final diagnosis, appointment waiting times, time taken to reach a final diagnosis and the number of hospital admissions avoided.

Results and discussion

A total of 760 patients were reviewed over 2 years. In that period, general practitioner (GP) referrals increased by more than 200%. The commonest diagnoses were migraine, functional neurological disorder (FND), neuro-inflammatory disorders (including multiple sclerosis), other primary headache disorders, and compressive radiculopathy (Fig 1).

Fig 1. The most common neurological diagnoses made in hot clinics over the 2-year period.

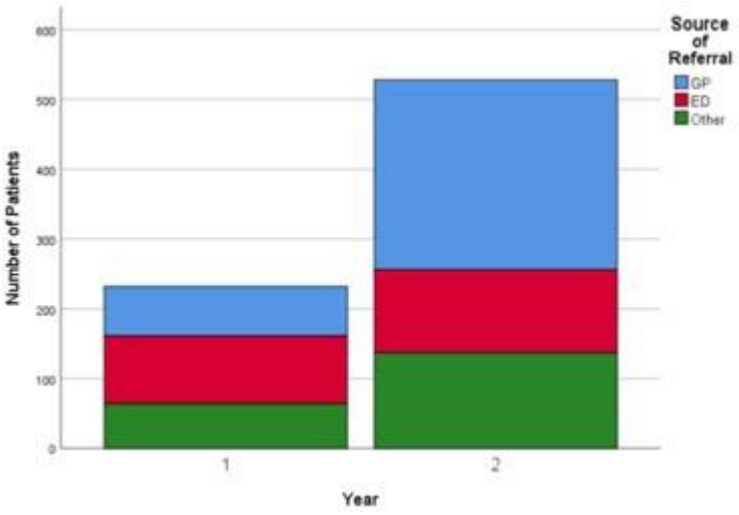


Thirty-eight per cent of referrals were headache-related, of which 16.9% were migraine. Chronic migraine represented 20.1% of the migraine cohort (75% from the emergency department (ED)). Of headache patients, 54.2% (n=155) had an MRI, of which only five were abnormal.

Compared with year 1, there was an increase in hot clinic appointments from 232 to 528 in year 2. In year 2, 51.5% of patients were referred from primary care compared with 30.6% in year 1 ($p<0.001$, Fisher's exact test; Fig 2).

The median (interquartile range) waiting time for year 2 increased compared with year 1 (6.0 (2.0–8.0) year 2; 4.0 (2.0–7.0) year 1; $p<0.001$, median test). The proportion of admissions avoided in year 2 decreased compared with year 1 (56.8% vs 67.2% respectively; $p=0.008$, Fisher's exact test).

Fig 2. Sources of referral to hot clinics for patients in year 1 and year 2.



Conclusions

The use of this service has grown significantly over time. However, a significant proportion of this growth is represented by chronic migraine and compressive radiculopathy. Given the natural history of these conditions, neither are suitable for hot clinic referral. In particular, chronic migraine and other primary headaches are poorly recognised by referrers. Reducing inappropriate referrals of this nature is important to prevent decline in the quality of service (waiting times, admissions avoided). This is critically important should such clinics become the standard for acute ambulatory neurology care, in particular for patients discharged from ED/acute medicine. One solution would be to encourage GPs to discuss prospective neurological admissions directly with a neurologist (rather than the medical registrar on call, as is standard). Another would be to encourage the ED to direct a larger proportion of their ambulatory neurological patients to hot clinics rather than acute medicine once suitable criteria are agreed, in turn supported by adequate education of non-neurologists regarding excluded conditions.

Conflicts of interest

None declared.

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Mechanical thrombectomy and the 'weekend effect': does admission time influence outcomes?

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Introduction

In acute ischaemic stroke, 'time is brain', with 1.9 million neurones lost for every minute of untreated ischaemia, leading to death or disability.[1] Recanalisation through mechanical thrombectomy has been shown to greatly improve outcomes in patients with large vessel occlusion.[2] In the UK, few centres offer a 24/7 or out-of-hours thrombectomy service; however, many centres are planning on increasing their operating hours. For many conditions, there is strong evidence that treatment outside normal working hours results in poorer outcomes.[3] This 'weekend effect' impacts the outcomes for many conditions, including stroke;[3] however conflicting evidence exists for its impact on mechanical thrombectomy patients.[4,5] In this study we report the effect of admission timing on mechanical thrombectomy outcomes at a 24/7 comprehensive stroke centre.

Methods

Patients were identified through a prospectively entered database of all mechanical thrombectomies performed at the Royal Stoke University Hospital. Data extracted included: age, National Institutes of Health Stroke Scale (NIHSS) scores, risk factors, pathway timings, complications and modified Rankin Scale (mRS) scores at 3 months. All thrombectomies performed between May 2009 and June 2019 were identified, of which 493 had complete data available and were therefore included in the study. In-hours admissions were defined as between 08:00–17:00 on Monday to Friday, any patients presenting outside this time window were classed as an out-of-hours admission. Statistical analysis was performed using Mann–Whitney *U* test and chi-squared test where appropriate.

Results

There were 210 in-hour thrombectomies and 283 out-of-hour thrombectomies performed in the time period analysed. Demographics of the two groups differed significantly with regards to age (in-hours median 71, interquartile range (IQR) 61–77; out-of-hours median 68, IQR 57–76; p=0.01) and presence of hypertension (in-hours 47% vs out of hours 56%; p=0.03). Door-to-groin times were significantly longer in the out-of-hours group (134 minutes vs 110 minutes; p=0.02). There were no significant differences in short-term outcomes, including symptomatic intracranial haemorrhage (sICH) identified (in hours 6% vs out-of-hours 8%; p=0.25). Finally, there were no significant differences in long-term outcomes including rate of functional independence at 90 days (in hours 51% vs 47%; p=0.94) and death at 90 days (in hours 17% vs out of hours 20%; p=0.28).

Conclusion

Patients presenting out of hours represented a different stroke population to those presenting in hours. Key pathway measures such as door to groin puncture were significantly longer in the out-of-hours period. However, these differences did not translate into any difference in short- or long-term outcomes. In conclusion we have demonstrated two key points. Firstly, that it is possible to provide a 24/7 mechanical thrombectomy service in the UK safely and effectively, and secondly, that there is no discernible 'weekend effect' in terms of short- and long-term outcomes post-mechanical thrombectomy.

Conflicts of interest

None declared.

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Comparison of brief clinical delirium and cognitive testing among patients admitted via the trauma and orthopaedic acute intake – a service evaluation on the clinical dependence, efficacy and accessibility of implementing Gwent orientation and awareness listing testing in relation to the 4AT at the Royal Gwent Hospital, Newport

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Introduction

Gwent orientation and awareness listing (GOAL) is the brief delirium/cognitive clinical test currently employed at Royal Gwent Hospital, Newport, whereas the 4AT test is routinely utilised at Ysbyty Ystrad Fawr Hospital.[1,2] To our knowledge, both tests have not been prospectively compared relative to equal patient cohorts. We aim to evaluate two rapidly performed valid cognitive examinations among the same patient cohort, and assess patient testing results among acute/emergency trauma and orthopaedic (T&O) admissions compared with previously obtained patient data presenting via the acute medical intake.

Materials and methods

Verbal consent to cognitive testing by means of GOAL and 4AT was sought from patients presenting acutely to T&O admissions over a 4-week period. A GOAL score of <8/10 is deemed a 'fail', and on 4AT any error is deemed 'possible cognitive impairment'.[1,2] Patient documentation regarding dementia, epilepsy and psychiatric/neurological illness was recorded alongside living arrangements.

Results and discussion

There were 146 patients, of whom 10 were not well enough to be scored, and one patient declined to participate. Of the 135 participants, 92 passed both GOAL and 4AT (68.15% overall success rate; GOAL average score = 9.31; 4AT average score = 0), 40 failed the 4AT (29.63% 4AT failure rate; average score = 2.45), 21 failed the GOAL (15.56% GOAL failure rate; average score = 5.43) and 18 failed both the GOAL and 4AT (13.33% overall failure rate; GOAL average score = 5.22; 4AT average score = 3.17). Also observed were three participants who failed the GOAL but passed on the 4AT. Hence the probability of a participant failing the 4AT was significantly greater than with the GOAL (chi-squared = 7.65; $p<0.01$). Likelihood of test failure was significantly greater with 4AT (chi-squared = 7.65; $p<0.01$). Ages and comparisons on GOAL testing results with a historical general medical patient cohort displayed significant differences between patient cooperation in acute medical and T&O intakes. The median age of eligible study participants are 64 (standard deviation (SD) 19.8) and 73 (SD 18) years of age, with 114 (84%) and 720 (73%) participants obtaining the pass score of >7 points, and 21 (16%) and 270 (27%) participants who failed testing (threshold of <8 points) within T&O and medical intakes respectively. We also observed the number of participants unable to cooperate (0 and 58 patients for T&O and medical intakes respectively). In addition, of the 135 eligible participants in the T&O cohort, we documented a number of following conditions/comorbidities present in individuals included in the current study; five with known or diagnosed dementia, six with a background of alcohol dependence, 28 with psychiatric diagnoses, three with known or diagnosed epilepsy and one with a known learning disability.

Conclusion

The 4AT test is more likely to signal cognitive impairment than GOAL among T&O emergency admissions; and T&O intake patients are more likely to cooperate with cognitive testing by GOAL, and they perform better than acute medical emergency admissions. Further studies would include analysing the current study's participant deprivation indexes via their documented postcodes to identify whether socioeconomic

factors influence GOAL and 4AT failure rates and incidences in cognitive impairment and/or delirium, further comparing the GOAL system to other commonly used cognitive testing in other neighbouring health boards and introducing GOAL into primary healthcare environments to assess its efficacy and accessibility within the community.

Conflicts of interest

None declared.

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HEALTH SERVICES AND POLICY

A review of 117 cases of unprovoked pulmonary embolism and further investigation in patients over 40

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Introduction

Venous thromboembolism (VTE) is a common cardiovascular disease with an approximate annual incidence of up to 200 per 100,000 people.[1] Pulmonary embolism (PE) is a subtype of VTE, and has an estimated incidence of up to 70 per 100,000 people.[2] A 2018 Cochrane review identified that while investigating for undiagnosed cancers in cases of unprovoked PE may lead to earlier diagnosis of cancers at earlier stages, there is insufficient evidence that detection improves morbidity or mortality.[3] A 2019 meta-analysis examining rates of cancer in venous thromboembolic disease found a 4.3% prevalence of occult cancers found in those with PE,[4] however current National Institute for Health and Care Excellence (NICE) guidance estimates that approximately 20% of all cases of VTE are due to an active cancer.[1] This study reviewed cancer rates detected by routine investigation in patients over 40 years old with unprovoked PE, as recommended by current guidance from NICE.[1]

Materials and methods

This retrospective study examined 117 cases of unprovoked PE diagnosed in a district general hospital between September 2018 and February 2019. Medical notes were reviewed for initial diagnosis, investigations undertaken, cancer diagnosis and type of cancer.

Results and discussion

From the cohort of 117 unprovoked PEs, 59% (n=69) were female and 41% (n=48) were male. The average age was 69 years ±15. The diagnosis of PE alone was made in 94% (n=110) patients, while PE with deep vein thrombosis (DVT) was made in 6% (n=7) patients. Further investigations for underlying cancer as a cause of unprovoked PE were carried out in 77% (n=90), while 23% (n=27) did not complete investigations. Underlying cancers were detected after the presentation with an unprovoked PE in 10 patients (male n=4; female n=6), and diagnoses included prostate, lung, breast, renal, gastrointestinal and haematological malignancies.

Conclusion

This data supports current guidelines to investigate unprovoked PEs for underlying cancers, with a diagnostic rate of approximately 10%. Ideally this should be performed by a dedicated service in order to streamline investigations and onward referrals.

Conflicts of interest

None declared.

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Dialysis and end of life: an analysis of advance care planning and patient outcomes

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Introduction

The End of Life Care in Advanced Kidney Disease Framework suggests that renal units should create a renal supportive care register (RSCR) to promote consistent communication with patients and to encourage advance care planning.[1] The aim of the RSCR at Birmingham Heartlands Hospital is to identify patients who are requiring dialysis with a prognosis of less than 12 months. This work aims to explore whether patients were identified appropriately on the RSCR, and if conversations around withdrawal of dialysis and end of life took place.

Methods

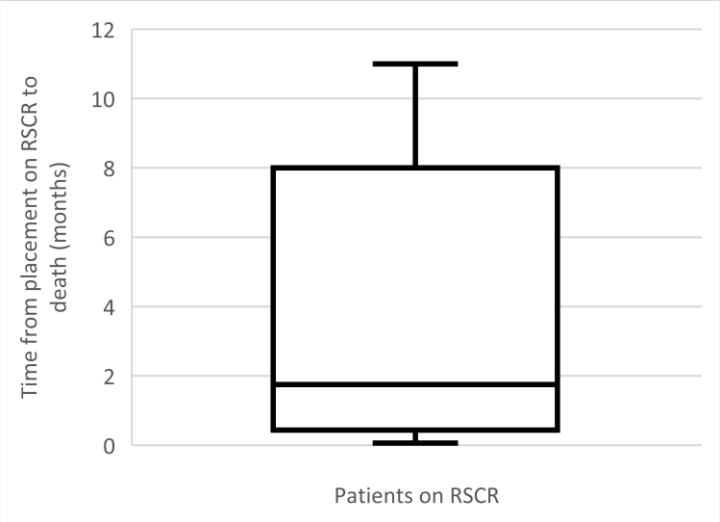
We reviewed the inpatient and outpatient consultations of patients who died while listed on the RSCR between 1 January 2016 and 31 December 2018. We recorded the dates when patients were added to the RSCR and when they died. We reviewed conversations around dialysis withdrawal and events at the end of life.

Results and discussion

Data from Proton, the renal team's coding system, showed that there were 80 deaths of patients listed on the RSCR: 59% were male, 41% were female. The median age at death was 77.5 years (interquartile range (IQR) 12.25 years). Thirty-eight per cent of these patients had an alert on Concerto, the hospital's main electronic system, informing users that the patient was on the RSCR.

Eighty-eight per cent of patients were listed on the RSCR within 12 months of death; 69% of these were listed on the day they died. For the remaining patients who were listed on the register, Fig 1 illustrates that the median time to death from being placed on the register was 1.75 months (IQR 7.54 months).

Fig 1. Time to death in months from being placed on the renal supportive care register (RSCR).

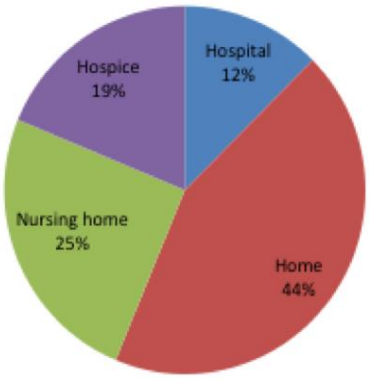


Thirty-eight per cent of patients were offered a conversation on withdrawal of dialysis; 70% of these then opted to withdraw. Cited reasons for continuing dialysis after these conversations were families' refusal to

accept palliation and denial. Of those who did not have dialysis formally withdrawn prior to death, there were reports of dialysis being withheld due to low blood pressure and patients being too unwell to come in from home for dialysis.

Eighty-seven per cent had valid 'do not attempt cardiopulmonary resuscitation' (DNACPR) forms. Two patients who did not have DNACPR forms received CPR (without return of spontaneous circulation) on the day of their death in hospital. Preferred place of death (PPD) was established in 20% of patients (Fig 2). While the majority of patients asked chose their PPD as home, 65% of patients on the RSCR died in hospital.

Fig 2. Preferred place of death.



We recommend that all patients on the RSCR should have alerts placed on Concerto. This would ensure that the wider hospital, who may not know the patient as well as the renal team, are prompted to think about advance care planning. The literature reinforces that alerts can improve healthcare professionals' engagement with conversations around resuscitation.[2]

Conclusion

Our data suggests that the deterioration of these patients may have been unrecognised. While some deaths are likely to be unexpected, we are missing opportunities to engage patients with end-stage renal disease in advance care planning.

Conflicts of interest

None declared.

References

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Barriers to hospital discharges: a mixed-method audit

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Introduction

Delayed discharges have been recognised to be a source of additional cost to the NHS as well as leading to reduced functional mobility to the elderly. In the current economic climate with hospital trusts in financial deficits, ways to reduce cost without harming patient care or the quality of care are being sought. Transferring patients efficiently to the appropriate care setting once the acute illness has been treated is one potential way hospitals can realise cost savings. This study aims to establish what the barriers are to achieve this.

Materials and methods

This is a mixed-methods study. A literature search was performed to identify interventions that may enable or inhibit effective transitions of care and patients' experience of prolonged hospital admissions. A quantitative study included a cross-sectional survey of hospital inpatients to identify those not in the correct care setting. Hospital data of these patients were analysed to describe them. A sample of the patients in the incorrect care setting had their notes reviewed and further data was collected and analysed to identify variables that may be used in a predictive model. The qualitative study used semi-structured interviews with patients whose hospital admission had been prolonged. Thematic analysis was used to classify themes from the interviews.

Results and discussion

There was a significant difference in length of stay (mean difference 12.6 days; 27.35 vs 14.70; 95% confidence interval (CI) 8.96–16.6; $p < 0.01$) and age (mean difference 11.35 years; 95% CI 7.92–14.77; $p < 0.01$) between those who were in the incorrect care setting compared with those in the correct care setting. Those patients who were in the incorrect care setting had independent mobility prior to admission, required informal help with activities of daily living, lived in their own accommodation and mobilised using a stick or 'Zimmer frame'. They had no previous contact with health or social care services. They suffered an illness (infection, stroke, fracture) that meant that they were unable to return to their previous social and community arrangements. The issues involved in delays in transfer of care included organising a placement or rehabilitation, care packages, funding for the health and social care services or resolving family issues which rely on multiple health and social care providers. The prolonged hospital admissions made patients feel they were imprisoned and isolated. Poor communication was found between patients and health and social care teams. These feelings of abandonment led patients to change their behaviour as they appeared to feel that becoming aggressive was the only way to get attention for the difficulties they were going through.

Conclusion

Delayed transfer of care is a complex issue reliant on multiple health and social care organisations. The patients identified in this study with significant delays were due to organisation and coordination of all these services to enable the patient to be discharged from hospital. Further complexity is added as patients may improve or get worse during their assessments changing the health and social care requirements in a dynamic fashion.

Conflicts of interest

None declared.

Leadership and change management in advancing hybrid operating rooms into interventional cardiology in hospitals within the National Health Service

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Introduction

Hybrid operating rooms (HORs) constitute a new advancement in cardiology where endovascular surgeons join cardiologists to perform more complex operations in an integrated care system.[1] The adoption of this advancement is in line with the 10-year plan of the NHS where more funding is being provided for measurable improvement and commitment for enhanced service.[1] Cardiac diseases continue to pose a challenge to the NHS where increased survival of chronically managed conditions continues to be more prevalent.[2]

Materials and methods

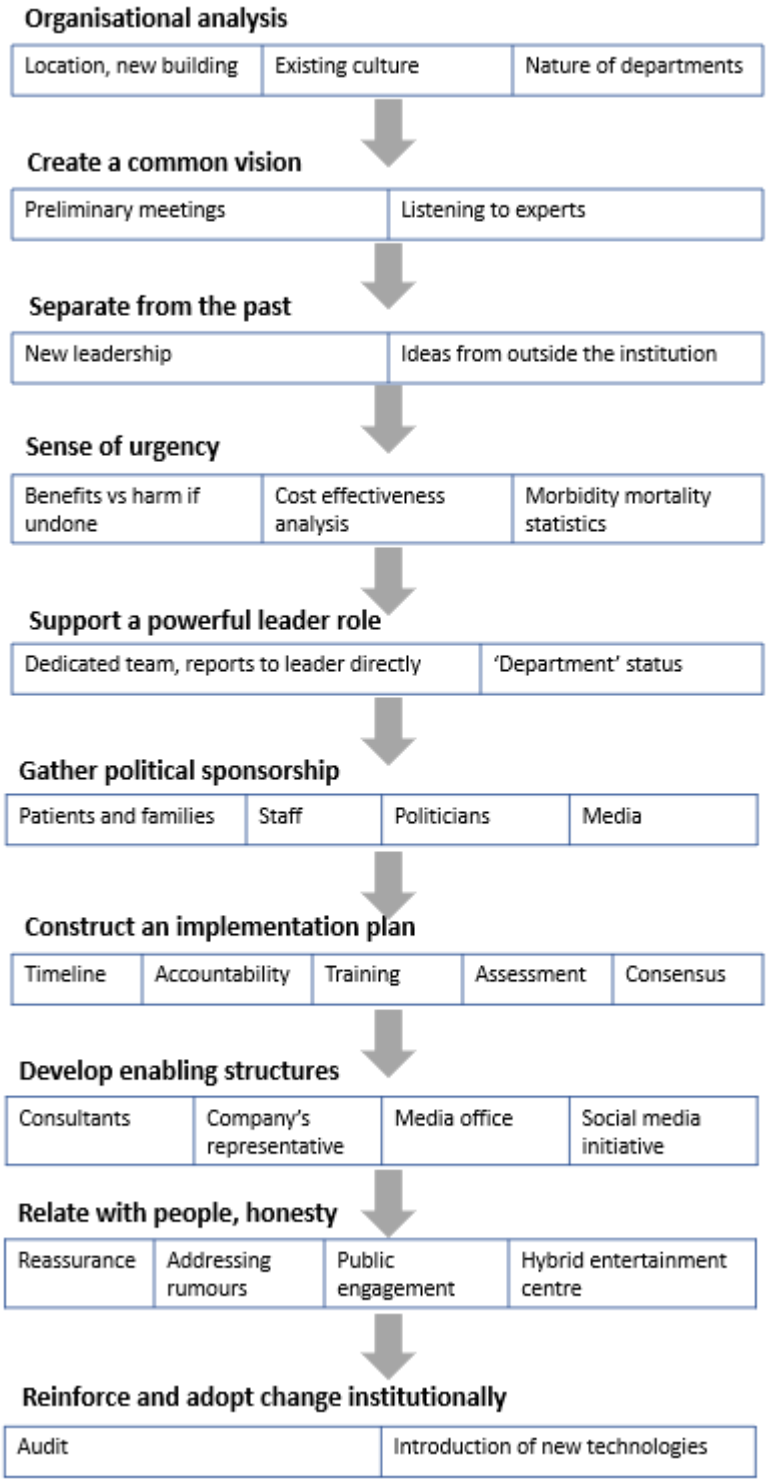
This research would design a model to allow for an efficient introduction of HORs into an existing healthcare service. This is done by analysing leadership theories, leadership domains, challenges of improvement, change management and models of change agency.[3,4] A literature review was conducted and it included PubMed, Medline, Embase, Google Scholar, the King's Fund publications website and NHS Evidence. The keywords used were 'hybrid operating rooms' or 'HOR', 'leadership', 'leading change', 'organisational change', 'change management', 'change theories', 'quality improvement' and 'NHS change'. The results were reviewed manually to identify key articles for more investigation.

Results and discussion

A plan is devised based on Kanter *et al*'s theory of change management starting with organisational analysis of cardiology and cardiothoracic surgery departments.[5] This is followed by arranged meetings to create a common vision and then creating a separate leadership to head the change with organisational autonomy; such a design would reduce tribalism and allow for better advocacy for HOR implementation within the healthcare service. Afterwards, a cost–benefit analysis and projected morbidity and mortality improvements would be drafted in order to create a sense of urgency for moving forward with the project. At this stage gathering political sponsorship (Fig 1) is vital to secure funding and support as well as constructing an implementation program, which would be of a continuous incremental type.[6,7] Assurances to staff and tackling rumours would reduce resistance to new change.[8] An audit would be conducted after completion to learn from the process and to incorporate learned lessons in future projects (Fig 2).

Fig 1. Political sponsorship: modalities to garner political support.

Fig 2. Summary of the hybrid operating room implementation plan.



Conclusion

The study concludes that a carefully designed strategic plan can ease the transition into adopting HORs through identifying gaps, building a harmonious environment, garnering acceptance and facilitating workflow. Such a plan needs to be flexible and also needs the participation of multidisciplinary team of various specialties to benefit from different perspectives and knowledge bases. Resistance should be expected and addressed. Finally, continuous involvement and collaboration throughout the process is important, and is an essential determinant of success of the project as a whole.

Conflicts of interest

None declared.

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Revamping front door medicine in a busy tertiary care hospital

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Introduction

The Royal College of Physician's vision for future hospitals proposes that patients be reviewed by a senior clinician as soon as possible after arriving at hospital.[1,2] It encourages specialist medical teams to work together with emergency teams, to diagnose patients swiftly and to facilitate early discharge.[3] In our hospital, ambulatory emergency care (AEC) was established in October 2015. All non-ambulatory medical patients referred by general practitioner (GP) were directed to the emergency department (ED). The ED referred patients, who would also wait long hours for medical beds. All non-ambulatory, same-day care was managed in the ED, acute medical unit (AMU) or frailty emergency assessment unit (FEAU). This increased workload and length of stay (LOS) in ED and elevated bed pressure in AMU and FEAU.

Standard of care was for patients to be reviewed by the consultant physician within 12 hours of admission, leading to delay in diagnosis and treatment. To tackle these challenges, we proposed a consultant-delivered rapid assessment pathway supported by a dedicated unit, to assess all ED- and GP-referred medical patients not suitable for AEC. Our aim was an earlier contact with a consultant physician to improve patient experience and outcome by reducing time to reach definitive diagnosis and treatment initiation. This would avoid unnecessary admissions and reduce overall LOS by optimising same-day emergency care.

Materials and methods

In October 2018, front door medicine was redesigned to direct all medical referrals from the ED to a consultant physician-led acute medical rapid assessment triage (AMRAT) process, which aimed to review patients within 30 minutes of referral. Patients seen in the ED would transfer to a dedicated 14-trolley area called the acute medical rapid assessment unit (AMRAU) adjacent to the ED, for further assessment and treatment. All non-ambulatory GP patients are also received in AMRAU, with an aim to be reviewed within 30 minutes of arrival.

Results

During the first 6 months, 7,747 patients were assessed and treated by AMRA team. Of these, 48% (3,700) were discharged home either directly from the ED or after a period of treatment in AMRAU; 38.5% (2,983 patients) were managed physically in AMRAU. Patients were reviewed by consultant with median time of 40 minutes. From October 2018 to March 2019, although ED attendance was increased by 12.5% (7,691 patients) when compared with same months the year before, there was only a 1.3% (89 patients) increase in ED referral to medicine, hence showing relative reduction in referrals. This highlights the impact of AMRAU taking direct referrals from GPs. Average reduction of 522 minutes (70%) in LOS in the ED was recorded, and a 26% increase (2,077 patients) was noted in the number of patients treated on the same day by medicine. Short stay admissions (0–2 LOS) observed a 16.7% reduction. Overall, 5.7% less admissions to medical beds were observed in the first 6 months of establishing the unit. There has been an overall 3% reduction in beds used by medicine. There was no evidence of increased readmission rate.

Conclusion

Early contact with the consultant physician reduces admissions and length of stay. An independent, purpose-built unit, separate from the ED and AMU, is a highly efficient way of delivering such a service.

Conflicts of interest

None declared.

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Controlling antibiotic usage – analysis of nationally published data from GP practices including demography, geography, comorbidity and prescribing factors highlights opportunities to reduce overall prescribing through changes in discretionary prescribing choices

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Introduction

Antimicrobial resistance (AMR) is a critical and worsening public health threat driven by high volumes of use and inappropriate clinical targeting. Ecological studies show an association between antibiotic use and resistance rates. Moderation of antibiotic prescribing requires a deeper understanding of differences in local prescribing behaviours. The purpose of this study was to understand the factors in antibiotic prescribing determined by discretionary choice behaviour that may provide insights into enhanced methods to modify antibiotic usage and control AMR.

Method

Oral antibiotic prescribing information extracted from general practitioner (GP) prescribing data were aggregated by applying WHO Anatomical Therapeutic Chemical Classification (ATC) defined daily doses (DDD). Average annual antibiotic daily prescribing rate (AAADPR) was the sum of DDD of all oral antibiotics in each practice divided by practice population and 365 (days). AAADPR in each GP practice with >2,000 people in England in 2017–18 were linked by regression to other publicly available factors including demographics, geography, medical comorbidities, clinical performance, patient satisfaction, prescribing selection and medical workforce characteristics. Regression coefficients for those modifiable prescribing selection factors were applied to the difference between values for median and top decile practices to establish the overall reduction opportunities through changing prescribing behaviour.

Results

We studied 5,889 practices supporting 49.8 million patients to identify 25 factors accounting for 58% of AAADPR variation between practices (Figs 1 and 2). Factors non-modifiable by the local practice that are linked to increased AAADPR: more northerly location, higher prevalence of diabetes, chronic obstructive pulmonary disease (COPD), coronary heart disease (CHD) and asthma; higher white ethnicity; higher patient satisfaction; and lower population density. However, 11% of the variation in AAADPR can be linked through prescribing behaviour modifiable by the local practice to increased AAADPR, these include wider range of antibiotics prescribed, higher proportion taken as liquids, higher doses in each prescription, lower National Institute for Health and Care Excellence guidelines compliance, lower use of targeted antibiotics, lower spend/dose and less seasonal variation.

Fig 1. 2017–18 cross-sectional regression analysis (factors on the left side of the graph relate to less prescribing).

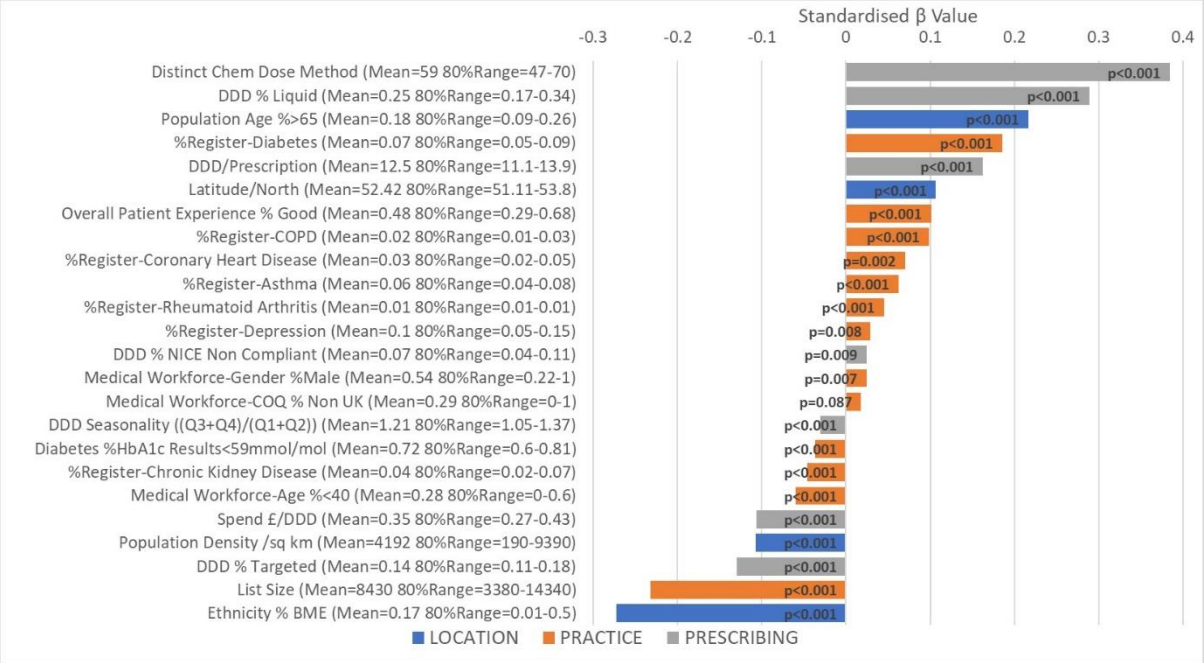
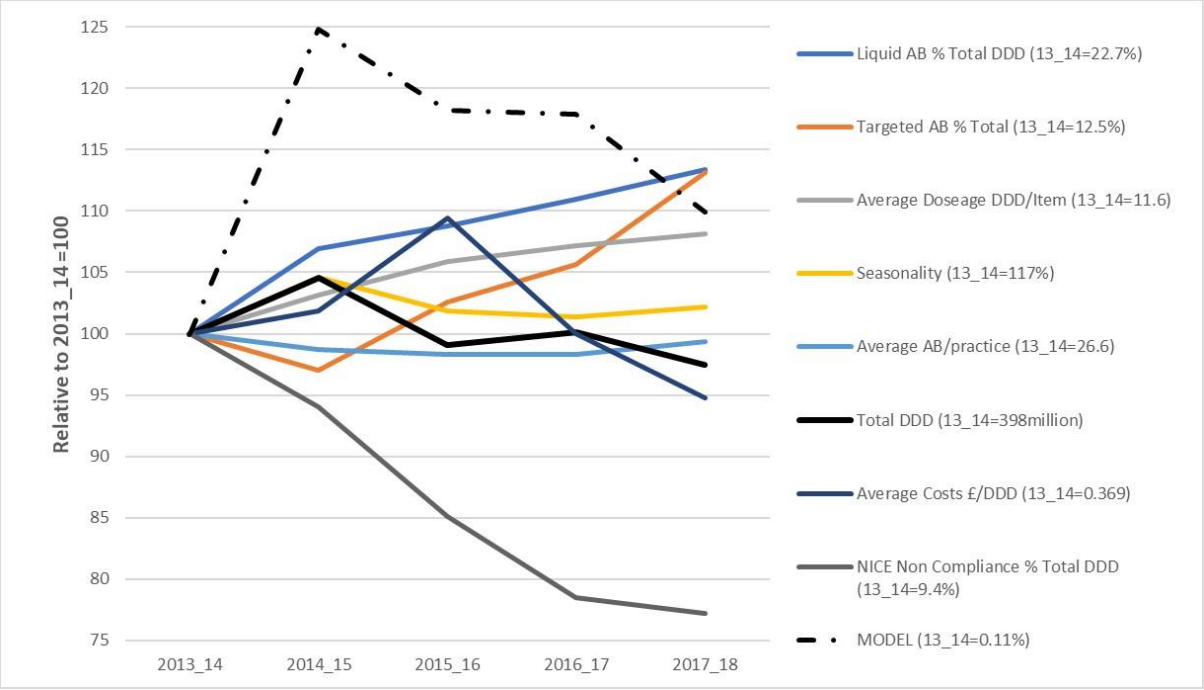


Fig 2. Trend in prescribing factors over last 5 years linked to model regression.



Conclusion

Applying the model to the last 5 years shows that since 14–15 changes in prescribing factors have been reflected in reduction in the overall prescribing. The model also suggests that if all practices achieved the level of prescribing modifiable factors of the top decile practices, the statistical model suggests that overall AAADPR would be reduced by up to a further 31%.

We acknowledge that such analysis cannot infer causation and is ultimately associative in its nature. Demographics, location and medical condition of the population are major drivers in antibiotic prescribing in general practice. However prescribing selection plays a significant role and results from this analysis can provide benchmarks for both the non-modifiable and modifiable factors against which practices could evaluate their opportunities to reduce their antibiotic prescribing.

Conflicts of interest

None declared.

Improving the care of inpatients who are homeless: why we need to ask 'have you got somewhere safe to go when you leave hospital?' and use the Homelessness Reduction Act 2017 'duty to refer' process

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Introduction

'Homelessness' is an increasingly important UK healthcare issue. Mean age of death of people who are homeless is 43–47 years and there were 726 homeless deaths in England and Wales in 2018.[1,2] People who are homeless have complex health needs reflected in increasing emergency attendances and admissions.[1] One in three deaths might have been preventable with timely treatment, yet 'homelessness' is often not identified by clinicians as a health issue and is poorly documented in health records.[1,3]

The Homelessness Reduction Act (HRA) 2017,[4] which came into place in October 2018, imposes a legal duty on NHS trusts to refer people experiencing / at risk of homelessness to 'their' local authority (LA) housing team for needs assessment, subject to their consent ('duty to refer' (DtR)).

The aim of this audit was to investigate the prevalence and characteristics/needs of inpatients who are 'homeless' in one inner-city hospital, and to evaluate the use of DtR.

Materials and methods

A snapshot audit of 'homelessness' in an inner-city hospital was performed by a team of trainee doctors, in partnership with two LA housing teams, in July 2019. All adult inpatients were asked 'have you got somewhere safe to go when you leave hospital?'

With their consent, those identified as 'homeless' answered further questions about their current situation and information on demographics / diagnoses / length of stay (LOS) was anonymously extracted from their records. They were offered a meeting with a housing specialist on the ward and that the DtR process be completed by their ward team.

Results and discussion

In total, 204 adult inpatients were interviewed; 70 (34%) were unable to answer, predominantly due to cognitive impairment (n=42).

Fifteen (10 male; five female) patients (7% total and 11% of those able to participate) were identified as not having somewhere safe to go. All 15 agreed to further review; mean (range) age was 57 (40–72) years. Comorbidities are shown in Table 1; mean (range) comorbidities was six (1–15); Mean (range) LOS was 36 (5–199) days and 6/15 (40%) did not have a working mobile phone; 10/15 (66%) were 'sofa surfing'; none had been referred using DtR and for 3/15 (20%) their team was unaware they were 'homeless'; 8/15 met a housing specialist and all eight had DtR completed.

Table 1. Documented prevalence of common underlying long-term conditions for group of inpatients in an acute trust (n=15) identified as being homeless or at risk of homelessness

Comorbidity	Prevalence n (%)
Mental health diagnosis	5 (33)
Tobacco dependence (current/previous)	9 (60)
Alcohol dependence (current/previous)	8 (53)
Other substance misuse (current/ previous)	4 (27)
Respiratory disease	8 (53)
Cognitive impairment/dementia	2 (13)
Obesity	3 (20)
Cardiovascular disease	5 (33)
Type 2 diabetes mellitus	4 (27)
Leg ulcers / cellulitis / pressure sores	2 (13)
Liver disease	2 (13)
Epilepsy	1 (7)
Cancer	2 (13)
Venous thromboembolism	1 (7)

Conclusion

Eleven per cent of adult inpatients in an inner-city hospital were identified as 'homeless' during this summer 2019 snapshot audit. As expected,[1] these patients had multiple physical and mental health comorbidities and 'long' hospital admissions. Teams were unaware that homelessness was an issue for one in five who were 'homeless', and none had previously been referred using DtR.

To address these, and other gaps, in our care of this high-cost, high-needs group, we now have a trust-wide Homelessness Quality Improvement Group, working in partnership with two LA housing teams.[5]

Initial aims have been to:

- Start to embed *'Have you got somewhere safe to go when you leave hospital?'* as a standard healthcare question asked by clinicians of all patients presenting to our hospital.
- Make it easier for clinicians to document 'homelessness' as a 'diagnosis' in a patient's health record.
- Make it easier for clinicians to complete 'DtR' for patients identified as homeless, who consent to referral, by using an electronic pathway within our health record, so their housing needs can be assessed/addressed by the appropriate LA housing team.

Conflicts of interest

None declared.

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Women speakers in healthcare: taking steps towards balanced gender representation

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Introduction

International evidence suggests that although the proportion of women speakers at medical conferences has increased during the last decade, women continue to be significantly underrepresented.[1] Women comprise the majority of the health and social care workforce in the UK, yet occupy approximately 41% of seats on NHS organisational boards and remain underrepresented in senior leadership positions across the sector.[2] Conferences offer unrivalled opportunities: to showcase diversity and inclusivity, for networking and as a lever for cultural and organisational change. Female representation at healthcare events is important in the aim to achieve gender equity across the healthcare workforce. Women Speakers in Healthcare (WSH) was co-founded by five NHS healthcare professionals, with a vision to ensure balanced gender representation at all healthcare conferences and events, with parity of opportunity for all.

Methods

WSH is actively promoting and raising the profile of women speakers by creating and maintaining the UK's largest database of women speakers in healthcare, from all backgrounds and professions; providing development and training opportunities to inspire and enable women; and engaging women speakers and male allies through networking and collaboration. Women speakers nominate themselves or others via a speaker nomination form, which automatically pulls through to a secure database. Event organisers contact WSH to request women speakers using a speaker request form; we search the database for women with relevant expertise and experience and seek permission from the speaker(s) identified to facilitate a direct connection via email.

Results and discussion

At the time of writing and 5 months since its inception, WSH has 418 women speakers signed up to the database, 1,841 Twitter followers, and has facilitated organiser–speaker connections for conferences across a broad range of topics. WSH welcomes all forms of diversity and self-identification and initial data collected during speaker signup indicates that the database is diverse across a wide range of characteristics. WSH's facilitatory role ensures that the model is scalable, and maintains the autonomy and authenticity of speakers, and we believe this approach could be replicated to promote speakers from other underrepresented demographics. We strongly encourage women speakers and supporters to 'lift as we climb', by nominating other women speakers to join the database during the signup process. We are actively engaging with male allies through social media and a 'male allies' database.

Future steps include: To continue to grow the database, to facilitate further speaker–event organiser connections and to organise bespoke development and coaching sessions for women speakers. We request feedback from speakers and conference organisers following every event and intend to analyse this to improve the service and experience offered for both speakers and event organisers. Ultimately, WSH aims to achieve gender balance across all healthcare events. Website: www.womenspeakersinhealthcare.co.uk. Twitter: @womenspeakersHC

Conflicts of interest

None declared.

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Teledermatology for all? A service evaluation of mandatory teledermatology in Cardiff and Vale UHB 2016–17

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Introduction

With over 10 years of experience in providing a teledermatology service, the department of dermatology in the University Hospital of Wales now requires all general practitioner (GP) referrals to be in the form of teledermatology. Referrals are reviewed by a dermatologist within 2–3 days and may be accepted or returned with diagnosis and treatment advice.[1] Dermatology is a topic that is taught less extensively in medical school and only a handful of GPs received dermatology training, yet around 20% of GP appointments every year concern patients with skin conditions.[2] This results in long waiting lists for dermatology clinics and unnecessary outpatient appointments for conditions that, given the correct advice from specialists, could be actively managed by their GP.[3] This project evaluated the teledermatology service after its first year and sought opinions from the key user groups (GPs, consultants, patients and office administrators) to identify any concerns, risks or deficiencies in the current service and potential opportunities for its future improvement.

Materials and methods

Details about the workflow and opinions about the service were recorded for each group. Thirty general practices and all nine dermatology consultants in the Cardiff and Vale University Health Board were sent an online questionnaire. Office administrators and patients were interviewed in person for their opinions. Statistics on the service were collated and **t**he metrics of the service were analysed for variation between dermatology consultants. Two studies were undertaken: Study 1, intraconsultant variation – to analyse consistency of diagnosis within individual consultants; and Study 2, interconsultant variation – to analyse differences in diagnostic opinion between consultants**.**

Results and discussion

From September 2016 to September 2017, 17,467 patient cases were sent to dermatologists via teledermatology; 26% were returned by the consultant, 3% were redirected to other specialties, and the rest were accepted into dermatology clinics. Thirty-eight per cent of the referred cases were urgent or urgent suspected cancer cases while 62% of those were routine cases. Results from users showed appreciation of this new service and few problems such as technical difficulty were highlighted. Intraconsultant variation study showed 79% consistency in diagnosis over a 6-month interval, where the diagnosis of the inconsistent cases was uprated. Interconsultant variation study showed a wide variation of acceptance of routine cases but unanimity in urgent cases.

Conclusion

Given the results shown, it is safe to say that teledermatology is here to stay. The service is appreciated by both the patients and doctors. The removal of unnecessary appointments in conjunction with ‘fast track’ appointments for urgent cases are highly valued by patients. GPs think highly of the advice given by the consultants, which has allowed the practitioners to advance their primary care and professional development. Consultants found the service excellent for triage and management of increased need for dermatology appointments.

Conflicts of interest

None declared.

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A novel 2-week wait lung cancer pathway starting with a telephone consultation, with patient satisfaction survey results

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Nationally, 2-week wait (TWW) referral rates are increasing. This is reflected locally, with no corresponding rise in numbers of new cancers diagnosed. In May 2018, in collaboration with local general practitioners (GPs), we redesigned our pathway to enable speedier diagnosis and reassurance.

First, the referring GP requests computed tomography (CT) of the chest/abdomen and blood tests, at the same time as electronically booking a TWW telephone appointment (OPA) with a respiratory consultant. Initially local GPs were reluctant to book the CT as they did not want the responsibility for chasing and acting on the results, but agreement was reached and the request form now stipulates that the trust are responsible for this.

At the telephone appointment a history is taken, and the CT results and initial investigative plan is explained. At this point those with no cancer can be reassured and discharged. Suitable patients, judged by performance status (PS) and comorbidities, are then sent directly to test or seen face-to-face (F2F) to assess fitness level, or if the patient is felt not to have fully grasped all the issues and needs further explanation.

A satisfaction survey was carried out asking the following questions:

- Did your referring doctor tell you that you had been referred on the cancer pathway?
- Did you know what the phone call was going to be about?
- How did you feel about having a phone call as your first appointment?
- Was the hospital doctor who called you clear about:
    - what it was they were investigating?
    - what your scans and X-rays showed?
    - what the next steps would be?
- Please comment on how we could further improve the service.

The results from the first 111 patients going through the pathway showed high satisfaction with the service; scores were above 93% in all parameters pertaining to the telephone consultation. Despite initial misgivings about having a telephone conversation as the first contact, our survey shows that the patients appreciated it as it gets them to a diagnosis or reassurance of no cancer diagnosis sooner.

After the survey we changed a few processes to improve the quality of the experience.

- There were several patients who had dementia and so were not suitable for a telephone call. After the survey we added an extra question into the referral form for the GP to check that a telephone call was appropriate.
- A significant number of people had expressed a preference for a F2F OPA as their first contact so we now give them the option of coming to a F2F OPA within the same week, rather than pushing on with the call.

We advocate the use of this system. Provided the GP screens the patients as being suitable for a telephone consultation, the patient is given the choice of whether they want to continue with a phone call, and the consultant carrying out the call brings frail/comorbid patients to a F2F OPA before sending off for tests. We have found this to be a safe service with high patient satisfaction.

Conflicts of interest: None declared.

The 'CURE IT' programme – introducing equity, removing barriers, and treating patients with hepatitis C close to home: the Queensland experience

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Background and aims

Healthcare delivery in Queensland has geographical challenges including distance, transport and distribution of specialists and services. Hepatitis C virus (HCV) affects approximately 230,000 people in Australia. In 2016, the Pharmaceutical Benefits Scheme facilitated primary care prescribing of the new direct-acting antivirals (DAAs). Traditional HCV treatment occurred in tertiary hospitals, requiring patient travel, multiple attendances and missed appointments.

The 'CURE IT' programme facilitates a shared model of care between community prescribers and hospital specialists, while providing clinical, financial and a best practice governance encouraging appropriate treatments. The 'CURE IT' programme is 'echo-lite', utilising a clinical nurse and hospital consultant offering daily advice to municipal, regional and remote communities, needle exchange workers and hospital prescribers. All patient treatments are facilitated by the treating general practitioner (GP) close to home. Patients with advanced liver disease were referred before or after treatments.

Method

From March 2016 all referrals to the Prince Charles Hospital were reviewed for suitability for CURE-IT. Simultaneously, community providers were engaged and provided with written and verbal education regarding HCV treatment and the CURE IT programme. Completed pro formas containing relevant information (patient demographics, medical history, ultrasound and laboratory results) were returned to the specialist, whereupon, following review, patients were commenced on treatment in 1–2 business days. The average time taken for the specialist to review each request was 5–7 minutes.

Results

Between March 2016 and November 2018, 380 remote treatment requests were assessed:

- 371/380 (97.6%) patients approved for community-based treatment.
- 350/380 (92.10%) patients, GP commenced DAA therapy
- 371/380 (97.63%) patients avoided hospital visits
- 9/380 (2.37%) patients referred for specialist review
- 220/350 (62.85%) patients completed therapy
- 218/220 (99%) patients achieved sustained virologic response (SVR)
- 38/380 (10%) patients lived 70–647 km from Brisbane
    - 1,200–1,600 outpatient appointments avoided
    - >44,000 km of travel avoided.

Conclusion

CURE-IT has redefined specialist healthcare delivery achieving SVR in 99% of patients, not one of whom have attended hospital. Other endpoints have resulted in a 'patient-centred, patient-focused programme' of factors most important to patients – treatment closer to home, treatment by a trusted GP, reduction of hospital visits, reduction in time lost from work, reduction in financial loss for patients and distance travelled by patients, and this may all be doubled if partners also attended. The CURE IT programme has also had unintentional network gains including: dynamic collaborative relationships with primary care;

increased awareness of HCV, liver disease, cirrhosis, liver cancer and treatments, leading to upskilling of regional and rural healthcare workers.

Conflicts of interest

None declared.

RESEARCH AND INNOVATION

Parasite histones mediate blood–brain barrier disruption in cerebral malaria

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Introduction

Cerebral malaria (CM) is a severe complication of *Plasmodium falciparum* infection. Despite effective antimalarial drugs, 10–20% of children developing CM die, contributing to 400,000 malarial deaths per year, mostly in children in sub-Saharan Africa.[1,2] A defining feature of CM is the cytoadherence of *P falciparum*-infected erythrocytes (IE) to vascular endothelial cells and their sequestration in the microvasculature, which is observed by retinopathy. Microvascular thrombosis and blood–brain barrier breakdown are key components of CM pathogenesis.[3,4] We have previously demonstrated that elevated circulating histones, released from damaged host cells, bind to cell membranes and cause coagulation activation, platelet aggregation, microvascular thrombosis and vascular leak in critically ill patients.[5–8] The aim of this study was to investigate whether histones are released from parasites to play a pathological role in CM.

Materials and methods

Children aged 6 months – 16 years were recruited at Queen Elizabeth Central Hospital, Blantyre, Malawi between January 2010 and August 2011; inclusion criteria were described previously.[9] Children who met World Health Organization criteria for CM underwent funduscopic examination by an ophthalmologist: characteristic retinal changes are strongly associated with sequestration of IE in the brain and distinguish children with stringently defined retinopathy-positive (ret-pos) CM from those with retinopathy-negative (ret-neg) CM, to which malaria makes a variable contribution to coma aetiology.[1] Healthy controls were children attending elective surgery. Circulating histones were quantified by Western blot, and mass spectrometry was used to determine the origin of histones. Endothelial toxicity and leakage assays were performed using primary human brain microvascular endothelial cells. Magnetic resonance imaging (MRI) images acquired on admission were scored independently by two radiologists, blinded to patient details.[3] Formalin-fixed post-mortem brain tissues from Malawian children with fatal encephalopathic illness were collected and stained for histones and fibrinogen.

Results and discussion

Using Western blot and mass spectrometry, we demonstrate that extracellular histones are significantly elevated in the circulation of CM patients compared with controls, with over 50% released from parasites. Circulating histones were significantly elevated in ret-pos CM compared with ret-neg CM. Serum from patients with ret-pos CM or purified *P falciparum* histones are toxic to cultured human brain endothelial cells and cause disruption of barrier function. This can be reversed by anti-histone antibodies and non-anticoagulant heparin. On post-mortem brain sections of patients with CM, we found that histones are co-localised with *P falciparum* parasites sequestrated within the brain vasculature, suggesting that histones may be locally released from parasitic breakdown. Histone staining on the luminal vascular surface is strongly associated with thrombosis and leakage, indicating coagulation activation and endothelial disruption. High levels of circulating histones were significantly associated with the extent of brain swelling on MRI, providing further clinical evidence for the role of histones in this process.

Conclusion

Our data strongly suggest that parasite histones play key roles in thrombosis and swelling in the brain, processes implicated in the causal pathway to death in CM. Neutralising histones with agents such as non-anticoagulant heparin holds great promise to prevent the development of CM and reduce mortality of children with malaria.

Conflicts of interest

None declared.

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A systematic review of the safety of non-tumour necrosis factor inhibitor and targeted synthetic drugs in rheumatic disease in pregnancy

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Background

Despite increasing evidence to support safe use of tumour necrosis factor inhibitor (TNFi) drugs in pregnancy, there remains a paucity of evidence regarding non-TNFi and targeted synthetic disease-modifying anti-rheumatic drugs (tsDMARDs) in pregnancy. Therefore, we conducted a systematic review to summarise use of these drugs in pregnancy and breastfeeding.

Method

We performed a systematic search of databases including EMBASE, PubMed (MEDLINE) and Cochrane up to December 2018, using keywords including commonly prescribed non-TNFi and tsDMARDs, pregnancy, conception/pre-conception, lactation/breastfeeding, childhood and vaccination/infection.

Results

From an initial screen of 700 papers, 92 full-text papers were included in the final analysis. A summary of findings from known outcomes of pregnancy and breastfeeding exposures, as well as long-term follow-up of infants where available, is shown in Table 1. Overall, these data do not identify an increased risk of adverse pregnancy outcomes with these drugs in this population of patients.

Table 1. Summary of maternal exposure to non-tumour necrosis factor inhibitor and targeted synthetic disease-modifying anti-rheumatic drugs

Drug	Studies	Pregnancy exposures	Live births	Spontaneous miscarriages	Congenital malformations	Breastfeeding exposures	Adverse effect of drug
Abatacept	3ct, 1cs	151	87	40	4	ns	No
Anakinra	4cs, 2cr, 2ct	46	43	ns	1	13	No
Belimumab	4cr, 2rv	250	104	58	12	ns	No
Canakinumab	1cr, 1ct	9	8	1	ns	4	No
Ixekizumab	1ct	3	ns	ns	ns	ns	ns
Rituximab	22cr, 9cs, 4ct	198	131	36	3	2	No
Secukinumab	1cr	1	0	1	ns	ns	ns
Tocilizumab	2cs, 4ct	361	220	82	59	4	No
Tofacitinib	1cs	41	26	7	1	0	No
Ustekinumab	7cr, 7cs, 2ct	29	26	4	0	ns	No

cc = case–control; cr = case report; cs = case series; ct = cohort; ns = not stated; rv = review.

Conclusion

These findings do not suggest an increased risk of non-TNFi and tsDMARDs in pregnancy. However, given that the total number of exposures remains limited, these drugs should only be considered in pregnancy if

the benefit of maintaining disease control in the mother justifies any potential risk to the fetus. This body of evidence will be useful when counselling women about the potential risks of using these types of drugs during pregnancy and the breastfeeding period, as well as following accidental exposure to drugs at conception.

Conflicts of interest

None declared.

Change in blood test results prior to diagnosis in multiple myeloma

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Introduction

Multiple myeloma is a plasma cell malignancy, with one of the longest diagnostic pathways of all cancers in the UK.[1] Delay in diagnosis in myeloma is associated with poorer prognosis and more advanced disease.[2] End organ damage is often present at diagnosis,[3] detectable on blood tests as anaemia, renal impairment and hypercalcaemia – recognition often relies on these features. Other blood test abnormalities occur, including raised total protein, or raised calculated globulin (total protein minus albumin) which reflects total immunoglobulin levels.[4] Previous research suggests that some abnormalities may be present for years before diagnosis.[5,6] This may allow strategies to detect these changes earlier, and prompt automated testing to reduce diagnostic delay. This research aimed to assess blood test abnormalities present at diagnosis with multiple myeloma, and change over time before diagnosis.

Methods

Data were collected for all patients diagnosed with multiple myeloma at the Queen Elizabeth Hospital Birmingham between 2007 and 2017. Patients were identified using clinical coding. Blood test results available on clinical systems up to the date of diagnosis were collated. Calculated globulin was determined for each result and compared with immunoglobulin results from the same sample using Spearman's rank order correlation. Test results were grouped in 90-day intervals preceding date of diagnosis. Mean results for each test were calculated for each interval and change was assessed using one-way repeated measures ANOVA.

Results

Using the above criteria, 285 patients were identified. In total, 56,711 individual tests were available. Per patient, this ranged from 10 results (one full blood count) to 2,535 individual tests spanning 13 years. The most common abnormalities at diagnosis were low haematocrit (86%), anaemia (81%), raised total protein (49.8%) and raised creatinine (44.5%).

There was a statistically significant decline in mean haemoglobin over 2 years prior to diagnosis ($p<0.0005$). Haematocrit appeared to decline over the same time, but this was not statistically significant. There appeared to be an increase in mean corrected calcium and creatinine in the 90 days preceding diagnosis, but not before.

Calculated globulin ranged from 13 g/L to 133 g/L, and was raised in 43.8% of patients and low in 2.5%. Calculated globulin correlated well with total immunoglobulin levels (combined IgG, IgA and IgM) with a strong positive correlation ($rs(73)$ 0.961; $p<0.0005$; Fig 1). However, the relationship between calculated globulin and each immunoglobulin class separately was not linear (Fig 2).

Fig 1. Correlation between calculated globulin and sum total of immunoglobulin G, immunoglobulin A and immunoglobulin M.

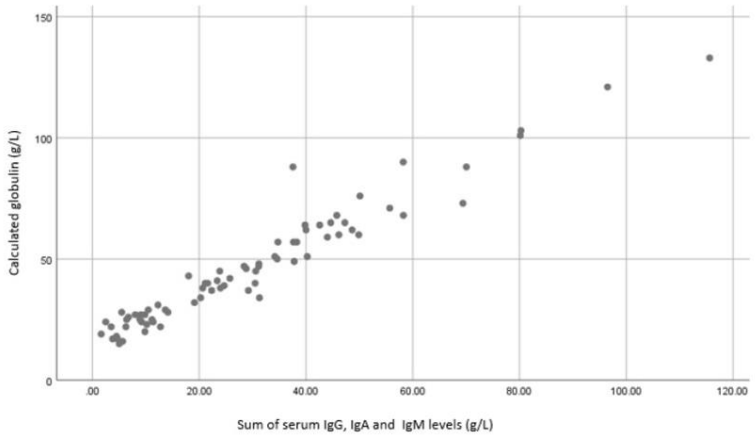
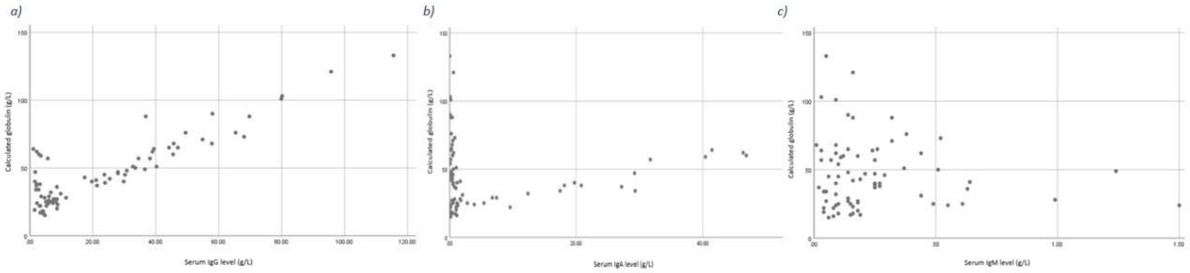


Fig 2. Correlation between calculated globulin and individual classes of immunoglobulin.



Discussion

Abnormalities that are often used to prompt testing, for instance hypercalcaemia, raised total protein and abnormal renal function, are abnormal in fewer than half of patients with myeloma at diagnosis. It is important to highlight this in education and awareness campaigns, as normal results should not prevent testing.

Haemoglobin declines over at least 2 year prior to diagnosis. A gradual unexplained fall in haemoglobin could be used to identify patients for testing.

Calculated globulin is an accurate reflection of the total immunoglobulin level. An abnormal calculated globulin may prompt testing for myeloma, but normal calculated globulin cannot rule out myeloma, due to a fall in the uninvolved classes of immunoglobulin, so cannot be used alone as a screening test.

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Conflicts of interest

None declared.

The genetic landscape of hepatitis delta virus infection

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Introduction

Hepatitis delta virus (HDV) is a small, defective ribonucleic acid (RNA) virus that requires hepatitis B virus (HBV) for entry into hepatocytes, but its genome replication is independent of HBV. Over 15 million people are infected by HDV worldwide, always occurring in the presence of HBV.[1] HBV/HDV co-infection is associated with an acceleration of liver disease, leading to cirrhosis, liver cancer and eventually liver failure. Transmission occurs parenterally through contact with infected blood and body fluids.[2]

HDV is highly variable, and eight genotypes have been identified to date.[3] This variability has a great impact on identifying standardised diagnostic tools, as well as specific direct anti-HDV drugs. Currently, the standard treatment for HDV consists of a 48-week course of pegylated interferon α (PEG-IFN-α), but it is highly ineffective, with a sustained virological response rate of 25%.[4] Novel agents such as Myrcludex B have shown promise but remain in the development pipeline.

The aim of the study is to sequence and genotype HDV samples of patients managed at the Royal London Liver Unit. Moreover, mutational analysis was conducted to confirm the high variability of HDV.

Materials and methods

Sixteen patients with HDV were identified from the Liver Unit at Barts Health NHS Trust. Ten (62.5%) were male, with a median age of 37 years old. Ten (62.5%) patients were originally from Europe, four (25%) from Africa and two (12.5%) from Asia.

Plasma samples were collected and viral RNA was inactivated and extracted. Reverse transcription was performed to obtain viral complementary deoxyribonucleic acid. A specific sequence of the virus was amplified, which was then sequenced using the Sanger technique. Mutational analysis and sequence alignment allowed the generation of a phylogenetic tree using MEGA©.

Results and discussion

Mutational analysis showed the presence of quasispecies, which define the high variability of nucleotides within the viral pool in each patient. This is due to the high replication rate of the virus and the lack of an error-checking mechanism. Sequence alignment also confirmed the high variability of HDV.

Finally, phylogenetic analysis using MEGA© allowed genotyping and subtyping of the 16 samples. Fifteen samples were found to be genotype 1. This was coherent with our expectations, considering that genotype 1 is the most prevalent. One sample was found to be genotype 5 – this was also coherent, as genotype 5 is predominantly found in sub-Saharan Africa, which is where this specific patient is originally from.

Conclusion

In conclusion, the project aims were met, and the study provides valuable information which will add to the current limited understanding of HDV.

Future work will focus on full-length sequencing and next-generation analysis of HDV from the same cohort of patients. This will aid in the identification of the HDV quasispecies, which will be used to provide a better understanding of the biological events in HDV infection, as well as to improve diagnostic assays and treatment decisions.

Conflicts of interest

None declared.

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Feasibility of transradial multi-vessel percutaneous coronary intervention to both left and right coronary arteries by using Judkins left as a multipurpose guiding catheter

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Introduction

Appropriate guiding catheter selection in transradial percutaneous coronary intervention (PCI) is important for procedural success. Use of separate guiding catheters for multi-vessel PCI to both right and left systems requires catheter change, leading to increased radial artery spasm, patient discomfort during exchange, increased procedural time, fluoroscopy time and cost.

Materials and methods

This prospective single-centre study included patients undergoing transradial PCI of right and left systems from January 2016 to December 2018. They were assigned to two groups: single left-sided guide vs separate right and left guide. Patients requiring acute ad hoc PCI to the right coronary artery (RCA) first were excluded. We statistically analysed contrast volume, procedural time, radiation time and radial artery spasm between the two groups.

Cannulation technique: default access was right radial, unless right radial pulse was impalpable. Judkins left (JL) or appropriate left-sided catheter was engaged for left-system PCI. After completing left-system PCI, guide was disengaged, advanced to the floor of right coronary sinus, then turned clockwise while continuing to push its tip down with gentle manipulation. In some cases, a 0.035" wire was used to assist engagement.

Results and discussion

In total 937 patients were included. Of these, 451 (48.1%) were in the group with single left-sided guide use. In the other group, 486 (51.9%) had separate right and left guide use. In the single guide (JL) group, 367 (81.4%) underwent double-vessel PCI, 84 (18.6%) underwent triple-vessel PCI. 41.5% underwent PCI to the left anterior descending coronary artery (LAD) and RCA; 39.9% underwent PCI to the left circumflex artery (LCx) and RCA. JL 3.5 5 French (F) catheter was most frequently used (96.1%). JL 3.5 6 F, JL 3.0 6 F and Ikari left (IL) 3.5 5 F guides were used in 1.5%, 0.9% and 1.5% of patients respectively. Compared with the group with separate guide catheters, a single guide catheter was associated with significantly lower procedural times (p=0.032) and radial artery spasm (p=0.02), most frequently seen during catheter exchange. Contrast volume was lower in the single guide catheter group. Switchover from JL to right-sided guide was 0.66%, mostly in case of chronic total occlusion of RCA, necessitating better back-up support.

The search for the ideal multipurpose guide is not new, but certainly not over. Previous authors have reported the feasibility of using JL guides as multipurpose catheters, owing to their resemblance to the universal transradial diagnostic Tiger catheter, when the secondary curve of a JL catheter is straightened with a Teflon guidewire.[1] The present study, however, is the first to demonstrate a significant reduction in radial spasm and procedure time with a single JL guide use. Another study reported the feasibility of 6Fr IL 3.5 as a universal guide for both-system PCI, with the limitation of a learning curve.[2]

A reduction in fluoroscopy and procedural times is particularly important for high-volume operators. A reduced incidence of radial spasm, increased patient comfort and reduced cost make such a universal guide particularly convenient in high-volume centres.

Conclusion

Except in certain exceptional circumstances, the use of a JL guide as a multipurpose catheter is a safe and feasible option for both-system transradial PCI, resulting in less procedural time and reduced radial spasm.

Conflicts of interest

None declared.

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Role of apoptosis in the hypoxic regulation of human embryonic stem cells

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Background

Human embryonic stem cells (hESCs) are pluripotent cells that originate from the inner cell mass of a blastocyst. Their limitless differentiation capacity and ability to self-renew, also known as 'stemness', give them great potential in regenerative medicine. However, hESCs need to be maintained as a highly proliferative and pluripotent population to be used in clinical application.[1] Much evidence suggests that a hypoxic (5% oxygen) culture is more beneficial in maintaining hESC stemness than atmospheric (20% oxygen) cultures.[1–4] Studies have shown a higher expression of transcription factors NANOG, SOX2 and OCT-4, which regulate hESC pluripotency, and a lower rate of apoptosis in hESCs cultured at 5% oxygen compared with those maintained at 20% oxygen. This is perhaps not surprising since the pre-implantation embryo develops in a hypoxic reproductive tract, ranging from 1.5–5.3% oxygen concentration.[5]

However, the regulation of apoptosis in hESCs under hypoxia has been largely overlooked.[6] BCL2 anthogene 1 (BAG1) is a recently discovered multifunctional protein that is involved in many cellular processes including apoptosis, transcription, proliferation, cell signalling and differentiation.[7] BAG1 expression has been shown to be upregulated in mesenchymal and trophoblastic cells under hypoxia, suggesting that its expression may be regulated by environmental oxygen tensions.[7] BAG1 is overexpressed in many cancers, suggesting that it may contribute to cancer pathogenesis by increasing resistance to apoptosis.[8] BAG1 knockout experiments in mice have demonstrated its requirement for the survival and differentiation of haematopoietic and neuronal cells.[8]

This study therefore aimed to investigate whether BAG1 has a role in regulating the increased proliferation of hESCs observed at hypoxic conditions and whether it has an effect on hESC self-renewal.

Methods and results

Immunocytochemistry showed that BAG1 is expressed in hESCs, suggesting that it may have a function in the maintenance of hESC stemness. It showed that BAG1 expression was localised to both the cytoplasm and nucleus in hESCs cultured at both 5% and 20% oxygen. But Western blotting showed no significant difference in BAG1 expression between hESCs cultured at 5% oxygen tension and those maintained at 20% oxygen tension (Fig 1). This suggests that BAG1 expression in hESCs is not dependent on environmental oxygen tensions.

BAG1 was also silenced in hESCs cultured at 20% oxygen using small interfering ribonucleic acid, which showed no significant effect on OCT-4 expression in hESCs compared with negative control (Fig 2). This suggests that BAG1 does not regulate hESC self-renewal. A recent publication by Tang *et al* (2017) supported this finding in murine embryonic stem cells (mESCs), and reported that BAG1 homozygous knockout mESCs had a normal karyotype and maintenance of pluripotency.[9]

Fig 1. BAG1 expression is not significantly different in hESCs cultured at hypoxia compared with hESCs maintained at atmospheric oxygen. A) Representative blot where data were normalised to β-actin and to 1 for expression at 5% O_2. B) No significant difference in total BAG1 expression. C) No significant difference in BAG1 S, M and L expression (n=5). Bars represent mean ± standard error of the mean.

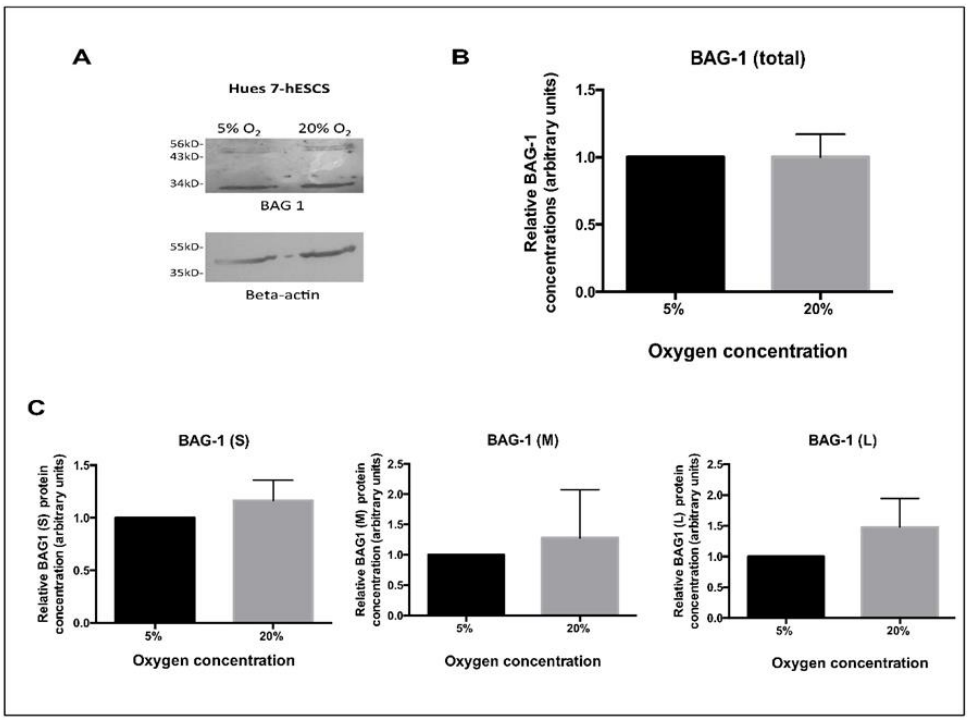
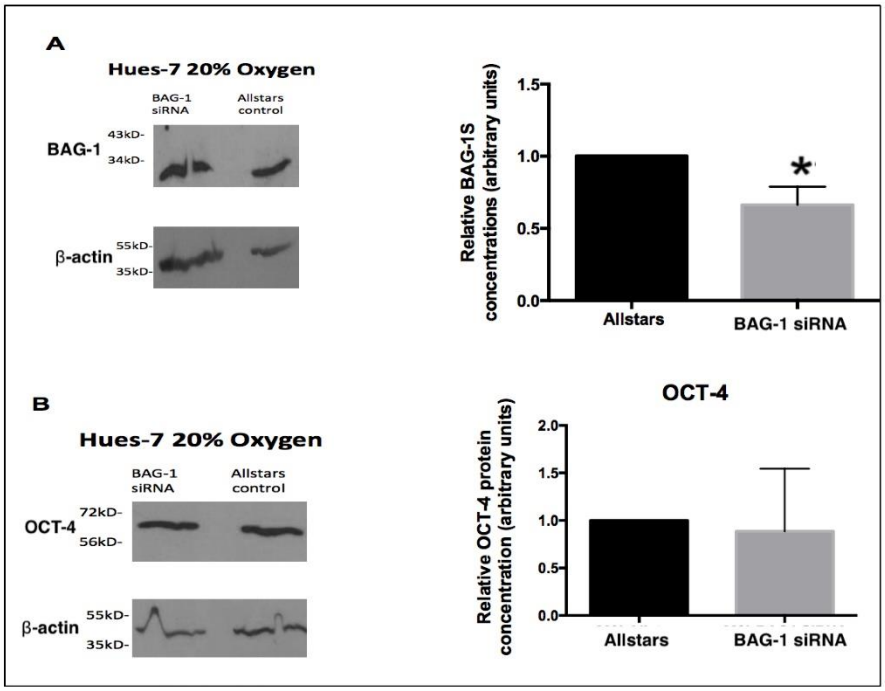


Fig 2. BAG1 does not regulate OCT-4 expression. Human embryonic stem cells cultured at 20% O_2 were transfected with either an Allstars control small interfering ribonucleic acid (siRNA) or BAG1 siRNA. A) BAG1 expression in human embryonic stem cells transfected with BAG1 siRNA was significantly reduced (p=0.0435; n=3). B) No significant difference in OCT-4 expression in BAG1 siRNA-transfected human embryonic stem cells (n=3). Data were normalised to β-actin and to 1 for control siRNA-treated cells. Bars represent mean ± standard error of the mean.



Conclusions

The present study therefore shows that BAG1 does not play a role in the hypoxic response of hESCs and that perhaps other pro-survival proteins may be involved. Gene expression profiling comparing anti-apoptotic gene expression, including BAG1, between hESCs and cancer cell lines showed that only two anti-apoptotic factors, BCL10 and BIRC5 (survivin), are preferentially expressed in hESCs.[10] Future work should therefore be directed to elucidating the roles of other anti-apoptotic proteins in hESCs.

Conflicts of interest

None declared.

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Expression of neurones and neuronal precursors in the transition zone of short-segment Hirschsprung's disease

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Introduction

Hirschsprung's disease (HSCR) is a congenital disorder of dysfunctional enteric nervous system (ENS) development, resulting in distal aganglionosis of the bowel.[1] The cellular composition of the transition zone (TZ), the region between the distal aganglionic bowel and normally innervated ganglionic bowel, is not well understood. Some children have resectional surgery in which TZ bowel is left *in situ*, with variable effects on functional outcome.[2] Understanding the cellular anatomy of this region may aid in understanding the aetiology of HSCR and the effects of TZ pull-through on outcome, in addition to permitting the development of safe and effective use of ENS progenitor cells as therapy.

This work aimed to characterise the TZ of short-segment HSCR bowel, by assessing the expression of ENS and neuronal markers by immunofluorescence and quantitative polymerase chain reaction (qPCR).

Materials and methods

Human bowel was collected following a pull-through procedure in four patients with short-segment HSCR. Protein expression of ENS and neuronal markers (p75, SOX10, PHOX2b, Hu and GLUT1; Table 1) in ganglionic, proximal and distal TZ and aganglionic region of the bowel was visualised through immunofluorescence, and mRNA levels of the corresponding markers were quantified using qPCR.

Table 1. Neuronal markers studied in different regions of the bowel

Neuronal/precursor marker	Description
p75	ENCC marker
GLUT1	Glucose transporter and expressed in perineurium of nerves
Hu	Human neuronal marker
SOX10	ENCC and glial cell marker
PHOX2b	ENCC and neural cell marker

ENCC = enteric neural crest cell.

Results and discussion

Immunofluorescence analysis showed a gradual loss of SOX10, PHOX2b and Hu protein in the lower TZ and absence in the aganglionic region. However, generally the expression of ENS and neuronal markers presented with inter-patient variability within the TZ. In contrast, GLUT1 was highly expressed in the perineurium of thickened nerve trunks, characteristic of the aganglionic region. Perineurial structures positive for GLUT1 were also visualised in the TZ, but to a lesser extent than in the aganglionic region. This observation corresponded with a decrease in mRNA levels of p75, SOX10, PHOX2b and Hu from the ganglionic to the aganglionic region and an increase in GLUT1.

While SOX10, PHOX2b and Hu positivity was not observed by immunofluorescence in the aganglionic region of bowel, mRNA of each marker was detected at low levels in each region via qPCR. Immunofluorescence visually detects protein expression, while qPCR quantifies mRNA levels. As mRNA is eventually transcribed into a protein, it may be assumed that there is a correlation between mRNA and protein levels, with qPCR and immunofluorescence results complementing each other. However, due to the many complicated and varied post-transcriptional mechanisms involved in protein production from mRNA, there is potential for

poor correlation between mRNA and protein expression, hence the potential for differing results between the methods.[3]

Conclusion

This work displayed a trend of a decreasing number of cells expressing ENS and neuronal markers from the ganglionic and aganglionic region, through the TZ. However, our analysis reveals inter-patient variability in the cellular composition of HSCR bowel, especially in the TZ. This finding may explain the variable functional outcome for HSCR children with TZ pull-through.

Conflicts of interest

None declared.

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Humoral factors in serum of rats with chronic heart failure induce cardiomyocyte hypertrophy and reduce viability

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Introduction

Myocardial infarction (MI) is one of the leading causes of global mortality. Over the last decade, acute MI mortality has significantly decreased; however, fatal heart failure remains a common complication for post-MI survivors.[1] Lack of oxygen due to MI causes cardiac tissue necrosis and, as a result, the induction of a pro-inflammatory environment. The necrotic tissue is replaced with a fibrotic scar rather than new cardiomyocytes. Excessive inflammation can result in increased death of cardiomyocytes and increased fibrosis, which reduces cardiac function.[2] To optimise cardiac function, the heart may undergo hypertrophy. Although initially the hypertrophic response is advantageous, sustained hypertrophy is a contributor to heart failure.[3]

Here, we assess whether rodent chronic heart failure (CHF) serum contributes to the induction of cardiomyocyte hypertrophy and cell death.

Materials and methods

MI was induced by the surgical ligation of the left anterior descending (LAD) artery in adult male Sprague Dawley rats. Serum was collected from healthy controls, and 2 weeks (acute) and 16 weeks (CHF) post-MI.

Primary adult cardiomyocytes were isolated from healthy rats and treated with control and CHF serum for 24 and 48 hours for apoptosis and cytotoxicity assays.

Serum from healthy and CHF rats was further used to stimulate the HL-1.6 cardiomyocyte cell line for quantitative PCR (qPCR) expression analysis of α-myosin heavy chain (*MYH6*) gene, and the hypertrophic genes β-myosin heavy chain (*MYH7*), atrial natriuretic factor (*NPPA*) and brain natriuretic peptide (*NPPB*).

Results and discussion

CHF serum applied to healthy adult cardiomyocytes for 24 h resulted in increased apoptosis compared to stimulation with healthy serum (25.91±4.53 (mean ± standard error of the mean; control; n=5); 53.13±3.961 (CHF; n=10); p=0.0025). CHF serum stimulation for 24 h and 48 h showed reduced viability due to increased cytotoxicity compared to stimulation with healthy serum (day 1: 83.75±0.9287 (control; n=5); 73.45±2.722 (CHF, n=7); p=0.0178; day 2: 86.66±1.294 (control; n=5); 73.43±3.508 (CHF; n=7), p=0.0066).

The increase in apoptosis and cell death of cardiomyocytes after CHF serum stimulation suggests the presence of humoral factors in CHF serum that cause direct damage to the cardiomyocytes.

To assess the effect of CHF on cardiac hypertrophy, CHF serum was applied to a cardiomyocyte cell line (HL-1.6). This did not cause a significant change in the expression of *NPPA*, *NPPB* and *MYH6* compared to control serum. However, CHF serum induced a significant increase in *MYH7* expression compared to control (fold change 0.88±0.08 (control; n=5); 1.2±0.05 (CHF; n=8); p=0.0061). Importantly, the *MYH7/MYH6* ratio also increased (fold change 2.59±0.58 (control; n=5); 4.19±0.49 (CHF; n=8); p=0.0322).

A previous study suggests that the increase in *MYH7* alone is sufficient to cause cardiac deterioration.[4] Furthermore, it has been proposed that the shift from *MYH6* to *MYH7* expression might play a role in cardiac disease progression.[4] Thus, the increase in *MYH7* expression and *MYH7/MYH6 r*atio indicates a hypertrophic response.

Conclusion

These findings suggest that humoral factors present in CHF serum may be involved in the induction of the cellular processes leading to persistent myocardial damage and pathological cardiac hypertrophy.

Conflicts of interest

None declared.

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Prevalence of hypogonadism in young obese males

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Background

Ageing, obesity and chronic illness are major factors affecting serum testosterone (T) levels in men. The magnitude of the impact of ageing on serum T levels is well established; for obesity this is less clear.[1–4] Severe obesity may lead to isolated hypogonadotropic hypogonadism (IHH). Several explanations have been offered to clarify the presence of reduced T levels in obese men. One relates to the technique that is generally employed to measure serum androgen levels, ie measurement of total testosterone (TT) instead of free testosterone (FT). TT represents the sum of FT and T bound to albumin and sex hormone-binding globulin (SHBG). A profound reduction in SHBG level is commonly found in obese men, and this is a major factor causing a decrease in TT.[4]

Measurement of FT levels may provide a more accurate assessment of androgen status than the (usually preferred) measurement of TT in situations where SHBG levels are outside the reference range. However, reference ranges for FT levels are not well established, especially in older men, and some have argued that the measurement of FT levels merely reintroduces age in a covert form.[5,6] This is a cross-sectional study to estimate prevalence of hypogonadism in young obese males.

Methods

The present study was carried out at Armed Forces Medical College and Command Hospital, Pune, India between October 2017 and August 2019. In this study 147 young obese men participated, and we confirmed low TT levels in 35.4% of participants with a p-value of 0.06.

Results

We studied to see whether there is association between T levels and body mass index (BMI; Table 1). In our study we found no statistical association as the p-value was 0.26 (>0.05).

Table 1. Presence of hypogonadism in study participants.

Hypogonadism (T <3, LH <9)	Number, n	Percentage, %
Present	35	23.8
Absent	112	76.2
Total	147	100

LH = luteinising hormone; T = serum testosterone.

Discussion

Since only TT was measured for categorising subjects with or without hypogonadism, FT measurement would be a better indicator for the diagnosis of hypogonadism in cases where the TT is borderline low or when SHBG concentrations are abnormal. As such, the study is valuable in the context of the ongoing controversy as to whether T treatment should be limited to men with classical hypogonadism, or be considered for appropriately selected men with functional hypogonadism as well. The principal findings are in general agreement with existing literature reporting correlation between levels of T, BMI and constitutional symptoms.[7–10] However, this has never been shown before in the context of the Indian population.

Conflicts of interest

None declared.

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Mortality risk by peak serum creatinine in hospital episodes complicated by acute kidney injury

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Introduction

Acute kidney injury (AKI) is common in hospitalised patients and provides valuable prognostic information, although there is suggestion of negligible mortality difference between AKI stages 2 and 3.[1,2] AKI stage is principally determined by proportional serum creatinine (SCr) changes, not by absolute values. We hypothesised that establishing prognostic differences within and between AKI stages can be improved by using peak SCr (pSCr) values as well as proportional change. To address a secondary aim, we compared prognosis based on pSCr between patients with AKI and those with chronic kidney disease (CKD). This was to determine whether the outcome for any given SCr is worse in AKI or CKD.

Methods

Anonymised data for all adult inpatient episodes at Salford Royal Hospital from March 2014 to August 2018 were acquired as previously described.[3] Exclusion criteria were: pregnancy, renal transplant, maintenance dialysis, transfers for tertiary nephrology care, insufficient SCr data. AKI events were determined using the NHS England algorithm.[4] pSCr for each hospital episode was classified as ≤100, 101–200, 201–300, 301–400 or >400 µmol/L. Odds ratio (OR) for in-hospital death was determined for each pSCr category against a reference group of no AKI and pSCr ≤100 µmol/L, using binary logistic regression adjusted for age, gender and ICD-10 coded comorbidities. Results were compared between AKI stages and CKD status.

Results

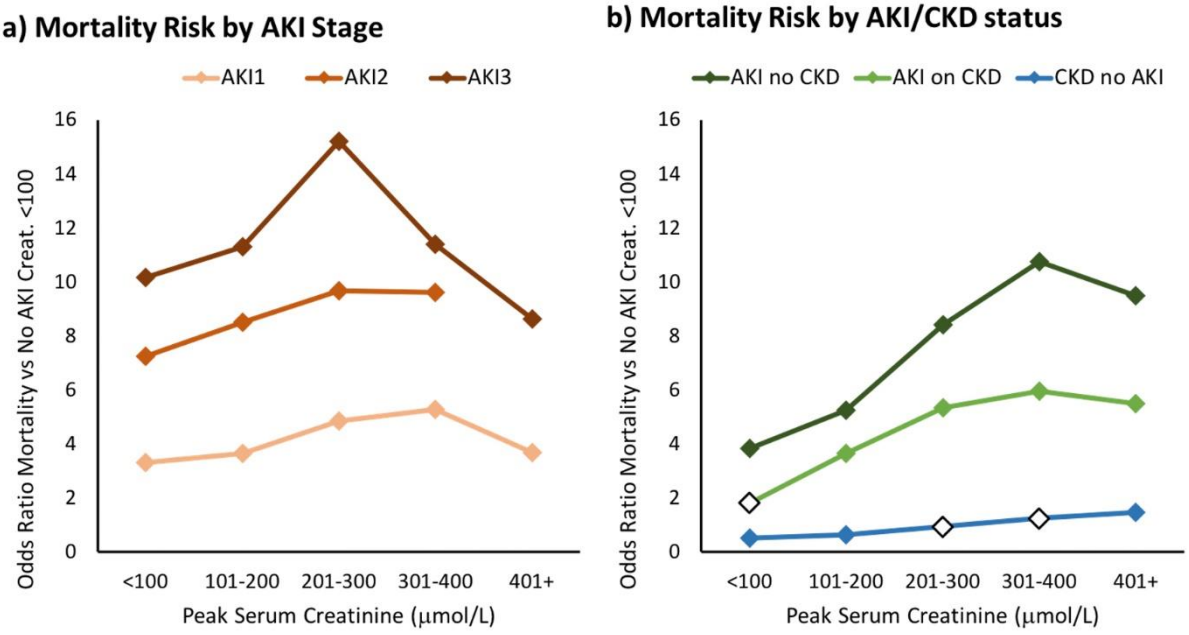
There were 163,428 inpatient episodes, of which 21,545 were excluded. Of 141,883 included episodes (52.6% female; mean age 56.5±22.1 years; CKD 5.9%; inpatient death 3.8%), 9.8% were complicated by AKI. Highest AKI stage was one in 9,339 (6.6%), two in 2,614 (1.8%) and three in 1,882 (1.3%). Table 1 displays the number of admissions, AKI and deaths in each pSCr classification, categorised by AKI stage and CKD status. Fig 1 displays the OR for mortality between pSCr categories. Mortality risk generally rose with increasing pSCr, and there was a greater risk with advancing AKI stage. The highest mortality risk was in AKI stage 3, pSCr 201–300 µmol/L (OR 15.22 (confidence interval 11.71–19.77); p<0.001). Of note, mortality risk was lower for pSCr >400 µmol/L in patients with AKI stages 1 (OR 3.70 (2.11–6.51); p<0.001) and 3 (OR 8.65 (7.19–10.41); p<0.001) compared with categories 201–300 and 301–400 µmol/L. In AKI stage 3, pSCr >400 µmol/L had the lowest OR across the range of pSCr, including pSCr ≤100 µmol/L (OR 10.18 (5.65–18.36); p<0.001). Sub-analyses showed that overall adjusted mortality risk was significantly higher in AKI stage 3 vs 2 (OR 1.25 (1.09–1.44); p=0.001), although when assessed across pSCr categories this was not significant at extremes. In patients with CKD, AKI was associated with significantly higher mortality across pSCr levels.

Table 1. Admissions and deaths in peak serum creatinine categories

	AKI stage 1	AKI stage 2	AKI stage 3	AKI no CKD	AKI on CKD	CKD no AKI
pSCr (µmol/L)	**n / deaths (%)**	**n / deaths (%)**	**n / deaths (%)**	**n / deaths (%)**	**n / deaths (%)**	**n / deaths (%)**
≤100	3,861 / 342 (8.9%)	458 / 80 (17.5%)	68 / 17 (25.0%)	4,335 / 433 (10.0%)	52 / 6 (11.5%)	1,594 / 41 (2.6%)
101–200	4,331 / 633 (14.6%)	1,475 / 367 (24.9%)	434 / 125 (28.8%)	5,684 / 1,018 (17.9%)	556 / 107 (19.2%)	3,944 / 141 (3.6%)
201–300	842 / 186 (22.1%)	547 / 176 (32.2%)	301 / 102 (33.9%)	1,288 / 370 (28.7%)	402 / 94 (23.4%)	782 / 37 (4.7%)
301–400	185 / 42 (22.7%)	132 / 42 (31.8%)	337 / 110 (32.6%)	443 / 145 (32.7%)	211 / 49 (23.2%)	200 / 12 (6.0%)
>400	120 / 15 (12.5%)	2 / 0 (0.0%)	742 / 194 (26.1%)	530 / 150 (28.3%)	334 / 59 (17.7%)	254 / 13 (5.1%)

AKI = acute kidney injury; CKD = chronic kidney disease; pSCr = peak serum creatinine.

Fig 1. Mortality risk by peak serum creatinine. A blank marker denotes that this odds ratio is not significant (p>0.05); all other results are significant (p<0.05).



Conclusion

Mortality risk is high in hospital episodes complicated by AKI and risk increases proportionately with AKI stage and pSCr, except in patients with pSCr >400 µmol/L. For a given pSCr, AKI carries significantly greater mortality risk than CKD. The absolute value of SCr has relevance for prognosis during inpatient AKI episodes, beyond that indicated by AKI stage alone.

Conflicts of interest

None declared.

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Outcomes of renal transplantation in adult patients with primary focal segmental glomerulosclerosis: a single-centre experience over 5 decades

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Introduction

Primary focal segmental glomerulosclerosis (FSGS) is a common cause of nephrotic syndrome in adults and children and often leads to end-stage kidney disease.[1] The aetiology may be immune mediated or due to genetic mutations affecting glomerular proteins. Primary FSGS frequently recurs following renal transplantation, with published reports of 30–50% of patients being affected.[2,3] A number of genetic mutations confer a very low risk of recurrent disease, and a more detailed understanding of the patient population is required in order to individualise pre-transplant counselling, and to identify patients at high risk of recurrence.[4]

Materials and methods

We performed a retrospective database search of all patients who received renal transplants at our centre since 1981 (n=3,908 transplants in n=3,533 patients) with end-stage renal failure (ESRF) due to primary FSGS. A detailed case-note review was undertaken to exclude patients with secondary FSGS. We evaluated the course of their native kidney disease, and their transplant outcomes including the incidence of recurrent FSGS and graft survival. The diagnosis of recurrent FSGS was made in patients with supportive transplant histology and proteinuria.[1]

Results and discussion

We identified 106 patients with primary FSGS who received renal transplants, representing approximately 3% of the transplant population. Detailed follow-up data were available for 75 patients, with a median follow-up time of 84 (±82) months. Of these patients, 48 (63%) were male and 27 (37%) were female, which reflects the higher preponderance of FSGS (1.5 times higher) in men in the general population. Median age was 43 (±18) years at time of transplantation and, where known, 30.5 (±67.5) years at the time of FSGS diagnosis. 66.7% (50) of the patients were Caucasian and 33.3% (25) were non-Caucasian (including Pakistani, Indian, Bangladeshi, Black Caribbean or other Black, or other Asian background, or did not state ethnicity). Genetic analysis revealed mutations in six patients: ACTNS4, NPHS2, ACTN4, INF-2 (n=2) and NUP107, but this analysis was not available for the majority of patients in our cohort. 52% of transplants were from deceased donors and 48% were from live donors.

In all patients with functioning grafts, the median graft estimated glomerular filtration rate (eGFR) was 46 mL/min and urine albumin to creatinine ratio (ACR) was 9.3 at median 96 months post-transplant.

We identified recurrent FSGS in 13 (17.3%) of patients. Recurrent disease was more common in young Caucasian men and typically occurred early post-transplant (median 1 month), but was observed as late as 3 years post-transplant. Recurrent disease was treated with plasma exchange (nine times) and/or rituximab (three times) in addition to maintenance immunosuppression with calcineurin inhibitor, anti-proliferative and corticosteroids. Despite treatment, recurrent disease led to graft failure in 10/13 cases, within median <1 month. No cases of recurrent disease occurred in patients with an identified genetic mutation.

Conclusion

Our study shows that the rate of recurrent FSGS observed in our centre over 5 decades is much lower than published rates (16.3%), but that recurrent disease is likely to lead to graft loss. Recurrent FSGS occurred more commonly in young Caucasian men. This information will guide more individualised risk counselling to our multi-ethnic urban population prior to renal transplantation.[4]

Conflicts of interest

None declared.

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OCT angiography (OCTA): investigating real-world experience in neovascular AMD new patient clinic when using OCTA compared to the gold standard FFA

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Introduction

Age-related macular degeneration (AMD) is the most common cause of irreversible blindness in the older population.[1]

Fluorescein angiography (FFA) is the gold standard investigation for AMD but it is invasive, takes 15 minutes to perform and some patients may experience allergic reactions to the fluorescein dye. Optical coherence tomography angiography (OCTA) has become increasingly used as a non-invasive and fast modality for imaging neovascular AMD (nAMD).[2]

Clinical studies have shown that the sensitivity of OCTA in detecting nAMD is 70% compared with the gold standard FFA. Most of the current literature uses the AngioVue RTVue XR from Optovue. This study aims to assess the usefulness of OCTA in patients with nAMD using the Topcon DRI OCT Triton and to also assess whether our model is comparable to current literature.

Materials and methods

Thirty-one patients were referred by community optometrists or from subspecialties within ophthalmology. They attended the rapid-access AMD clinic as new patients. The study looked at data from a real-life outpatient clinic at University Hospital of Wales, Cardiff.

Examinations included best-corrected visual acuity, dilated fundoscopy, standard structural optical coherence tomography (OCT), FFA and OCTA (using the Topcon DRI ICT Triton model). FFA images were graded. OCTA images were reviewed and graded to determine whether choroidal neovascular membrane (CNV) was seen.

Results and discussion

FFA and OCTA images were taken from the 31 patients. Their mean age was 80.7 years. Of the 31 patients, CNV was identified on FFA in 29 eyes, compared with 24 eyes on OCTA. Of the 24 CNV identified on OCTA, 23 were also identified on FFA and one was not seen on FFA.

When using FFA images as the gold standard, sensitivity and specificity of OCTA images were calculated as 79.3% and 83.3% respectively.

Six OCTA images were excluded, including two due to poor image quality and four having no identifiable neovascular networks.

Conclusion

OCTA is an imaging modality with great potential. Despite Topcon DRI having little published evidence examining its use in AMD, this study has produced sensitivity levels of 79.3%, which proves that this model can provide similar outcomes to models (such as the AngioVue RTVue XR) used in other studies.

Overall, the high levels of sensitivity and specificity that this study has produced could mean a significant reduction in the number of FFAs being carried out in the diagnosis of nAMD. Although it is unlikely that OCTA will fully replace FFA, treatment for nAMD can be started in patients where CNV is obvious on OCTA.

Conflicts of interest

None declared.

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The truth behind the pubic rami fracture: identification of pelvic fragility fractures at a university teaching hospital

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Introduction

Older patients presenting on the acute medical take with pelvic fragility fractures (PFF) represent an increasing epidemic.[1] The most common pelvic fracture identified by plain X-ray is that of the pubic rami.[2] PFF are painful and despite optimal analgesia, many of these patients struggle to mobilise. Between 60% and 80% of patients have fractures of the posterior pelvic ring, namely of the sacrum, which are overlooked and not visible on plain X-ray.[3,4] Sacral fractures are unstable and load-bearing, thus increasing the likelihood of pain-dependent mobility reduction and the risks that this poses in an older population.[5] Minimally invasive sacroplasty is available and has been shown to improve pain-related outcomes.[6,7] We aimed to quantify the number of patients progressing to further pelvic imaging in the form of computed tomography (CT) or magnetic resonance imaging (MRI) and the prevalence of combined pubic rami and sacral fractures.

Methods

We carried out prospective screening of pelvic imaging in patients aged 70 years or over presenting to Nottingham University Hospitals NHS Trust over a 10-month period (October 2018 to July 2019). Patients with a traumatic mode of injury or concurrent hip or pathological fracture were excluded from analysis.

Results

One hundred and twenty-five predominantly female (83%) patients with an average age of 86 years presented with acute fragility fractures of the pubic rami on plain X-ray. Eighteen per cent were discharged direct from the emergency department, 47% were admitted under elderly medicine, 30% under trauma and orthopaedic, and 5% under other specialties. Thirteen per cent had concurrent acetabular fractures identified on X-ray. Only 26% of patients received further pelvic imaging, by CT or MRI. In those patients who received further imaging, 88% confirmed acute pubic rami fractures, 41% showed acetabular fractures and 63% showed sacral fractures of all types. Three per cent (n=1) showed fracture of the ilium. Overall, 53% of patients who received further imaging were diagnosed with a combined fracture of the public ramus and sacrum, and 9% (n=1) with a combined fracture of the pubic ramus and the ilium.

Furthermore, 23 patients had acute pelvic fragility fractures identified on CT or MRI, in the presence of normal X-rays. In these patients, further imaging showed that 70% had suffered pubic rami fractures, 22% acetabular fractures, 74% sacral fractures and 22% ilium fractures.

Conclusion

Pubic rami fragility fractures are a significant problem in older people and often require admission to hospital. Further imaging confirms that these fractures are complex, with co-existing fractures of the acetabulum and sacrum being common. Findings also confirm that plain X-rays are a poor modality in the identification of pelvic fractures. However, despite this, only a quarter of patients admitted had further imaging. Where pelvic fractures are missed or severity not appreciated, appropriate pain control can be more difficult to achieve. With the potential for minimally invasive surgical options to aid pain management in sacral fractures, it may be prudent for all patients hospitalised with suspected or confirmed pelvic fracture to undergo further imaging.

Conflicts of interest

None declared.

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A novel assay of neutrophil extracellular trap (NET) formation identifies anti-IL-8 therapies to reduce disseminated intravascular coagulation and mortality in the intensive care unit

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Introduction

Neutrophils are the first line of defence against bacterial infection, and formation of neutrophil extracellular traps (NETs) is an important protective mechanism. NETs can also be harmful by inducing intravascular coagulation and multi-organ failure (MOF) in animal models.[1–6] Although increasingly considered as important therapeutic targets,[7–9] there is currently no robust and specific measure of NET formation to inform clinical care and enable precision medicine in patients on the intensive care unit (ICU). The aim of this study is to establish a novel assay for measuring NETs and assess its clinical significance.

Materials and methods

A prospective cohort of 341 consecutive adult ICU patients was recruited at the Royal Liverpool University Hospital, following written informed consent. The NET-forming capacity of ICU admission blood samples was semi-quantified by directly incubating patient plasma with isolated healthy neutrophils *ex vivo*. Associations of NET-forming capacity with sequential organ failure assessment (SOFA) scores, disseminated intravascular coagulation (DIC) and 28-day mortality were analysed and compared with available NET assays. Cytokine analysis and inhibitor studies were performed to determine the driving factors of NET formation in patients. To determine the pathological relevance of NETs, complementary *in vivo* studies were performed in mouse models of sepsis (caecal ligation and puncture (CLP) or intraperitoneal injection of *Escherichia coli*), without or with anti-NET therapy.

Results and discussion

We observed that NETs were directly induced by heterologous healthy neutrophils incubated with plasma taken from ICU patients on ICU admission, but not from healthy donors (unless incubated with 100 nM PMA). Using this novel assay we could stratify patients into four groups: those with absent (22.0%), mild (49.9%), moderate (14.4%) and strong (13.8%) NET formation. Strong NET formation was predominantly found in sepsis ($p<0.0001$) and was associated with higher SOFA scores. Adjusted by APACHE II, multivariate regression showed that measuring the degree of NET formation on ICU admission could independently predict DIC and mortality, whereas other NET assays, eg cell-free DNA, myeloperoxidase and myeloperoxidase–DNA complexes, could not. Interleukin (IL)-8 levels were found to be strongly associated with NET formation, and inhibiting IL-8 significantly attenuated NETosis.

Using mouse models of sepsis, we could monitor NET formation using plasma, which was associated with NET-positive staining (cit-H3) in the lung tissue. This was associated with increased fibrin deposition within the lung tissue, along with lung injury scores and circulating markers of liver (blood urea nitrogen; CLP: $p=0.005$, *E coli*: $p<0.001$), kidney (alanine aminotransferase; CLP: $p=0.01$, *E coli*: $p=0.002$) and cardiac injury (cardiac troponin I; CLP: $p<0.001$, *E coli*: $p<0.001$). By targeting IL-8 (using a clinically relevant compound, reparixin) in septic mice, we were able to significantly inhibit NET formation, fibrin deposition and organ injury, and improve survival times ($p=0.004$).

Conclusion

Our new NET assay directly measures the NET-forming capacity in patient plasma. This could guide clinical management and enable identification of NET-inducing factors in individual patients for targeted treatment

and personalised ICU medicine. We identify IL-8 as a major driving factor in sepsis, with anti-IL-8 therapy in septic mice significantly reducing NET-induced organ damage and mortality.

Conflicts of interest

None declared.

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Reprogramming immunosuppressive tumour-associated dendritic cells with GADD45β inhibitors

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Introduction

The ability of dendritic cells to present tumour antigens efficiently to cytotoxic T-cells has led to a continuous focus on exploiting their unique stimulatory abilities in therapeutic cancer vaccinations.[1] However, existing clinical strategies utilising dendritic cells have failed to induce durable responses.[2] The fact that a dominant immunosuppressive tumour microenvironment (TME) often results in dendritic cells adopting a paralysed or an immunosuppressed phenotype outlines the need to increase the immunogenicity of the TME.[3,4] The role of dysregulated NF-κB signalling has additionally been implicated in various human malignancies, with its effector molecule, GADD45β, shown to suppress pro-inflammatory activation of tumour-associated macrophages.[5] However, as the role of GADD45β in dendritic cells remain unknown, the aim of this study was to investigate whether the immunosuppressive function of GADD45β extends to dendritic cells, and whether inhibiting GADD45β could reprogramme dendritic cells to the pro-inflammatory phenotype.

Materials and methods

Bone marrow-derived dendritic cells (BMDCs) were obtained and pooled together from seven GADD45β$^{-/-}$ mice and seven GADD45β$^{+/+}$ mice. BMDCs were then treated with the inflammatory agents LPS/IFN-γ, followed by the collection of cell lysates and RNA. Western blot techniques were performed to assess the activation of the pro-inflammatory MAPK and STAT1 signalling pathways. The expression of pro-inflammatory genes was additionally measured via quantitative reverse transcription (qRT)-polymerase chain reaction (PCR). The pharmacological relevance of targeting GADD45β in dendritic cells was also performed on the immortal dendritic cell line JAWS II. Western blotting and quantitative PCR techniques were used to assess pro-inflammatory JAWS II activation following a specific GADD45β inhibitor, DTP3, and LPS/IFN-γ co-treatment.

Results and discussion

Western blotting analysis revealed that BMDCs from GADD45β$^{-/-}$ mice showed an augmented p38 signalling phosphorylation compared with their GADD45β$^{+/+}$ counterparts. This indicates the role of GADD45β in suppressing the pro-inflammatory p38–MAPK signalling pathway. GADD45β ablation also corresponded with the upregulation of pro-inflammatory genes, such as *IL-1β*, compared with GADD45β$^{+/+}$ mice (relative messenger ribonucleic acid (mRNA) 375.58 (GADD45β$^{+/+}$; n=1); 1,730.18 (GADD45β$^{-/-}$; n=1)). The activation marker *MHC II* was also upregulated in GADD45β$^{-/-}$ mice compared with GADD45β$^{+/+}$ mice (relative mRNA 369.74 (GADD45β$^{+/+}$; n=1); 640.56 (GADD45β$^{-/-}$; n=1)). This indicates a heightened pro-inflammatory activation state of dendritic cells. Given the established role of GADD45β in macrophages, this potentially recognises GADD45β as an innate-immune checkpoint across cells of the myeloid lineage. Western blot analysis of JAWS II cells treated with DTP3 showed enhanced p38–MAPK signalling compared with untreated control. This corresponded with increased expression of the pro-inflammatory *IL-1β* gene (relative mRNA 1,520.05 (control; n=2); 4,565.27 (treated; n=2)). *MHC II* expression was additionally upregulated relative to untreated control (relative mRNA 29.57 (control; n=2); 39.87 (treated; n=2)). Altogether, this indicates the ability of DTP3 to phenocopy the effects of GADD45β ablation.

Conclusion

These findings highlight the role of the NF-κB-regulated protein GADD45β in suppressing the pro-inflammatory p38 pathway in dendritic cells. Additionally, with the ability of DTP3 to induce pro-

inflammatory activation, it indicates the potential capacity to reprogramme dendritic cells from a TME-induced immunosuppressive state to an anti-tumour phenotype. This potentially highlights a new avenue of targeted therapeutics, to increase the likelihood of eliminating even refractory cancers.

Conflicts of interest

None declared.

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The impact of mesenchymal stem cells on host immunity and disease outcome in bacterial lung infection

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Introduction

Bacterial pneumonia is the most common infectious cause of death worldwide, disease burden is increasing and antibiotic resistance continues to escalate.[1,2] Novel therapies are needed. Mesenchymal stem cells (MSCs) are a heterogeneous subset of stromal stem cells which reside in bone marrow and other anatomic niches.[3,4] MSCs have been demonstrated to regulate lung inflammation and enhance bacterial clearance in preclinical models of pneumonia and sepsis, making them an attractive novel treatment for bacterial lung infection resistant to antibiotic therapy.[5–7] There remain many unanswered questions about the mechanisms by which MSCs achieve their immunomodulatory effects, particularly relating to MSC crosstalk with immune effector cells from both the innate and adaptive immune systems. A putative mechanism by which MSCs have anti-inflammatory effects is via the recruitment of regulatory T cells (Tregs).[8,9]

Tregs are a subset of $CD4^+$ T cells acknowledged to be important in maintaining the fine balance of immune responses during bacterial infection.[10] Their precise role in streptococcal and pseudomonal lung infection is undefined and their interaction with MSCs in the context of bacterial infection is undetermined. This project explores the impact of MSCs on host immunity in bacterial lung infection. This involves an investigation of MSC antimicrobial effect in established experimental mouse models of Gram-positive and Gram-negative bacterial lung infection and exploration of the potential role of Tregs contributing to the observed antimicrobial effects.

Materials and methods

Autologous murine MSCs derived from compact bone and bone marrow are used in mouse models of *Streptococcus pneumoniae* and *Pseudomonas aeruginosa* pneumonia. MSC treatment is given intravenously 3 hours into a 24-hour infection. All mice are on a C57Bl/6 background, including the Foxp3-DTR inducible Treg knockout utilised to investigate the effect of Treg depletion on MSC function. This mouse has a targeting construct encoding human diphtheria toxin receptor fused to sequences encoding green fluorescent protein (GFP) inserted into the Foxp3 gene. Exposure to diphtheria toxin leads to depletion of Tregs. Infection and MSC treatment studies are carried out with and without Tregs.

Results and discussion

Systemic treatment with MSCs reduced bacterial burden in lung and bronchoalveolar lavage (BAL) following intranasal infection with *S pneumoniae* and *P aeruginosa*. Levels of pro-inflammatory cytokines in lung (TNF-α, IL-6, IFN-γ and IL-17F) and BAL (IL-6) were also significantly reduced. Depletion of Tregs prior to infection with *S pneumoniae* resulted in a significant increase in lung bacterial burden. In contrast, Treg depletion during *P aeruginosa* lung infection did not impact on bacterial burden or inflammatory response. Following infection with *S pneumoniae*, bacterial burden and inflammatory response were greater in MSC-treated Treg-depleted mice than in the Treg-replete cohort. In contrast, in the *P aeruginosa* lung infection model, MSC protective effect was preserved following Treg depletion.

Conclusion

MSCs may be utilised for the treatment of pneumonia. Tregs are beneficial to the host response to *S pneumoniae*, but have no role in the host response to *P aeruginosa*. MSC protective effect for *S pneumoniae* appears to be partially Treg dependent. For *P aeruginosa*, MSC protective effect is independent of Tregs.

Conflicts of interest

None declared.

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The use of mobile phone-based interventions to support adherence to antiretroviral therapy in sub-Saharan Africa: is it acceptable, feasible and sustainable?

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Background

HIV/AIDS remains a challenge. Achieving the last 90% in UNAIDS' 90-90-90 targets – viral suppression – requires optimal adherence to antiretroviral treatment (ART).[1]

Mobile phone-based interventions (MPBIs) promote adherence.[2–7] Scale-up of these necessitates a wider appreciation of the beneficiaries' likes and values, and cost implications. This study reviews and summarises the literature on acceptability, feasibility and sustainability of MPBIs for improving ART adherence in sub-Saharan Africa.

Methods

This is a narrative review of the published literature that included elements of a systematic review process.[8] The search strategy retrieved articles that combined 1) mobile phone use and 2) ART and 3) adherence and 4) sub-Saharan Africa. Findings are presented as a narrative synthesis.

Results

The included studies were conducted in seven countries. User subgroups including adolescents and pregnant women were included. The studies assessed short messages (SMS) and/or voice calls as reminders, or with additional messaging.

Regarding acceptability, patients found SMS and voice calls beneficial as reminders, tools for consultation and as conduits for encouragement. They would be most useful among those starting ART to help them get into a routine. Patients prefer two-way SMS to one-way SMS. The fear of breach of confidentiality is a major barrier.

Regarding feasibility, phone ownership was relatively high. Most participants could read and write SMS. There were conflicting concerns about the affordability. Technical challenges such as poor network, high mobile phone turnover and certain phone habits were barriers to feasibility.

On sustainability, information was very limited. Patients' concerns were related to SMS fatigue when they get bored and fear of dependency on the SMS, yet they were unsure about the longevity of SMS programmes.

Conclusion

In promoting adherence, MPBIs are considered acceptable. Fear of breach of confidentiality is a major concern. Technical challenges and some individual phone habits are barriers. Information about costing and sustainability is limited and inconclusive. There are concerns about maintaining such interventions in the long term and addressing SMS fatigue among users. During scale-up, MPBIs could be prioritised for some patient groups among whom they would be most useful, such as those starting ART.

Conflicts of interest

None declared.

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Analysis of bed occupancy data on the acute medical unit

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Introduction

Hospitals may struggle to operate effectively and meet quality standards when unscheduled (emergency) admission rates are high in relation to operational capacity. Understanding patterns of ward admission and discharge from acute medical units (AMU) can help inform resource allocation. Discharges early in the day are advocated as a means to improve bed management, but delays may arise from post-AMU bed availability. It is unclear whether any change in AMU discharge patterns pre-dates hospital-wide pressure or whether it is a reaction to it.

Materials and methods

Anonymous data from 1 Jan 2016 to 31 December 2017 comprising the time and date of admission and discharge from a 56-bed AMU at a large, urban tertiary hospital were collected. For a measure of 'pressure' in the hospital system, we collected the daily (midnight) hospital occupancy by medical inpatients, as well as daily numbers of medical patients on 'outlying' (non-medical) wards over the same timeframe.

Admission and discharge times for the AMU were used to determine AMU occupancy as a function of time of day. In order to capture how daily patterns varied with day of the week and with season, data were then averaged. In order to investigate whether there was a correlation between the timing of peak daily occupancy and 'pressure' in the hospital system, the time of day at which maximum occupancy occurred was also calculated.

Fig 1. a) Occupancy follows the same daily pattern for different seasons, but is lower during summer (1 June – 31 August) than in winter (1 December – 28 February). b) Occupancy follows the same daily pattern for different days of the week, but is lower at the weekends.

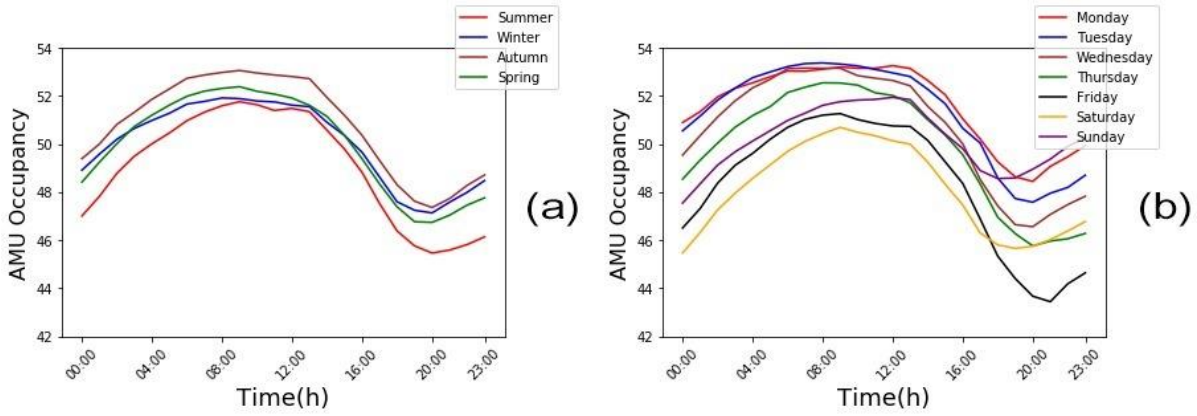
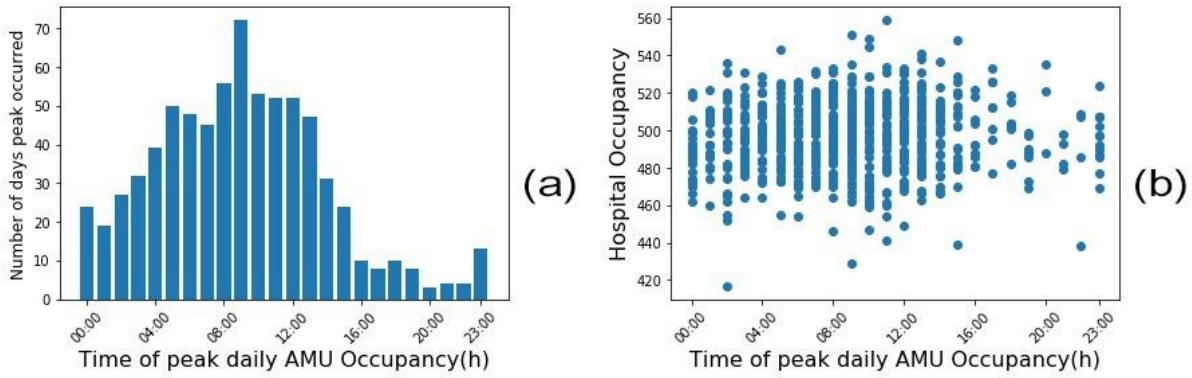


Fig 2. Time of peak occupancy. a) Histogram of time of day of peak AMU occupancy. b) Hospital occupancy vs time of day of peak AMU occupancy.



Results and discussion

In total there were 18,158 patient episodes. Bed occupancy followed a strictly cyclical circadian rhythm (nadir early evening, peak early morning), within a circaseptan rhythm (lower at weekends), within an annual rhythm, see Fig 1. Although occupancy was lower in summer, the mean daily amplitude of the occupancy rhythm was higher in summer than in winter (6.3 vs 4.8) and occurred later.

The average patterns mask the high daily variability in occupancy patterns. Although time of peak occupancy typically occurs around 08:00, it can occur at any point in the day, as shown in Fig 2. Initial results comparing AMU occupancy with overall hospital pressure do not suggest that there is a strong correlation between the time of peak daily AMU occupancy with overall hospital pressure, but further work needs to be done to investigate daily and seasonal differences and time lags.

Conclusion

Hospital bed occupancy may be better modelled using circadian mathematical techniques. If a change in bed policy is made, this could be better tested via its effect on the ‘circadian system’.

Conflicts of interest

None declared.

Assessment of fracture risk assessment tools in care home residents

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Introduction

Fragility fractures are common in care home residents. National guidelines recommend risk assessment to allow initiation of prophylactic measures. Currently available risk assessment tools have been tested in community-dwelling adults, but not in care home residents. It is possible that one or more of the existing tools are also practicable in this population.

Aim

The aim of this project was to identify fracture risk assessment tools that are usable in care home residents and to determine which is the most suitable for use in this population.

Objectives

- Conduct a systematic literature review of the existing fragility risk assessment tools and select those that can be used in care home residents.
- Then undertake an observational pilot study of the fragility risk assessment in a cohort of care home residents.

Methods

- A literature search was performed by a combination of electronic and manual literature searches, and studies of assessment tools potentially usable in a care home population were selected and assessed based on content and quality criteria. The search was updated on 12 August 2019.
- A cohort observational study was conducted in 18 care homes in Boston, Lincolnshire, England.

Results

- In the systematic review, 33 fragility tools were identified and four were potentially practicable in care home residents. These were FRAX, QFractureScores, Garvan nomogram and body mass index (BMI). The updated search identified a fifth measure, microribonucleic acid (miRNA). However, this was not implemented.
- In the feasibility study, 217 (35%) participants out of 618 residents in the 18 care homes were enrolled. Of the 217 participants, 147 (68%) had mental capacity and 70 (32%) did not because of the difficulty in obtaining informed consent from the consultees in residents without mental capacity.

Discussion

The systematic literature review identified many fragility risk assessment tools, but only four were potentially practicable in a care home population. Recruitment to the observational study was restricted mainly to residents who possessed mental capacity, because it was difficult to obtain consultee consent in this setting.

The statistically significant odds ratios for the outcomes were: BMI falls 0.952, standard error (SE) 0.021 (p=0.015), fractures 0.868, SE 0.073 (p=0.024), combined falls and fractures 0.868, SE 0.073 (p=0.024). Low BMI and history of dementia were identified as the risk factors for falls, fractures and combined falls and fractures in the cohort. A BMI of 25 kg/m² or less had the highest sensitivity of 74.5% for falls. Of the 10 incident fractures, 40% occurred in the participants who had dementia.

Conclusions

BMI was the best predictor of falls, fractures and combined falls and fractures, but the associations were weak. Of the 10 incident fractures, 40% were observed in participants who had dementia despite the small representation of this group, thus dementia is a strong risk factor for fractures in this cohort. A fully powered and representative study is unlikely to be feasible if individual consent is required, as the majority of care home residents do not have mental capacity, and legal representative consent is difficult to obtain in this setting.

Conflicts of interest

None declared.

EDUCATION, TRAINING AND MEDICAL PROFESSIONALISM

Simulation training using WhatsApp (Sim-thru-WhatsApp) improves doctors' confidence in endocrine and diabetes case management

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Introduction

Simulation is defined as a process that substitutes or amplifies real patient encounters with artificial models, live actors, or virtual reality patients.[1] The goal of simulation is to replicate patient care scenarios with guided experiences in a realistic environment.[2] This is usually followed by debriefing sessions to facilitate abstraction, conceptualisation and relation to clinical practice, in order to promote higher learner retention.[3] Simulation creates an ideal educational environment as learning activities are standardised, safe, and reproducible, and knowledge, skills and attitudes can be acquired in a safe and efficient manner.[2,4]

Simulation-based learning (SBL) has increasingly been used as a learning tool in undergraduate and postgraduate medical curricula, to help the modern healthcare professional to achieve higher levels of competence and safer patient care.[4] The aim of Sim-thru-WhatsApp is to create a feasible and cost-effective SBL model in medical education. This study was conducted as part of the continuous professional development for Health Education West Midlands specialty trainees in diabetes and endocrinology. It aims to evaluate the effectiveness and acceptance rate of this new SBL model.

Materials and methods

All specialist registrars who attended the July and October 2019 endocrinology and diabetes training days, organised by Health Education West Midlands, participated in the study. Standardised transcripts of five anonymised pituitary cases (non-functioning pituitary adenoma, craniopharyngioma, macroprolactinoma, acromegaly and Cushing's disease) were used for the July training day. Five diabetes cases (hypoglycaemic unawareness and insulin pump, monogenic diabetes during pregnancy, interpreting Libre, dawn phenomenon, hypoglycaemic unawareness and islet transplant) were used for the October training day. These scenarios were based on real-life cases and approved by relevant experts prior to their inclusion. Moderators, specifically trained on these scenarios, interacted with trainees through WhatsApp. The diabetes simulation was preceded by a lecture covering the basics of diabetes technology. All cases were then discussed by a consultant, with reference to local and national guidelines. Trainee acceptance rate and confidence levels pre- and post-simulation of simulated cases vs non-simulated cases were compared by assessing the Chi-squared statistics.

Results and discussion

Twenty-four and 17 trainees participated in the endocrine and diabetes simulation respectively. There were significant improvements in trainees' confidence levels in managing craniopharyngioma ($p=0.0179$) and acromegaly ($p=0.0025$), and interpreting continuous glucose monitor readings ($p=0.02$). There was a trend towards increased confidence in managing macroprolactinoma, Cushing's disease, hypoglycaemic unawareness, monogenic diabetes during pregnancy and interpreting Libre readings. Overall, trainees' confidence improved significantly in simulated endocrine and diabetes case scenarios ($p=0.0002$ and

p<0.01, respectively). In comparison, there were no significant changes in confidence levels for non-simulated cases. Trainees also reported that Sim-thru-WhatsApp accommodated their learning styles, was engaging and worth their time.

Conclusion

Sim-thru-WhatsApp proved to be an effective teaching model, with a high acceptance rate, which improved doctors' confidence in managing endocrine and diabetes cases. Further sessions with other conditions and specialities are necessary to assess the wider application of Sim-thru-WhatsApp in medical training.

Conflicts of interest

None declared.

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The representation of LGBTQ+ people in medical assessment and teaching scenarios

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Introduction

Examinations and teaching at UK medical schools are meant to be targeted towards common clinical scenarios faced by junior doctors in the NHS. This should include preparing students to provide equal treatment to groups with protected characteristics, including lesbian, gay, bisexual, transgender, queer+ (LGBTQ+) people. However, existing research has implied such groups face discrimination when receiving healthcare.[1] This research project aims to:

- explore whether LGBTQ+ people are adequately represented in assessment and teaching scenarios
- explore whether medical students feel comfortable discussing sexuality in clinical scenarios
- explore whether prejudiced attitudes towards LGBTQ+ people are present in medical settings.

Materials and methods

Participants were current medical students at all stages of training. Participants completed a survey on Google Forms in mid-2018, distributed on public forums (year group pages, MSA Newsletter). The questions were developed both with a Likert scale (1–5, where 1 = strongly disagree and 5 = strongly agree) and with free text space where applicable. The data analysis used descriptive statistics on the questionnaire responses. This study received minimal risk clearance (Reference MRS-17/18-8128 and MRS-17/18-8129).

Results and discussion

A total of 107 medical students participated. The majority (81%) attended one London-based medical school. The most common stage of training was in the final clinical year (38%). Overall, 72% of students had been taught using educational scenarios including LGBTQ+ people, but fewer remembered LGBTQ+ representation in OSCEs (21%) and written exams (29%). When asked whether LGBTQ+ people were adequately represented in assessments and teaching scenarios, the median response was 2 (disagree). When asked whether LGBTQ+ people most commonly appear in scenarios when the diagnosis is related to sexuality or sexually transmitted diseases, the median response was 4 (agree). Medical students were generally comfortable with discussing sexual orientation (median response 4 (agree)). Participants generally felt medical school was an accepting environment for LGBTQ+ people (median response 4 (agree)) but felt less confident about the NHS working environment (median response 3 (unsure)).

Conclusion

Our study shows there is limited overt representation of LGBTQ+ people in medical school teaching and assessment scenarios. Current representation predominantly focuses on sex/STD-related scenarios, which may encourage bias in the assessment of LGBTQ+ patients. This finding therefore has implications not only for patient care but also for the satisfaction and comfort of LGBTQ+ individuals undergoing medical training. Further work should be done to update curricula and examinations to ensure adequate representation of LGBTQ+ people at all stages.

Conflicts of interest

None declared.

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What does a good prescribing induction for the newly qualified doctor look like?

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Introduction

Foundation year 1 doctors (F1s) are expected to prescribe from their first day in clinical practice. Prescribing involves a complex series of steps involving integration of theoretical and experiential knowledge, patient information, communication skills, mathematics and awareness of human factors that undermine safe prescribing. It has been suggested that prescribing should routinely be viewed and treated as a high-risk procedural skill.

The majority of prescriptions within secondary care are written by foundation doctors (FDs).[1,2] FDs also make the most prescribing errors.[2,3] An important part of the transition to prescriber is F1 induction. Since 2012, trusts and health boards must provide an induction and at least 4 days' shadowing experience to new F1 cohorts before they begin their first post.[4] However, there is no standardised F1 induction curriculum and research shows that content, including prescribing-related topics, and format can vary widely.[5,6] FDs have themselves highlighted that they find transitioning to practical prescribing challenging and they often feel unprepared.[7,8]

This study aimed to address a critical knowledge gap: how can we use feedback from FDs to enable the F1 induction period and available resources to support prescribing competency during the first months of practice?

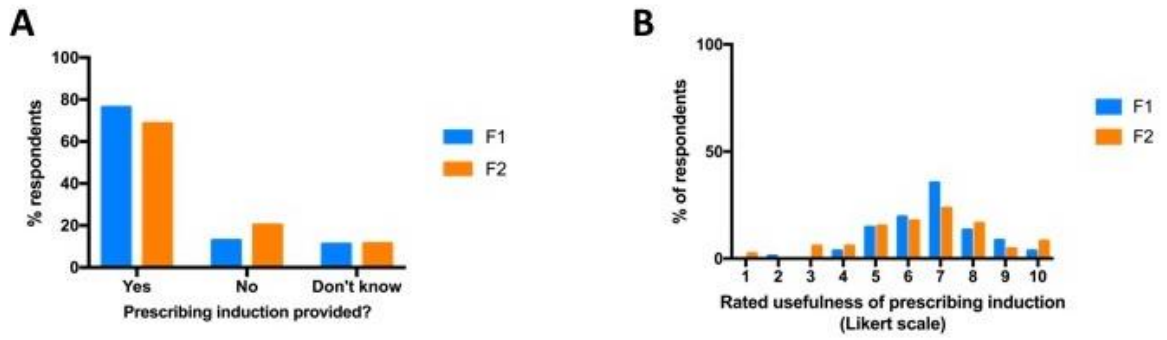
Materials and methods

A survey was designed to obtain information about F1 and F2 doctors' experiences of preparedness to prescribe following medical school; experiences of prescribing teaching and support during F1 induction; the tools, resources and sources of feedback available to them during their first placement; and views about prescribing error feedback. FD members of the RCP were invited to participate over a 2-month period, with 229 FDs doing so.

Results and discussion

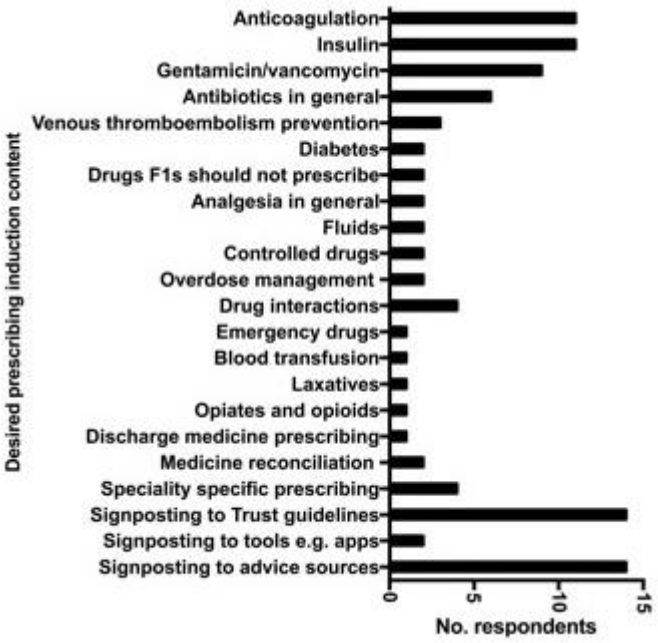
FDs felt moderately prepared for prescribing by medical school. 72% of FDs had received a F1 prescribing induction and had found this moderately useful, although less helpful if delivered several weeks after the start of F1 (Fig 1).

Fig 1. Provision and usefulness of prescribing induction.



FDs overwhelmingly expressed a preference for a neutral tone, and interactive and practical sessions. FDs strongly preferred prescribing induction topics based on common prescribing situations and errors, commonly prescribed drugs and local guidelines (Fig 2). They wished to avoid repetition of concepts covered in medical school.

Fig 2. Foundation doctors' perceived most useful content to include in a prescribing induction.



FDs found the most useful and accessible prescribing resource was the ward pharmacist (94%), followed by intranet-based prescribing guidelines (82%) and apps (65%). Current prescribing teaching sessions (27%), electronic prescribing safety messages (28%) and prescribing checklists (11%) were deemed less helpful. FDs gave clear reasons for the sources they valued most and least and highlighted unmet needs.

Almost all FDs (97%) found feedback after prescribing errors to be a useful prescribing development tool. The majority of FDs had received feedback, most frequently from a pharmacist.

Conclusion

This study provides insight into how FDs feel the mandatory F1 induction period, support systems and resources could be used more effectively to promote the transition from student observer to prescriber. In

particular, they favoured an emphasis on a suite of highly interactive, multimodal development opportunities with close involvement of pharmacists. Using FD feedback to direct refinements of induction-based prescribing teaching and development strategies could provide a mechanism to improve capability, competency and confidence during the new prescriber period.

Conflicts of interest

None declared.

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Preparing to be the medical registrar on call: the evolution of a simulation programme

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Introduction

According to local and national surveys[1] core medical trainees (CMTs) were anxious about the transition to becoming medical registrars. Simulation is a mandatory part of the new Internal Medical Training (IMT) curriculum,[2] however, no formal simulation programme previously existed for the CMTs in our trust. Our aim was to develop a structured simulation programme and determine whether this could improve the CMTs' confidence in becoming a medical registrar.

Materials and methods

Over one academic year, four monthly simulation days with 'Step up to registrar' scenarios were piloted during the CMT teaching programme in Torbay Hospital. The scenarios gave the CMTs the opportunity to act as either the medical SHO or registrar, while their colleagues observed via video link.

Each scenario was followed by a micro-teach that focused on human factor awareness and clinical learning points. Throughout the programme, the CMTs were taught peer-led debriefing skills and facilitated discussions were undertaken on wellbeing topics such as recognising and preventing burnout and supporting the team. There was an escalation in the intensity and difficulty of the scenarios in each subsequent training day.

Results and discussion

Feedback concerning perceived clinical and non-clinical skill confidence and experience of simulation was collected prior to the first session and after each subsequent session. Pre-course feedback allowed us to tailor the day to areas of concern for the individual CMTs.

Utilising both CMT feedback and facilitator reflections, the programme was able to evolve. Less scenarios were used during each day of teaching to reduce learner fatigue, while ensuring individual opportunities to be both CMT and medical registrar. The scenarios themselves evolved to include more human factor stressors, such as a crying baby, abusive patients and difficult discussions with relatives.

Feedback highlighted the appreciation of more realistic simulation scenarios therefore we moved to a default position of using live actors or hybrid models, unless it was not possible to do so, for all scenarios eg variceal bleeding, stroke or sepsis. This created more convincing, interactive experiences.[3] The overall feedback from the programme was largely positive, with the CMTs reporting a clear learning benefit (see Figs 1 and 2).

Fig 1. Participants perceived confidence in being the medical registrar and management of human factors.

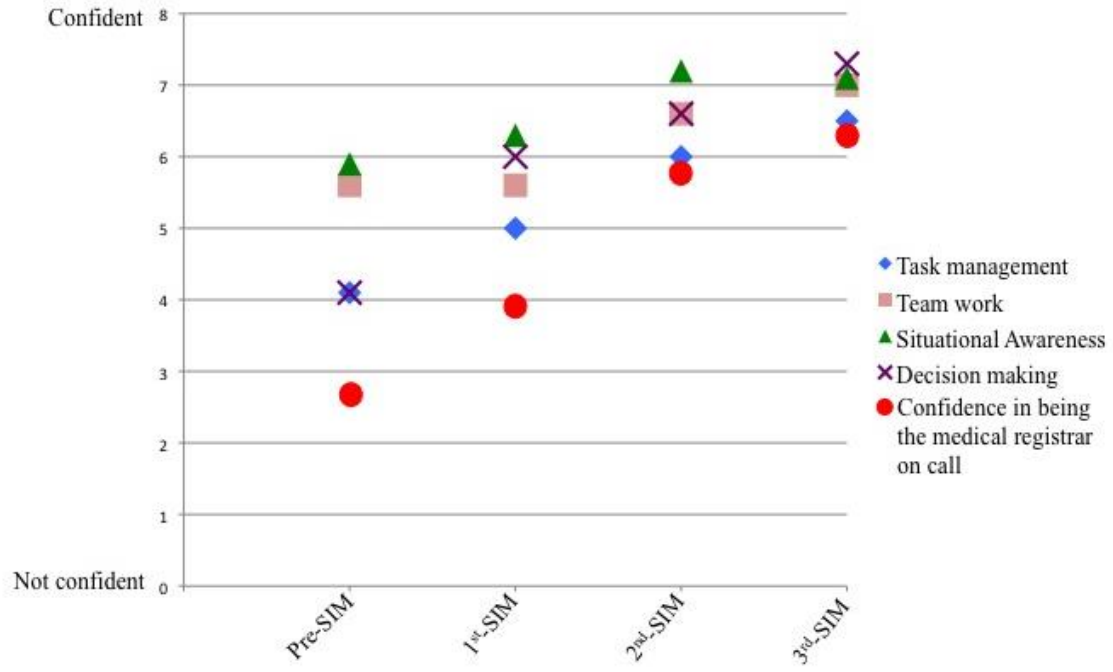

Fig 2. Word cloud descriptor feedback by frequency.

Reflecting on the feedback overall, and following each day, we were able to adapt and evolve so the CMTs got the maximum out of this learning environment. An IMT simulation programme has now been developed using the experiences and feedback from this initial pilot and the same format has been used for registrar simulation training. In order to continue evolving, we plan to include the use of bleeps to create the registrar on-call experience and continue to grow our scenarios to fit the learning needs of the individuals.

Conclusion

Our pilot has shown that simulation can be used to improve not only clinical confidence, but also develop human factor skills. It has also shown that by using feedback to inform continuous development, simulation can adapt to the needs of the group and can be used to train future medical registrars.

Conflicts of interest

None declared.

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Wellbeing initiatives: all things 'Great-ix'

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Introduction

It is becoming an increasingly common phenomenon for junior doctors to develop poor morale within the workplace. The Academy of Medical Royal Colleges reviewed the reasons for this, which included working in an organisation that is riddled with a blame culture, and working in fear of litigative circumstances.[1] The 'Health for Health Professionals' (HHP) group is a confidential counselling service available for all doctors in Wales; statistics have shown a sharp rise in the number of self-referrals, with 160 documented between January 2018 and June 2019.[2]

As part of my role as a chief registrar, I have been keen to set up more robust wellbeing initiatives to help junior doctors feel valued and supported while working at Aneurin Bevan University Health Board.

Materials and methods

Baseline data were collected regarding junior doctors' experiences of wellbeing initiatives currently available within the health board or regionally. Subsequently, I aimed to set up several projects locally within the health board, as well as working with HHP Wales to further promote their counselling services to junior doctors. Three main projects have since been initiated and are currently in development:

- Trainee committee meetings – as the Welsh equivalent to junior doctor forums these have been set up with a monthly committee meeting on each hospital site.
- Schwartz rounds – these forums allow staff to discuss the emotional challenges and rewards from working within a highly pressured healthcare system.[3]
- Great-ix implementation – research from the 'Learning From Excellence' foundation has shown that reporting positive outcomes, as a Safety II concept, can help improve morale and resilience within a healthcare organisation.[4]

Results and discussion

Of those surveyed, only 23% were aware of current support services on offer and over 70% of junior doctors felt they would benefit from having access to wellbeing initiatives locally.

The trainee committee meetings are now in their third month, attracting representation across all specialties. Informal feedback from these to date has been very positive, whereby different specialties feel united as one when they meet at these committee meetings.

While already set up within one hospital site, engagement at Schwartz rounds had previously been poor. Ways to improve uptake have since been trialled, including holding forums for junior and senior colleagues separately. Schwartz rounds have also been implemented in the other two hospitals, with encouragement of both junior and senior doctors to participate within the front panel.

The implementation of the Great-ix is the newest well-being project. While some departments were already running paper-based Great-ix systems, the trainee committee meetings have allowed collaboration to develop an electronic version available to all departments within the health board.

Conclusion

In conclusion, it is evident that the morale of junior doctors within the workplace is relatively low, with many keen to utilise services to improve wellbeing. Three main projects are currently ongoing, as well as

promotion of HHP Wales, with the aim to improve morale and help deliver a culture of positive change for the health board.

Conflicts of interest

None declared.

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Women empowering women

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Introduction

Seventy-seven per cent of NHS workers are female, yet only 37% are in senior positions.[1] Women have represented the majority of medical school cohorts for over a decade, but this is not translating into increased numbers of women in consultant or leadership roles. Women comprise only 36% of consultants, 13% of surgeons and 25% of medical directors.[1–3]

Gender balance at the top leads to effective financial and quality performance, and there is clear evidence the culture of any organisation is connected to the behaviours of the board and senior leaders.[4] Women bring unique qualities that are key to the balance of any team.

Materials and methods

To address this issue a deputy medical director, RCP tutor and core medical trainee at Sandwell and West Birmingham NHS Trust designed a 1-day national free conference aimed at medical female doctors entitled 'Women Empowering Women' to enable, inspire and empower women.

The day involved talks from women in leadership roles, including the president of the Medical Women's Federation, and workshops such as Research and Academia, Management and Leadership and Teaching and Education. Further workshops focused on maternity issues, LTFT working, and self-care. A workshop addressing inappropriate behaviour in the workplace was also very popular. The delegates overwhelmingly reported a day such as this was desperately needed.

The key aspects we aimed to address included:

- role-modelling – showcasing individuals in senior leadership positions and sharing their journey: 'If you can see it, you can be it'
- processes – maternity rights to application of jobs were addressed
- mindset – positivity, the importance of self-care and removing imposter syndrome mentality.

110 women attended, ranging from FY1 to consultant level. A survey was performed to assess how women felt about key issues such as gender balance, applying for senior leadership roles and sexual harassment in the workplace.

Results and discussion

Highlights of the data showed:

- 25% had been discouraged to apply for a senior leadership role
- 58% felt they were not achieving work-life balance. Examples included challenges with childcare, hobbies and self-care
- 70% felt they were underperforming in their careers due to the many challenges they faced including childcare, illness and exams
- 56% felt there was a lack of women in senior leadership roles
- 47% have had sexual comments and inappropriate behaviour from colleagues and seniors in the workplace and 73% have had this behaviour from patients
- 66% did not escalate these issues due to fear of potential repercussions or not being taken seriously.

There remains a multitude of issues facing women working in the NHS today. To address this, many initiatives are being generated at out trust including establishing a Women's Network, a leadership mentoring scheme and educational sessions on inappropriate workplace behaviours and how to escalate.

Conclusion

If we are to tackle issues, such as lack of women in senior leadership positions and sexual harassment in the workplace, then such innovative days must be an embedded feature within each organisation as a positive step forward to rectifying this imbalance.

Conflicts of interest

None declared.

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Crash course in prescribing – an interactive case-based teaching for final year medical students

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Introduction

Prescribing is an essential skill for all newly qualified doctors. With an expanding national formulary and ageing population bringing added pressures of polypharmacy and complex health needs, there are now greater demands to prescribe drugs safely and effectively. Despite being outlined as a core competency in the General Medical Council (GMC)'s Outcomes for Graduates,[1] literature shows that the majority of medical graduates do not feel confident in prescribing at the onset of their careers,[2] a trend reflected during data collection for this project. Most medical school curricula cover clinical pharmacology through didactic lecture-based teaching.[3] However, studies demonstrate that active learning techniques, such as case or team-based learning, improve knowledge retention and facilitate a smoother transition from theory to real-life problems.[4,5]

The aim of this project was to develop an interactive, case-based prescribing teaching resource aimed at final year medical students to help prepare them for common prescribing situations faced in foundation year 1 (FY1).

Methods

Newly qualified graduates from a London medical school (n=18) were asked via questionnaire about their confidence in prescribing, the medications they found most difficult to prescribe as newly qualified doctors, and their preferred method of teaching.

An interactive small-group teaching session of current final year medical students (n=11) was designed to address the previous responses. Learning outcomes were clearly stated and mapped to the university curriculum to demonstrate relevance. A fun warm-up activity was used to encourage student participation from the outset. Teaching focused on four difficult topics identified by the initial questionnaire: intravenous insulin infusions, blood products, end-of-life care and anticoagulation. Students were given ten minutes to tackle each scenario in small groups to simulate the pressure of working on call, followed by a rotational review session with a tutor.

A pre- and post-session questionnaire, inclusive of a single best answer (SBA) test, was used to assess student knowledge, confidence and interactivity of the teaching session. All data were collected using Likert scales via questionnaire.

Results and discussion

Students' responses (n=11; all in brackets on a scale from 1 to 5, where 1 is least and 5 is most) showed an increase in mean confidence levels in prescribing after completing the session (1.84 to 3.61). They found the session more interactive (4.73) and useful (4.81) than previously encountered prescribing teaching sessions (3.36 and 3.72 respectively). Scores in the SBA test increased from a mean of 46.59% to 79.55% after the session. Moreover, they felt that it was more representative of prescribing as an FY1 doctor compared to previous teaching (4.72 compared to 3.36).

Conclusion

The use of interactive case-based learning in prescribing teaching helped to improve student knowledge of targeted areas highlighted by their predecessors. Compared to traditional didactic teaching, the students described increased confidence and felt more prepared for real-life prescribing on wards as newly qualified

doctors. By making the session interactive and time-pressured, it simulates the typical hospital environment, and enables students to exercise skills necessary to deliver safe and effective prescribing as an FY1 doctor.

Conflicts of interest

None declared.

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A review of exception reporting practices and understanding at Royal Bournemouth and Christchurch Hospitals NHS Foundation Trust

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Introduction

Following the implementation of the 2016 junior doctor contract, exception reporting was introduced as a tool to improve junior doctor training, morale and patient safety by monitoring working hours. Thus far there has been minimal study into its effectiveness and acceptance in the NHS workforce. This audit assessed the use and views surrounding exception reporting at Royal Bournemouth and Christchurch Hospitals (RBCH).

Materials and methods

A SurveyMonkey questionnaire was circulated to 229 junior doctors (FY1–registrar) at RBCH. Questions related to hours worked and exception reporting habits over the last 2 months and their attitudes surrounding exception reporting.

Results and discussion

79 respondents from ten specialties were recorded. 83% of doctors indicated working additional hours, however only 35% of respondents had submitted an exception report. 63% were unaware they could report missed educational opportunities. 61% felt exception reporting would be viewed by seniors as a reflection of their competency and feared negative repercussions. 42% of respondents had been subject to/witnessed negative attitudes from seniors surrounding exception reports. Multiple barriers to reporting were highlighted including; unclear rota options on the reporting system, issues with account access, lack of training, as well as perceived negative senior attitudes towards exception reporting.

Conclusion

Despite being a potentially valuable asset in improving junior doctor rotas, training and patient safety, exception reporting is being significantly underutilised. This is likely due to a variety of factors, however most concerning is that of negative attitudes and culture surrounding exception reporting. Addressing these issues will be crucial to increasing rates of exception reporting.

Conflicts of interest

None declared.

‘Running on empty’: understanding more about the concerns around burnout in a cohort of trainee doctors, and the value of reflective practice as an intervention

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Introduction

The impact and risks of burnout for health professionals, patients and the NHS are increasingly recognised as a major issue for our healthcare system.[1,2] 28% of doctors currently report feeling unable to cope with their workload at least weekly and 12% took leave due to stress.[2]

While the issue of working in an under-resourced, under-staffed system needs to be systematically addressed, reflective practice (RP) is an evidence-based approach that can increase wellbeing.[3] As an acute trust with an integrated clinical psychology team, a number of our multidisciplinary teams already use RP to support staff in their work.[4]

The aim of this study was to explore concerns regarding burnout and wellbeing in a cohort of trainee doctors in one acute trust and to design, pilot and evaluate a clinical psychologist reflective practice facilitated programme for medical trainees, focusing on wellbeing.

Materials and methods

Trainees working in one acute trust were asked to complete a survey (1–10 scaling) concerning wellbeing and attitude to RP. An RP wellbeing-focused programme, comprising three 1-hour sessions held every 2 months, was designed, facilitated and piloted by a clinical psychologist. Core medical trainees and specialist medical registrars (n=24) were invited to attend sessions during a weekly lunchtime teaching slot. Feedback was collected during and after each RP session.

Results and discussion

45/161 (28%) trainee doctors completed the survey. The majority were very concerned about the impact of their work demands on their wellbeing (mean 7.7/10; range 1–10) and welcomed the offer of supervised RP sessions (mean 7.2/10); 88% requested as monthly sessions.

Attendance at all three RP sessions was the same, or more than, other timed teaching offered to the same cohort of medical trainees. RP sessions were highly valued with mean helpfulness/importance scores of 9.5/10 (n=21; range 9–10). When asked to what extent they felt they would benefit from further RP sessions, the mean score from all attendees was 8.3/10 (n=21).

Key qualitative survey findings and themes around risk of burnout identified in RP sessions are shown in Fig 1, and the impact of RP and assets identified during RP sessions are described in Fig 2.

Fig 1. Themes on risk of burnout from trainee survey and reflective practice sessions with medical trainee doctors in one acute trust.

Themes on risk of burnout	Trainee quotes
The problem with 'resilience'	'Resilience' implies we should be able to cope with everything.' 'I hate the word "resilient". It leaves me feeling like a failure when I'm struggling at work.' 'Being told to be resilient is insulting!'
Resources versus demands: mismatch between the resources available and the demands on us	'How to think about time management in a useful way – rather than just being something to berate yourself … that you are finding the workload too great.' 'Want to be able to process frustration about systems and colleagues in productive ways.' 'Want to try and minimise a culture of people often becoming very critical.'
Emotional impact: distress and helplessness of witnessing the suffering of patients	'Last year I was involved in an unexpected death which is something I found incredibly difficult to manage … when I talked to my peers it turned out that nearly all of them had been involved in equally difficult and challenging situations and wished that they had been able to talk to someone.'
Feeling out of my depth: the difficulty of not knowing what to do	'The sensation of feeling completely overwhelmed by either how much you have left to do or by not knowing how to do something, and then suddenly freezing and not being able to focus or carry on with the task in hand or even the simpler things, the things you do know how to do.' 'Trying to balance feeling completely panicked and wanting to cry with the expectation that you should just be able to get on and that someone's care is dependent on you being able to manage and know what to do.'
Feelings of guilt between peers: not wanting to let others down by taking time off or leaving on time	'How to know when it is OK to leave work on time when the workload is never ending.'
Compromised work-life balance and difficulty switching off	'I could really do with thinking about how I can better manage the uncertainty and difficulties I find at work, which will then hopefully enable me to switch off more at home.'
Culture of silence	'As a profession we are terrible at admitting we are struggling.'

Fig 2. Value of reflective practice sessions: themes on impact of sessions and identified assets from reflective practice sessions with medical trainee doctors in one acute trust.

Themes on value of reflective practice	Trainee quotes
Cathartic outlet in order to 'move on'	'…the space to express concerns.' 'A forum to let go of this.'
Moving from feeling alone to a sense of shared struggle	'Feeling that you're not alone.' 'It's reassuring knowing I'm not the only one.' 'It's good to hear from others having similar experiences.' 'We are all in this together mentality.'
Normalising difficulty	'It's normal to be stressed about things.' 'This normalises hard situations.'
A safe supportive reflective space	'I feel more supported at work.' 'Was nice to reflect and discuss challenges.' 'These sessions have become a sanctuary in themselves.'
Expanding own ways of coping and sharing strategies	'A greater sense of headspace when working busy jobs.' 'Allow me to look at the bigger picture, as well as boost morale.' 'I particularly enjoyed the links between sessions encouraging us to develop our own strategies and discussing how that has gone.' 'It has already changed the way I think about things … and I've passed this on to a colleague.'
Reconnecting with what is meaningful about work	'…reinforced what I value about my job and made me feel better about myself.'

Conclusion

Concern about burnout was widespread in this cohort of trainee doctors working in an acute trust. There have been urgent calls at a national level to address workforce wellbeing and the impact of 'running on empty'.[1,2,5,6] While it is well-recognised that system factors play a significant role in the development of burnout, and under-staffing needs to be addressed at a national level, individual factors are also important.[1,2]

Following feedback that reflective practice sessions would be welcomed, we piloted a psychologist-led wellbeing programme. This was well-attended and highly valued by trainees. Sessions were described as enabling a 'safe-space' for trainees to talk about themes that contribute to risk of burnout including under-resourcing, impact of 'feeling alone', and of 'not talking' but also importantly, as developing a community of support that enabled discussion of shared challenges and coping initiatives.

As a result of this successful pilot, clinical psychologist reflective practice facilitated sessions are now being provided on a monthly basis for medical trainees in our trust.

Conflicts of interest

None declared.

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Encouraging exception reports at an NHS foundation trust

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Introduction

Exception reporting was introduced to allow trainees to flag up work that has varied from their agreed work schedule or did not meet their educational curriculum needs.[1–4] At our foundation trust (FT), we saw that there were very few exception reports being made throughout the year despite many trainees either staying beyond scheduled hours or missing educational opportunities due to service pressures. We aimed to increase exception reporting by trainees by 20% at our FT by 1 October 2019.

Materials and methods

Junior doctors have an induction in two separate groups: one held for foundation year 1 (FY1) trainees and another held at a different time for all other trainees. We set about joining the induction programme for the trainees starting in the year 2019 to educate them about exception reporting and to encourage them to do so. We were able attend the programme for FY1 trainees but were prevented from doing the same for more senior trainees due to our service commitments, though they received the same from the guardian of safe working, without the voice of a fellow junior doctor. This ended up creating a divide in the form of an intervention and non-intervention group.

During the induction programme, we introduced the concept of exception reporting with the help of the guardian of safe working and its importance. We also engaged juniors regularly in informal settings to encourage exception reporting.
The success of interventions was measured by collating data from Guardian of Safe Working monthly exception report updates.

Results and discussion

Analysis of data showed for the same period, ie August and September: FY1 trainees exception reported 45 times in 2019, compared with four times in 2018, demonstrating a tenfold increase, whereas more senior trainees exception reported 25 times in 2019, compared with one time in 2018. The data for senior trainees is to be considered carefully, as this group also included the authors, who were more likely to exception report than others. If we consider the senior trainees' results without our figures included, it would be nine times in 2019, compared with one time in 2018 – though still impressive it is not as astonishing.

Conclusions

Exception reporting is an essential tool for both the NHS and trainees in highlighting service pressures as well as where educational objectives aren't met and are likely to lead to better long-term satisfaction with training when issues are highlighted and corrected. Our analysis showed that trainees are more likely to exception report if they are given the knowledge about exception reporting without the assumption that they already know something about it. Uptake is increased when other junior doctors champion exception reporting by leading by example.

Conflicts of interest

None declared.

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What is shared in Schwartz Centre Rounds in an acute trust setting?

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Introduction

Schwartz Centre Rounds (SCR) give staff an opportunity to discuss the experience of delivering care with a focus on the 'human dimension' of medicine.[1] This facilitated educational format, which originated in the US, helps staff deliver compassionate care, and was introduced to hospices and trusts in the UK in 2009. The uptake of SCR rose after they were mentioned in the 2013 *Francis Inquiry*.[2] Motivation for starting rounds in the UK differs from the US, focusing on staff wellbeing, rather than the promotion of compassionate care,[3] although the two are linked.[4]

Feedback from rounds suggests benefit from attendance[5] with increasing efficacy with repeated attendance.[4] The suggested benefit is hearing staff disclosures and recognising the locus of dysfunction lies in the organisation, not in the individual. This decreases self-criticism and may maintain engagement.[6] Reduced isolation, increased teamwork, communication, empathy, and compassion towards colleagues and patients, have been reported.[6] This is important to the current staff and patient wellbeing agenda, with ramifications for recruitment and retention, as well as addressing the stress, burnout and suicide rates of clinicians.

While attendee feedback, focus groups and staff surveys have been investigated, to date there is no report of the content of SCR which is clearly pertinent to the evaluation of their mode of efficacy. We therefore undertook a mixed methods evaluation of the Schwartz rounds within our acute trust. Consent to share content without attribution is taken.

Materials and methods

Quantitative analysis of 20 rounds of feedback was analysed using Chi-squared statistic and interpretative phenomenological analysis of 23 rounds' facilitator notes. Consent to share the learning but not to attribute the content is taken at every round.

Results and discussion

55% attendees were doctors; 8% nurses; 8% professions allied to medicine; 4% other 25% undeclared. 71% of attendees gave feedback. 70% rated rounds excellent or exceptional, with no difference between doctors and other staff. Staff rated 'developing insight into how others think and feel in delivering care', higher than 'knowledge to deliver patient care'.

The seven superordinate themes were: alone and fearful; chaos and tumult; psychological defences; failure and loss; recognising humanity; responsibility and courage; and encouragement. Thus, SCR content covers the difficulties of working in healthcare, personal psychological coping mechanisms, empathy in recognising patients and families as 'people like us', as well as the burden of responsibility and the encouragement between clinicians in recognition of the stories heard from colleagues.

Conclusion

Rounds were highly rated, but nurses rarely attend. Rounds are successfully addressing clinician experience of care, rather than process. The content demonstrated staff sharing trauma, challenge, and coping, telling of courage, advising and encouraging others in teamwork.

This novel report of contemporaneously recorded SCR content gives support to George[6] in suggesting attendance helps shift clinicians from a dispositional attribution of work experience with withdrawal and isolation, to a situational attribution of events with the likely outcome of preventing internalisation and burnout and promoting teamwork.

Conflicts of interest

None declared.

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Springboard – a course aimed to address clinical and non-clinical concerns of physicians returning to practice

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Introduction

A high proportion of physicians in London take time out of training for a number of reasons, including parental leave, health-related absence and approved learning opportunities in research, education and leadership. While out of programme, trainees may feel a loss of momentum with regard to career progression and/or a sense of professional isolation. On returning to practice, trainees may feel 'out of touch' with advances in practice and clinical developments which may, in turn, lead to a perceived lack of competence in what may be 'dormant' generic and specialty knowledge and skills.

Methods

A team of trainers and trainees at the London School of Medicine, Health Education England established a course, named Springboard, to support doctors in training taking career breaks to optimise management of their absence and subsequent return to practice. Using a 'plan, do, study, act' mode of quality improvement over a 5-year period, the course was developed to take place over 2 consecutive days and consist of clinical update seminars, clinical skills workshops, practical procedure simulation sessions, expert panel discussions, peer-led practical advice/professional support sessions and provision of 'return to practice' and 'clinical update' guides. Course attendees completed validated pre- and post-course questionnaires containing both quantitative questions, based on a Likert rating scale (0–5), and open-ended qualitative questions pertaining to the benefits of the course. A mixed method evaluation approach was used to evaluate questionnaire data.

Results

A total of 540 trainees attended Springboard between 2014 and 2019, 65% of whom (351) completed questionnaires. 79% of attendees were ST3–ST7 trainees, 8% were core medical trainees and the remainder were clinical fellows, GP trainees or staff grade doctors. Quantitative analysis of pre- and post-course responses showed that, by attending Springboard, there was a significant increase in participants' median [IQR] scores of self-reported leadership skills (3 [2] vs 4 [1]; $p<0.0001$) and confidence in being prepared to return to practice (3 [3] vs 4 [1]; $p<0.0001$), manage a cardiac arrest (3 [2] vs 4 [1]; $p<0.0001$) and run the acute medical take (3 [2] vs 4 [1]; $p<0.0001$).

Qualitative analysis demonstrated four major themes of trainees considering an improvement of their confidence by attending the course and an appreciation of practical sessions, new updates/clinical guidance and the experience of meeting other physicians returning to practice. The most highly rated clinical updates and workshops pertained to 'stroke mimics', 'gastroenterology updates', 'ECG interpretation' and 'advanced life support'.

Conclusions

Springboard is a conference tailored to the needs of physicians returning to practice that was demonstrated to provide an opportunity for improving confidence relating to many areas of clinical and non-clinical practice, as well as providing an environment for networking and sharing experiences. Such an evaluation may be utilised for future collaboration with other specialties and disciplines.

Conflicts of interest

None declared.

Course 2 – creating a specialty registrars procedure course

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Introduction

I am a Royal College of Physicians associate college tutor at Queen Alexandra Hospital, Portsmouth. As part of this role, one of my responsibilities is to deliver the Portsmouth Procedure Course, designed to offer simulation training in core curriculum skills to core medical and acute care common stem trainees. The course, tutored by subject matter experts (consultants or senior member of the multidisciplinary team), combined classroom theory with skills lab practical sessions.

I noticed that specialty registrars (SpRs) often applied to the course to perform procedural skills that weren't part of their core job role, and I felt there was a gap in their educational provision. I designed an SpR Procedures Course, focusing on the revision of the procedural skills, but also, recognising the senior level of the trainees, how to manage complications.

Materials and methods

The aspiration was for the new course to be peer led, with SpRs teaching fellow SpRs, giving all members of the course a chance to share their own expertise and ask questions of real life situations, creating an equal learning and sharing environment (with added benefits of developing clinical teaching skills and interdepartmental relationships). We ran two pilot courses to hone content and timings.

Results and discussion

Key differences from the SHO course was minimal classroom time (a brief revision session) with increased time in the skills lab to perform the procedure (as all SpRs had knowledge of procedural skills) and a Q&A at the end of each session for any on call emergencies / real-life situations.
Costs have been minimal (approximately £200) due to the faculty being organic, with the bulk of costs being the consumables. We feel this is excellent value for improving the education and support for our medical registrars, especially given the formal introduction of simulation training in the updated curriculum.

Conclusion

Feedback was universally positive, with the trust commissioning multiple courses a year to meet the demand. The SpRs felt appreciated and were delighted that a course had been designed with them in mind. Over the next year, we aim to integrate this course with a cardiac arrest team-skills simulation course, extend pleural procedure element, and share the course with the Wessex Simulation Network as an example of good practice.

Conflicts of interest

None declared.

Mind wandering affects learning – students' perspective

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Introduction

Just like anyone else, medical students are also prone to distractions, which take their attention away from teaching and learning activities. There is a well-known ubiquitous phenomenon called 'mind wandering' (MW). MW can cause a student to become distracted during an academic activity, either by external or internally generated stimuli. MW may constitute up to 50% of waking time. MW is generally correlated with impairment of learning and negative effects on mood and health. This qualitative descriptive study was designed to explore the students' perspective on MW.

Material and methods

It is a phenomenological study with exploratory case study design and interpretive-constructivist perspective. After all necessary ethical considerations and approvals, 16 final year MBBS students of Azra Naheed Medical College (in equal number from both genders) were selected by convenient non-probability sampling technique. They were explored through semi-structured interviews from September 2017 to February 2018. Data recorded as audio files and notes were converted to verbatim and processed to themes and sub-themes.

Results and discussion

Many themes and sub-themes were identified through data analysis. Important themes included: understanding and experience of MW, impression, content and factors responsible for MW, negative and positive effects and solutions of MW. A majority of the students were of the opinion that mind wandering has negative impacts on their learning. They identified many responsible factors that may increase this phenomenon. A few of the students were of the opinion that MW also has some positive effects. Although generally considered as a phenomenon with negative effects on learning, many scientists raise an important question: how can a phenomenon occupying up to half of a person's waking life have only negative effects? Consequently, many beneficial effects are also attributed to MW, such ase creativity, relief from boredom, problem solving and dishabituation.

Conclusion

MW as an important phenomenon must be understood by students as well as teachers. Solutions for MW, such as mental exercises including mindfulness exercises, should be available to students. At the same time MW should also be understood as having many positive effects. An aware and trained student should be able to efficiently handle his/her mind wandering.

Conflicts of interest

None declared.

'This is my vocation; is it worth it?' Why do core medical trainees break from training?

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Introduction

The number of trainees moving directly into training posts following their foundation training is decreasing[1] and the same pattern is emerging after CMT. Previous studies identified factors behind CMTs leaving the formal training route, but didn't explore the motivations behind this.[2,3]
Understanding the reasons why trainees take a break from traditional training trajectories is crucial in order to ensure structures are embedded to support them. This study investigates trainees' motivations in taking a break after CMT and develops recommendations to support trainees.

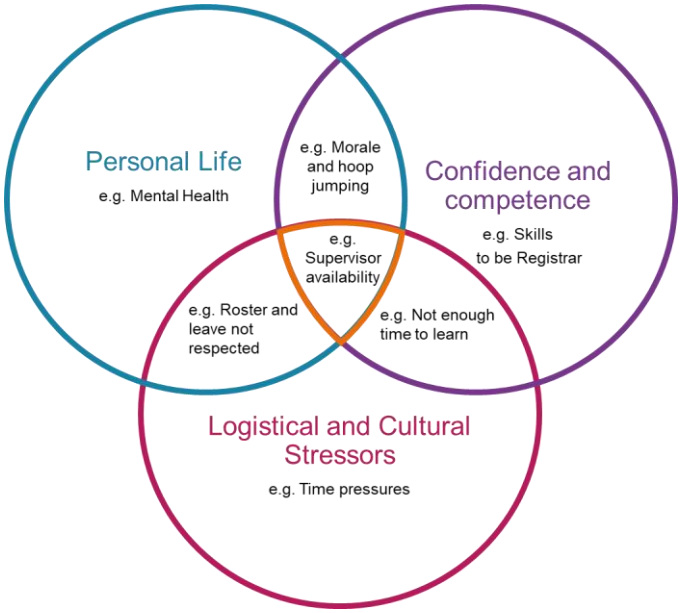
Methods

60-minute semi-structured, recorded, anonymised and transcribed telephone interviews with nine CMTs (five women and four men working in four different deaneries) who self-identified as leaving or taking a break from training were carried out between February and July 2019.
Transcripts were analysed and an emergent thematic framework created. For areas of disagreement we created thematic maps and calculated Cohen's Kappa (0.73), reaching a solid agreement level.[4] We reached saturation,[5] when no additional themes were added to the thematic framework, after the second coding of the first six interviews.

Results and analysis

Three inter-related overarching themes (Fig 1) were identified. Key quotes are shown for each theme.

Fig 1. The themes and their inter-relationships for why trainees leave training.



Personal life

'…Last year I felt very burnt out. I was considering leaving medicine completely. So I was looking for other jobs outside medicine and I thought it would be best if I could get a role outside the training programme with reduced hours, to give myself a chance to think if I wanted to stay in a career in medicine...' (Izabelle)

Confidence and competencies

'I think there needs to be an understanding that [becoming a registrar] doesn't just happen overnight, that I need to be trained to become that role and I need certain competencies. If I don't get those … and if I don't feel confident enough, then I just won't.' (Finlay)

'I feel like there are some consultants who are so unsupportive' there should be a way of making sure they're not people's supervisors … I've got Dr so-and-so and everyone grimaces and goes, "Oh no, poor you", and it shouldn't be like that.' (Jayce)

Logistical and cultural stressors

'… We're expected to attend 40 clinics over 2 years … and aren't able to leave work because there's not enough staff … I came in on annual leave to do [clinics] as well.' (Izabelle)

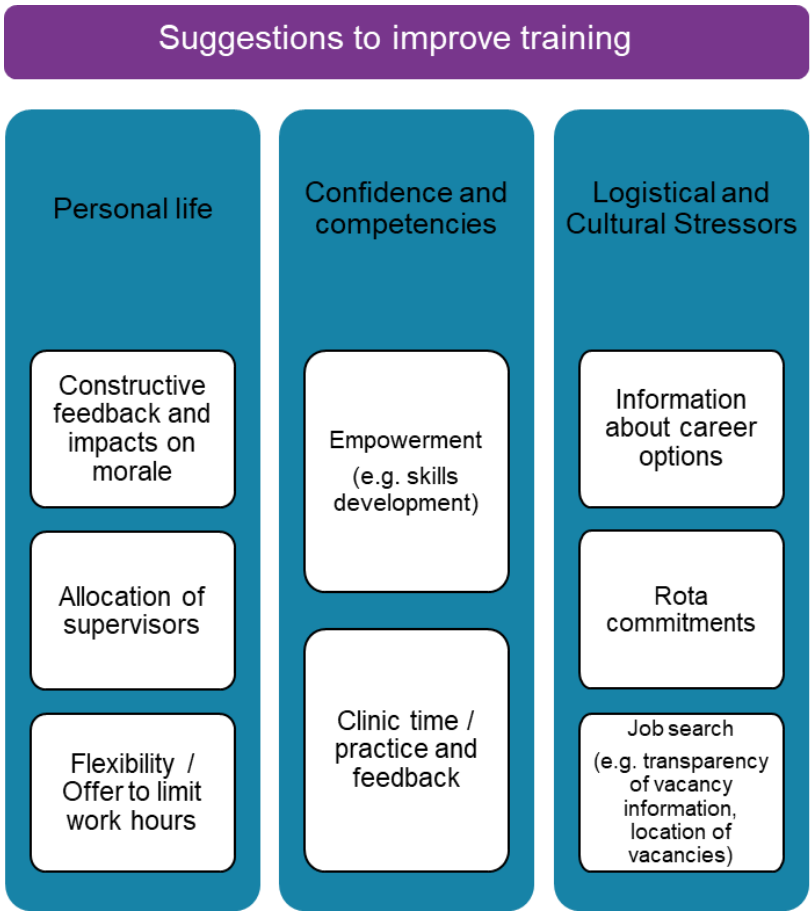
'Even if you wanted to, and you could step up as a registrar, there would be no one else to do the SHO work.' (Emilis)

Conclusion

In addition to the suggestions from interviewees to improve training (Fig 2), this study highlights the need for motivated, well-trained trainers (with the time required for the role) to improve trainee experience. Physicianly specialties need to make flexible training and working more accepted and improve trust understanding of training requirements so they can better support trainees. Flexible Portfolio Training[6] may help to some degree.

IMT has replaced CMT7 and may address confidence and competence issues by extending the programme and mandating intensive care rotations.

Fig 2. Trainee suggestions for the training programme.



Conflicts of interest

None declared.

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Improving medical trainees' experiences of intensive care – a regional survey

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Introduction

Medical trainees are commonly placed on intensive care (ITU) as part of core medical training (CMT). The programme has now been expanded as part of the introduction of Internal Medicine Training (IMT) to give all medical trainees a placement on intensive care. This expansion is in keeping with the evolution of critical care beyond a purely anaesthetic domain. In accordance, training of non-anaesthetic trainees must be rigorously evaluated and continuously refined. CMTs across the south London region were surveyed and their experience evaluated.

Materials and methods

A 21-question survey was designed collaboratively between medical and critical care teams and distributed to south London CMTs on ITU between August 2018 and July 2019. Responses were submitted through an anonymous online portal. Questions were designed to elicit trainees' views on 1) curriculum objectives 2) adequacy of support 3) learning opportunities 4) overall enjoyment and experience and 5) impact on career objectives.

Results and discussion

Twenty trainees from eight hospitals, tertiary and district general, responded with an equal proportion from year 1 and 2 of training. All had 4-month rotations and 13 were placed on the on-call rota.

Trainee overall experiences

19/20 of medical trainees found their placement enjoyable, of which nine said 'extremely enjoyable'. 17 described the placement as 'very valuable' for their medical training. 19/20 felt competent to perform common ITU procedures, eg central lines and arterial lines with minimal or no supervision.

Trainee impressions of curriculum and learning outcomes

Only half of trainees felt that their learning outcomes for the placement were clear and only 3/20 strongly agreed that there was sufficient intensive care teaching on medical training days. Despite this, 19 said they were able to obtain the necessary assessments for the block.

Qualitative feedback and trainee suggestions

Trainees reported positively on bedside teaching and access to senior members of staff. Respondents described increased confidence managing sick patients and knowing when to refer to intensive care.

However, multiple trainees reported feeling under-confident with ventilators even at the end of the placement, and a desire for more understanding of ITU drugs and basic airway skills. Many suggested a formal intensive care intro course at the beginning of the placement and that simulation training would be helpful.

Conclusions

Our survey supports current opinion that medical trainees find ITU placements valuable and that increasing ITU placements for medical trainees is a positive step in medical training. However, our survey identified a consistent message that trainees would like greater clarity on learning outcomes and more training on aspects of ITU care unfamiliar to them at the start of the placement.

Our survey provides evidence to support the creation of national ITU-specific learning outcomes for medical trainees and provides guidance for those supporting and designing education for medical trainees at the local level embarking on ITU placements.

Conflicts of interest

None declared.

A mixed-methods review of how quality improvement is represent in the UK postgraduate medical curricula

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Introduction

Today's medical curricula shape the institutional culture of tomorrow. There is an opportunity within the medical curricula to embed improvement methodology at the heart of practice, and ignite meaningful change throughout the health service. Therefore, it is imperative that quality improvement (QI) is well-characterised in the medical curricula.

Aim

To determine how QI is represented in postgraduate medical curricula.

Method

Sixty postgraduates' medical curricula and decision aides were reviewed. Text related to audit or quality improvement was extracted and coded for thematic analysis. QI engagement assessment measures were also reviewed.

Results

There is a significant variation between training programmes with regard to the number of audits or QI projects expected of trainees.

The text of the curricula was broadly congruent. Common themes included: the PDSA cycle, involvement of the multidisciplinary team and clinical governance.

Conclusion

QI should be pervasive across all healthcare settings. Despite this, there is considerable variation in the requirements for junior doctors in different training programmes. This suggests a lack of consensus on how many projects constitute an appropriate level of experience. Therefore, it is worth considering if there are potentially more meaningful methods of ensuring exposure to QI methodology.

Many curricula require a progression from participation in QI, in formative years, to leading a project and then simply supervising. This hierarchical view does follow a logical progression, but risks ingraining the damaging assumptions that a senior doctor's role in QI should be passive. Similarly, this progression encourages trainees to pursue leadership of small projects with limited impact, rather than become a participant in larger scale projects that are more likely to deliver change.
These curricula bear the hallmarks of an assessment methodology that needs to be administered in a standardised fashion, efficiently, to a large population. These assessment metrics have led trainees to realign their perception of QI, and temper their ambitions for change. As a result, only a minority of trainee interventions have a permanent positive impact, despite significant amounts of time being invested by trainees.

Recommendations for curriculum redesign

- Remove the arbitrary requirement for engagement with a certain number of projects and allow a wider range of evidence for engagement, such as: conference attendance, online education and involvement with ongoing iterative projects.
- Remove hierarchical terms from the QI curriculum.

- Consider whether cross-specialty collaboration is required in the setting of assessment metrics, to reduce the variability between training programmes.

Conflicts of interest

None declared.

Induction for foundation doctors: to what extent can face-to-face induction be replaced by Health Education England's national Doctors in Training induction e-learning?

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Introduction

The Doctors in Training (DiT) induction e-learning programme was launched by Health Education England in 2018. This covers eight topics: blood transfusion, consent, death certification, the Mental Capacity Act, record keeping, risk management, safe prescribing, and VTE thromboprophylaxis in three clinical scenarios. The certification is valid for 3 years.

Within the East Kent Hospitals University NHS Foundation Trust (EKHUFT), a 2-day induction for DiTs is standard. In order to potentially streamline and improve local induction, a survey was conducted to evaluate the e-learning modules against sessions provided in the face-to-face induction and to identify any duplication or replacement opportunities.

Materials and methods

Foundation doctors were encouraged to complete the e-learning before local induction. A survey was distributed to all foundation year 1 (FY1) and foundation year 2 (FY2) doctors (Likert scale and open question type) via a SurveyMonkey link at the end of the EKHUFT 2-day induction. The link was sent separately to each cohort, although questions were the same to compare responses. A total of 55 survey answers were analysed and results were generated.

Results and discussion

The majority of FY1 and FY2 doctors believed that HEE's e-learning induction modules are complementary to local induction (90.20% and 64.29% respectively) and that local induction should not be replaced by e-learning (75.6% and 57.1% respectively). They felt that there was only minimal duplication and that completing the e-learning in advance was beneficial to starting in their new role/workplace. Doctors valued both face-to-face induction and the e-learning.

Conclusion

Any streamlining that ensures an effective induction and that can save time and reduce costs must be explored. Evaluation demonstrated however that an 'either/or' approach was not desirable. DiTs valued both elements to the induction. The data showed that induction approaches to induction are valued by DiTs. Further work will consider how we can further enhance our face-to-face induction training around the opportunities presented by online induction programme.

Conflicts of interest

None declared.

Millennial learners – a blended approach to simulation for sepsis

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Introduction

The UK Foundation Programme curriculum highlights the need for competency in the identification, assessment and immediate management of the acutely unwell patient.[1] With the introduction of NEWS2 and the 'Surviving Sepsis' campaign, we identified a requirement to update our trust induction. The aim of this was to ensure the induction aligned with national updates and provided an educational tool for employees on early identification of unwell patients, including recognising and managing sepsis.[2,3]

Technology has transformed healthcare and learning preferences, bringing diversity through e-books, podcasts, social media and videos.[4,5] Teaching can harness technology to reflect this.[6] Millennial learners prefer interactive and innovative teaching, and pedagogy needs to reflect their learning styles and needs.[4] Interestingly, students feel this is more important than content, a concern of most educators.[4] Learning facilitated by a blended approach, combining knowledge and skill acquisition may be acceptable to both educators and our modern-day learners.[4,7] Simulated videos are interactive resources which enhance engagement with an added education value.[8]

Iorio-Morin *et al* applied Mayer's cognitive theory and recommended four interventions to optimise video learning: content, voiceover, visuals and planning.[9] Literature suggests that videos of 8–10 minutes improve engagement.[8]

Materials and methods

Clinical teaching fellows and the Simulation department developed a video (8mins 42secs) demonstrating early identification, escalation and assessment of an acutely unwell patient in a simulated environment. The aim was to provide up-to-date information about sepsis in a succinct, relatable and engaging format, with the ability to revisit information if required. The video content was aimed to be beneficial for all grades of healthcare workers who would be involved in patient care within our acute trust.

To reinforce learning, written keywords highlighted important aspects of the A–E assessment. Using screen-capture technology we were able to incorporate a demonstration of how to access Sepsis Trust UK guidelines, local antibiotic guidelines and trust sepsis bundles from both computers and mobile applications. These demonstrations aimed to encourage uptake and use of these evidence-based resources and supports a need to develop training packages to reflect the availability of such technologies, particularly favoured by next generation employees.

We collected excellent feedback and support from stakeholders within the 'Deteriorating Patient' management group. A pilot was run during FY1 teaching, feedback considered engagement with the simulated video and self-assessed knowledge, confidence and learning preferences after this blended learning activity.

Results and discussion

Verbal feedback was positive. Learners' confidence of sepsis identification, assessment and management increased. Qualitative feedback commended the interactivity, good use of technology and high-quality teaching. Learners appreciated the tool as a reference source, particularly by incorporating guidelines, and transformation to an e-learning resource would be beneficial to allow access in their own time.

Conclusion

This pilot study has demonstrated benefit of blended teaching using video technology. Further analysis of the program and variables affecting this intervention is required. Evidence supports the production of an e-learning induction program to standardise training and development of other video packages for core topics.

Conflicts of interest

None declared.

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Procedural skills training for medical registrars – is it needed?

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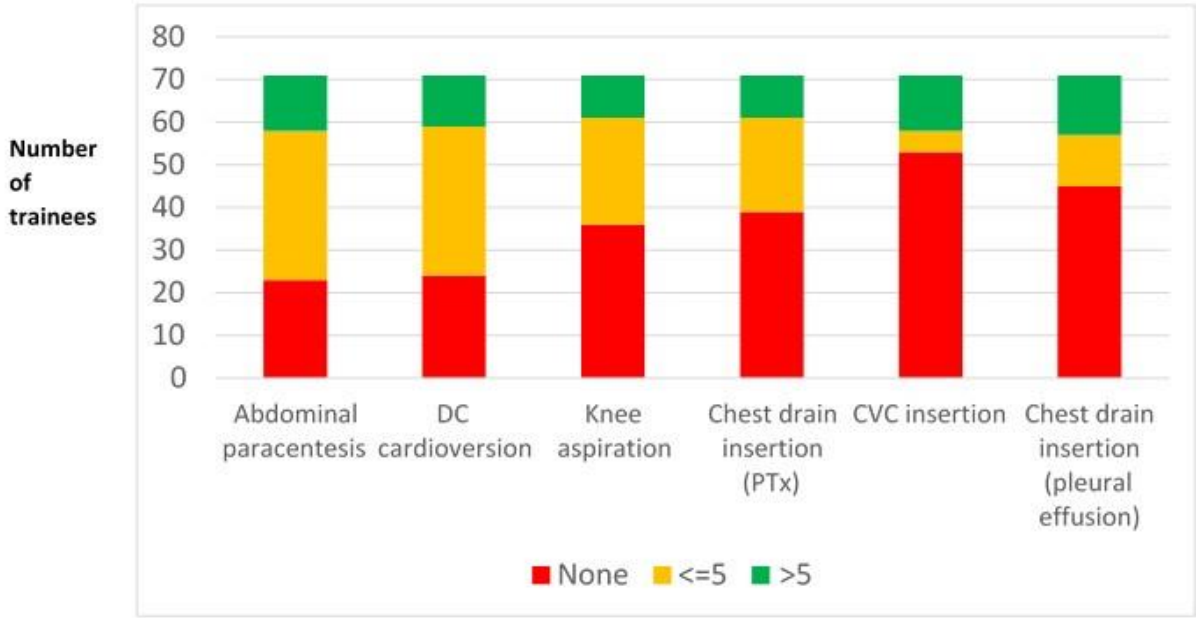
Introduction

The Royal College of Physicians' *Acute Care Toolkit 8*[1] recommends that procedural training should be available for medical registrars at all hospitals, and simulation training is widely regarded as a key way of teaching such skills.[2] Simulation training is now mandated for foundation and core medical training / internal medicine training stage 1 trainees nationally,[3] and is well delivered locally within our deanery. There is no such facility for general internal medicine (GIM) registrars, so we aimed to determine the interest, need, and pilot the delivery of such training in the procedures outlined by the Joint Royal Colleges of Physicians Training Board (2017).[4]

Materials and methods

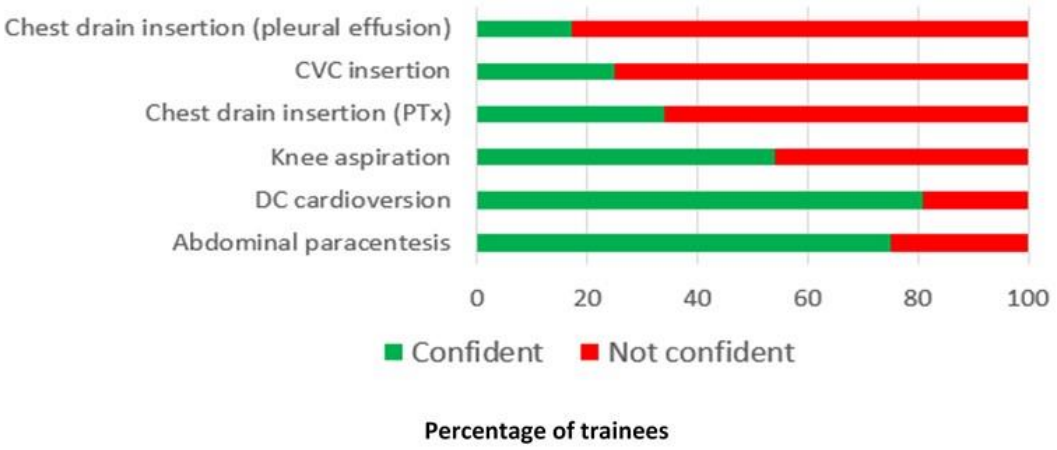
An online survey was sent to GIM trainees within the Thames Valley Deanery in January 2019. Semi-structured interviews were conducted using convenience sampling between February and March 2019 to further explore the issues.
71 responses to the online survey were received and six semi-structured interviews were conducted. Almost 70% of trainees felt current procedural training within the deanery to be inadequate. Trainees had limited exposure to procedures (Figure 1).

Figure 1: Number of procedures performed by trainees in the past 12 months



Ad-hoc procedural training during on calls was limited by lack of supervision and service demands, and despite half seeking additional training opportunities, confidence levels were low (Figure 2).

Figure 2: Trainee confidence in performing a procedure unsupervised



Key factors affecting trainee confidence included a lack of frequent exposure and medico-legal concerns.

90% of trainees felt simulation training would improve their confidence levels and identified small group size, good facilitators, protected time and a relaxed environment as being important to running an effective simulation session.

Using these results, we trialled a simulation programme for GIM SpRs with the aims of augmenting trainee confidence and providing evidence of basic competency training. Three pilot sessions were run across two sites from September to October 2019. Sessions lasted 3.5 hours, with trainees rotating through the following four stations: abdominal paracentesis/ knee aspiration (station 1), chest drain insertion (station 2), DC cardioversion/ pacing (station 3) and central line insertion (station 4). Trainers were Level 3 competency senior registrars who perform the procedures regularly as part of their clinical practice.

The first pilot had 2 trainees per station and using feedback from the first pilot, the second and third pilots were expanded to 3 trainees per station. VAS score assessment of confidence was performed pre and post session by each trainee for each individual skill.

Results and discussion

32 trainees attended across both sites. Trainee grade ranged from ST3–ST7. Excellent feedback was obtained, with all trainees commenting 'the sessions were well organised, relevant to clinical practice and improved procedural skills.' All trainees rated the training as 'excellent' and a 'great initiative' with 97% recommending incorporation into the HST curriculum. Confidence was improved by VAS scoring post training for all procedures and almost 90% felt the sessions would improve safety on GIM on calls.

Conclusion

Simulation training is an effective way to improve trainee confidence and competence in procedural skills[2] and this pilot showed such training is relevant, desired and necessitated across HST in GIM. Further work will assess its impact on maintaining trainee skillsets and its impact on patient safety.

Conflicts of interest

None declared.

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Developing the power of the pack: the long-term leadership impact of peer mentoring for female clinicians as part of the RCP's Emerging Women Leaders Programme.

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With women making up 54% of junior doctors[1] and almost 60% of new medical students[2] why does it remain that only 32% consultants and 24% trust medical directors are women?[1]

Bismark *et al* explored reasons and remedies for the under-representation of women in medical leadership roles and identified three contributing drivers: capacity, capability and credibility.[3] It has also been suggested that lack of effective mentoring for female clinicians aspiring to leadership positions has contributed to this under-representation at a senior leadership level.[2]

The RCP Emerging Women Leaders Programme launched in 2018 with an initial cohort of 12 female early career consultant physicians. It was designed to help address the under-representation of women in leadership roles within the medical profession by developing leadership skills and using peer and senior mentorship that centres around the drivers that Bismark described.

The RCP Emerging Women Leaders Programme uses facilitated peer mentoring known as 'Action Learning Sets'.[4] There is increasing evidence to support the effectiveness of Action Learning Sets and female peer mentoring in healthcare settings.[5]

Our study focuses on the effect that facilitated peer mentoring has had on the women involved in the RCP Emerging Women Leaders programme. Participants had highlighted the significant impact of facilitated peer mentoring in their post-programme feedback and it was decided to build on this feedback to formally develop research within this field.

Participants are current and previous participants of the programme. Qualitative data is being gathered in two phases; a focus group and one-to-one interviews, which will be analysed using a hybrid method of emergent and a priori codes and themes.

Our intention is to share the results of the study and make recommendations for the use of facilitated peer mentoring to support under-represented groups in leadership roles within a healthcare setting.

Conflicts of interest

None declared.

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Timeliness of electronic discharge summary sign-off for medical inpatients at Great Western Hospital, Swindon: a retrospective audit

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Introduction

Timely communication between healthcare providers is crucial for providing safe and effective care, particularly in the era of increasingly complex medical and social needs. Electronic discharge summaries (EDS) conveying relevant information from inpatient admissions to patients' GPs are an integral part of such communication. NICE[1] and Professional Record Standards Body (PRSB)[2] guidelines stipulate EDS standards, including that such documents be made available to GPs within 24 hours of discharge. The primary aim of our audit was to evaluate compliance of medical teams at the Great Western Hospital NHS Foundation Trust (GWH) with this quality standard.

Methods

A random sample of 109 patients who were discharged from the care of inpatient medical teams at GWH to community settings between 1 January 2019 and 11 August 2019 was provided by the audit department at GWH. We retrospectively reviewed the EDS of these patients on 6 September 2019, noting the date that the EDS sent electronically to GPs, compared with the date, time and day at the point of discharge. We divided patients into length of stay groups of short (48 hours or less), medium (3–7 days) or long (more than 7 days). The primary outcome was the percentage of patients with an EDS sent for GP review within 24 hours of discharge.

Results

109 patients were included for analysis. Of these, 107 had EDS available at the point of review (98.2%). The quality standard was achieved for 68 patients (64.2%), with a 1 day median delay from discharge to EDS, but a wide range of 0 to 82 days (excluding two cases where no EDS was available at the time of our review). This standard was achieved less frequently when patients were discharged over the weekend (15/35 cases, 42.9%) compared with those discharged from Monday to Friday (53/74 cases, 71.6%). There were no significant differences in compliance with the standard according to time of discharge or length of stay. For reasons which are difficult to fully explain, there was a marked deterioration in compliance with the standard during the month of April 2019 compared with previous and subsequent months.

Discussion

This sampled, retrospective audit suggests that medical patients discharged over the weekend in GWH are more likely to experience a delay in the EDS being made available to their GP than those discharged from Monday to Friday. Given the additional workload pressures on on-call medical teams at the weekend, this emphasises the need for inpatient teams to identify potentially dischargeable patients and complete as much as practical of their EDS before the weekend. GWH are currently conducting a wider quality improvement regarding EDS, which could include actions to emphasise this need.

Conflicts of interest

None declared.

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F1 simcalls: an *in situ* simulation programme for new doctors

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Introduction

Doctors starting their first postgraduate posts are particularly vulnerable to stress.[1] Areas of concern include working on call and managing acutely unwell patients. There is evidence that simulation is beneficial for experiencing these aspects in a safe environment.[2,3]

Materials and methods

Simulation sessions to improve on-call preparedness ran for all foundation year 1 doctors (FY1s) starting at one district general hospital in August 2019. 35 people took part over three evenings. Participants were divided into two groups per evening: one group undertook simulations of the deteriorating patient using SimMan, while participants in the other group took part in an *in situ* ward-based simulation. The ward-based group were provided with a map and a bleep and given two initial handovers, which they had to decide how to prioritise. Plastic wallets containing information about the required tasks were disseminated around the wards for participants to locate, interpret and decide whether to escalate. Once the individuals were on the wards, a team of doctors bleeped participants with additional tasks with one designated person acting as a senior who was available to give advice over the phone. Groups had allocated debriefing slots after both parts of the simulation, and swapped halfway through the evening. Data were collected via pre- and post-event questionnaires. Quantitative measures were integers 1–5.

Results and discussion

Mean confidence in starting FY1 and being on-call improved from 2.63 to 3.28 (n=32) and 2.00 to 3.16 respectively (n=34). 100% of respondents (n=29) felt this simulation should be offered to everyone commencing FY1. Simulation usefulness was rated a mean of 4.65 (n=34). Qualitative data on participants' concerns were used to provide specific feedback to the cohort.

Conclusion

Subjective measurements of preparedness for key junior doctor responsibilities increased post-intervention. Participants found this simulation particularly useful for practising responding to bleeps and managing unwell patients in a safe environment. This session is now mandatory for all new FY1s at the trust and will be run annually, with an aim to incorporate multidisciplinary team learning between nursing students, medical students, nurses and doctors.

Conflicts of interest

None declared.

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QUALITY IMPROVEMENT AND PATIENT SAFETY

Trends in aetiology, treatment and complications associated with diabetic ketoacidosis (DKA) – a 6-year study at a large tertiary care centre in the West Midlands, United Kingdom

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Introduction

Diabetic ketoacidosis (DKA) is an acute endocrine emergency that requires immediate diagnosis and management. Effective management of DKA in accordance with national guidelines improves clinical outcomes and may reduce long hospital stays.[1] Recent studies have shown that frequent audit cycles, performance feedback and regular feedback of specific clinical criteria are necessary to sustain improvements in DKA management.[2,3]

The study has three aims.

- To identify the common aetiologies of DKA, alongside auditing the practice of including DKA as a diagnosis on this cohort's discharge letters.
- To study the appropriateness of monitoring of blood glucose (BG) and ketones and of the prescription of fixed rate intravenous insulin infusion (FRIII) and fluids during DKA.
- To study the frequency of hypokalaemia, hyperkalaemia and hypoglycaemia during DKA management.

Materials and methods

All patients who were prescribed FRIII from April 2014 to August 2019 were included in the study. These episodes were then manually confirmed to meet the criteria for DKA (serum glucose ≥11 mmol/L, ketones ≥3 mmol/L and pH ≤7.3 or bicarbonate ≤15 mmol/L). Data were collected regarding aetiology of DKA, duration of DKA, inclusion of DKA as a diagnosis on discharge letters and appropriateness of prescription of FRIII and fluids and of BG and ketone measurements for all episodes. Data regarding hypokalaemia (potassium (K) <3.5 mmol/L), hyperkalaemia (K >5.5mmol/L) and hypoglycaemia (BG <4 mmol/L) were recorded for episodes from April 2018 to August 2019. DKA resolution was defined by the standard criteria (serum glucose <11 mmol/L, ketones <0.6 mmol/L and pH >7.3 or bicarbonate >15 mmol/L). All data were collected from the time of DKA diagnosis until resolution or up to 12 hours from diagnosis (whichever was longest).

Results and discussion

A total of 625 episodes were included in the study. The mean DKA duration was 18.6 hours. The common aetiologies leading to DKA were intercurrent illness (30.08%), suboptimal compliance with diabetes therapy (27.2%), new presentation of type 1 diabetes (8.32%), surgical-related aetiologies (6.4%), sepsis (5.44%) and alcohol-related aetiologies (3.68%). 17.92% of cases had unclear aetiology. Only 69.2% of patients from April 2018 to August 2019 had the diagnosis of DKA included in their hospital discharge letter. Prescription of FRIII and fluids was appropriate in 98.2% and 84.1% of cases respectively. 63.7% of patients received the recommended hourly ketone monitoring whereas glucose monitoring was carried out more frequently than

hourly, on average every 44 minutes. Only 63.1% had at least one potassium measurement during DKA. Of these, 9.6% had hypokalaemia, 17.6% had hyperkalaemia and 25.3% had hypoglycaemia.

Conclusion

Nearly 70% DKA episodes had preventable aetiology, highlighting the importance of patient education regarding diabetes management. Nearly a third of confirmed DKA cases did not have the diagnosis of DKA included in their hospital discharge letter, suggesting a need for improvement to enable follow up in primary care. Higher than recommended frequency of glucose measurements may indicate potential resource wastage, whereas under-monitoring of ketones might prolong DKA duration as it is one of the resolution criteria. High rates of kalaemic and glycaemic complications associated with suboptimal monitoring during DKA management need to be addressed urgently. Further studies are required to assess the impact of complications on overall DKA management, DKA duration and length of hospital stay.

Conflicts of interest

None declared.

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Use of sliding-scale insulin in medical patients at Hamad General Hospital, Qatar – an audit-based study

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Introduction

Poor control of diabetes mellitus (DM) in hospitalised patients is associated with worse clinical outcomes. Despite the lack of evidence of effectiveness of sliding-scale insulin (SSI), it remains a common practice in hospital settings.[1,2]

The aim of this study was to evaluate current practice of SSI use in medical inpatients at Hamad General Hospital.

Materials and methods

Electronic medical records of 30 patients with diabetes admitted under medical care (June 2017) were examined retrospectively.

Results and discussion

- The majority (63.3%) of patients were female, and elderly (>60; 53.3%).
- The majority (70%) of patients had type-2 DM. The type of DM was not documented in the rest.
- SSI was initiated on first day of hospital admission in almost all patients.
- SSI was continued beyond 48 hours in almost 80% of patients.
- The indication for initiation of SSI was not documented in almost all the patients.
- Regular insulin was used in 23.3% of patients and insulin aspart in the rest.
- Basal insulin was prescribed in only 53.3% of the patients. Of these, 68.75% were already on home basal insulin, either with oral diabetic agents or with bolus insulin.
- Almost a quarter (23.3%) of patients had blood glucose readings of <5 mmol/L. Of these, 28.6% had symptomatic hypoglycaemia.
- Almost a third (30%) of the patients had high blood glucose readings (>20 mmol/L).
- 58.6% of patients were discharged on their previous home treatment.
- 24-hr insulin requirement was calculated only in 10% of patients.

Conclusions

- There is variable glycaemic control with the use of SSI).
- Hypoglycaemia and hyperglycaemia are common problems with SSI.
- The accurate documentation of indication for SSI, and equivalent dose conversion, is still lacking.
- SSI is used well beyond the maximum suggested duration of 48 hrs.
- We aim to implement necessary changes and plan to re-audit to assess these changes.

Conflicts of interest

None declared.

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A review of pleural infection in Northumbria Healthcare NHS Foundation Trust

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Introduction

Understanding epidemiology of and deficiencies in care is crucial to inform practice. We serve 600,000 patients in a well-established pleural service.[1]

Method

A retrospective analysis of all patients with pleural infection between December 2016 and December 2017 was conducted.

Results

36 patients were identified, all being admitted from the community. The average age was 64.5 years and 19 were over 65 years of age.

Consolidation was present on chest X-ray in 24.

Comorbidities were malignancy (seven), alcohol excess (five), mental health (five), current smokers (nine) and ex-smokers (16). Drug use was recorded in one; eight had an HIV test.

Thoracic ultrasound findings were documented in 15 notes (commonest comment was 'multiloculated fluid' (11), others: 'small or moderate size' and 'echogenic').

28 samples of pleural fluid were available for analysis. Fluid was pus or turbid in 13, blood-stained in five, serous in six and four had no comments. pH result was available in 17 (and was <7.2 in 8); lactate dehydrogenase (LDH) was reported in 14.

In 11 (39%) samples cultures were positive: two *Streptococcus pneumoniae*, one *Strep intermedius*, one *Actinomycosis turnicensis* and *Haemophilus parainfluenzae* (in intravenous drug user), two *Staphylococcus aureus* (patients with indwelling pleural catheters). Other organisms included *Strep dysgylactiae*, *Strep anginosus* and mixed anaerobes.

Twenty-six had chest drains inserted with 10 receiving intrapleural lysis; nine received antibiotics only.

Thirty-five patients received piperacillin – tazobactam or co-amoxiclav initially. Clindamycin was given in 60% of cases, even for fully penicillin-sensitive organisms. Antibiotic duration was between 2 and 8 weeks.

The mean length of stay was 9 weeks (ICQ 1 – 56). All survived to discharge in first admission; three (9%) had died within 30 days, and three more within 6 months. Eight were readmitted within 38 days – 75% due to infection – with 50% staying for 4 weeks.

Conclusions

Our data are in line with known epidemiology, microbiology, comorbidities and expected length of stay.[2]

We need to improve checking of HIV status, ultrasound reporting, sending for biochemical and microbiological analysis in accordance with British Thoracic Society guidance and in blood culture bottles, and to stop reliance on clindamycin.[3–6]

We have hence introduced a pleural infection and procedure pro forma (see Fig 1).

Fig 1. Pleural infection and procedure pro forma.

Pleural ultrasound or procedure
Northumbria Healthcare NHS Foundation Trust

AFFIX PATIENT STICKER

FIRST NAME .....
SURNAME .....
DATE OF BIRTH / /
MRN .....

CONSENT: Written ☐ Verbal ☐
If verbal, risks and benefits explained:

Pleural ultrasound findings Side: Left ☐ Right ☐
Include size, depth, appearance, loculations etc

Procedure report *tick if done*
Procedure performed: Diagnostic tap ☐ Aspiration ☐ Chest drain ☐
Drain size (if appropriate) .....
Aseptic technique ☐
Local anaesthetic infused subcut ☐ Drug..... Dose.....
Document any difficulties or complications:

Pleural Fluid report *volume, appearance etc*

Drainage plan (if applicable)

Performed by: .....

Signed: .....**GMC**.....**Grade**.....

Supervisor/Assistant: .....

Date:...../...../..... **Time:**.....

Sent for:
pH ☐
Glucose ☐
Protein ☐
Albumin ☐
LDH ☐
Cytology ☐
C&S ☐
AFB/TB ☐
Lipids ☐
Amylase ☐

CXR required?
Yes ☐
No ☐

Conflicts of interest

None declared.

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Interpretation and documentation of chest X-rays in the acute medical unit

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Introduction

The chest X-ray (CXR) is considered a simple investigation that is carried on most medical admissions. The ionising radiation medical exposure regulations (IRMER) 2000 guidance states: 'The employer shall ensure that a clinical evaluation of the outcome of each medical exposure is carried out and recorded'. The Care Quality Commission wrote to all acute trust chief executives in July 2011 requiring them to audit the recording of radiological reports and to develop an improvement plan.

Aims

To review the medical records of patients admitted directly to our acute medical unit who underwent a CXR, to identify whether timely and correct interpretation was performed and to identify potential issues.

Methods

We carried out a prospective audit conducted over 5 days and looked at the time from CXR to documentation of results in the medical notes, and whether the interpretation of the CXR was accurate compared with the later radiologist's report. We also looked at how long it took for a radiology report to be available.

The standard used was that 100% of CXRs should have a result recorded in the notes by a clinician at a time when the result will influence the management of the patient (based on the Royal College of Radiology standards). Data were collected from all admissions from primary care during the audit period (n=97).

Results

See Table 1. Only 4% (3/65) of patients had a radiologist's report available within 4 hours. In 18% (8/45) of the cases with a clinician's report, the clinician's report and the radiologist's report was significantly different (for example, clear lungs instead of consolidation).

Table 1. Audit conducted over 5 days and the time from chest X-ray to documentation of results review

Total number of patients	Number of patients who had CXR within 24 hours	Number of patients who did not have CXR documented within 24 hours	Number of patients who had CXR documented within 24 hours	Average gap from CXR performed to documentation among the 69%	Number of CXR reviewed and results documented within an hour	Average gap between CXR and radiologist report
97	67% (65/97)	31% (20/65)	69% (45/65)	8 hours	31% (14/45)	22 hours

CXR = chest X-ray.

Conclusions

Timely and correct interpretation of CXRs can help guide correct treatment of patients. Delay in review or non-review of CXRs can lead to potential problems including incorrect treatment, delay in discharge, missed diagnoses, and added financial costs.

Conflicts of interest

None declared.

Tackling delays in patients requiring chest X-rays on the acute medical take

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Introduction and aim

Chest X-rays form a vital part of the initial assessment and management of patients seen by medical practitioners.[1] During the acute medical take at University College Hospital (UCH), patients are referred to the medical team by the emergency department (ED) team or via their general practitioner. Due to logistical arrangements, patients may be transferred to the acute medical unit (AMU) without the chest X-ray that they require as beds become available. As a result, patients would then be transferred to the X-ray department at a later time or date to have this crucial investigation when it could have been performed in ED at the time of admission. This can lead to delays in diagnosis and management, as well as unnecessary disruption for the patient. This quality improvement project was designed to tackle these delays in obtaining chest X-rays between October 2018 and March 2019.

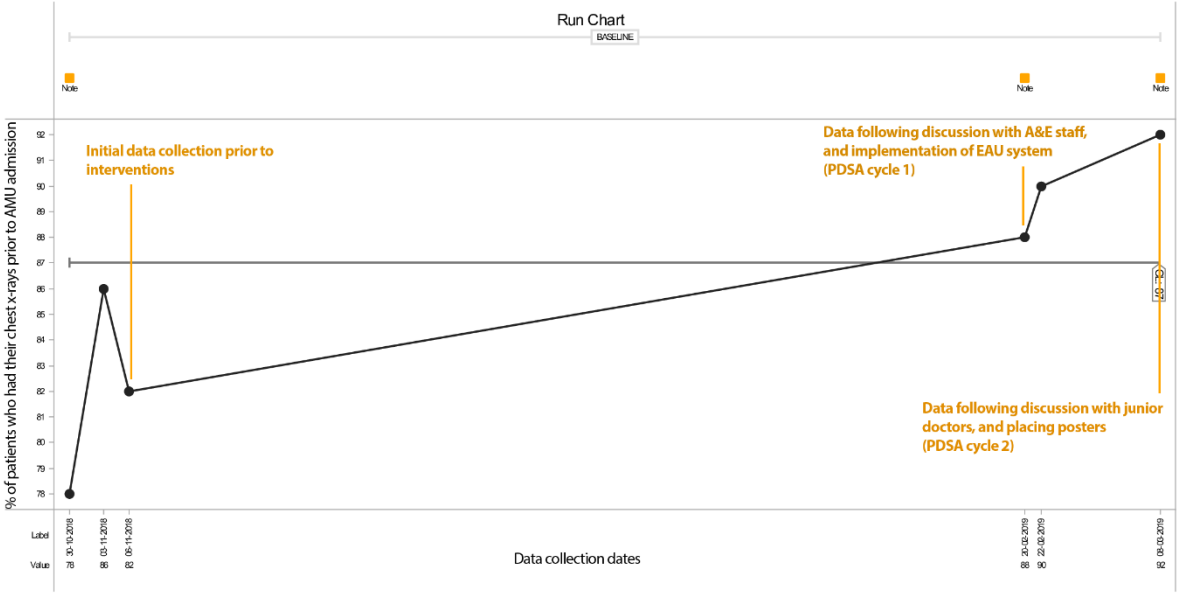
Method

Electronic health records of 122 patients were analysed pre-intervention to determine the proportion that did not receive a chest X-ray prior to admission to the AMU. The delay in patients who had the X-ray after AMU admission was recorded. Two plan, do, study, act (PDSA) cycles with interventions focussed around improving communication between ED staff, acute medicine doctors and radiographers were performed. A further 135 patient records were analysed post-intervention to determine if there was any increase in the proportion of patients receiving an X-ray prior to admission and if that corresponded to a reduced delay.

Results

By the second cycle, the percentage of patients receiving their clinically indicated chest X-ray prior to admission to the AMU rose from 82% to 92%, with delay time reducing from 2 hours and 22 minutes per patient to 42 minutes per patient (Fig 1).

Fig 1. Run chart demonstrating the improving proportions of patients receiving clinically indicated chest X-rays prior to their acute medical unit admission, with labels detailing timing of interventions and the corresponding plan, do, study, act cycle to which they belong.



Conclusion

The results given above translate to reduced disruption for patients[2] and reduced delays in diagnosis and management for patients admitted under medicine at UCH.

Conflicts of interest

None declared.

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Quality improvement project: identifying the barriers to accurate assessment and documentation of fluid status monitoring

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[A]Homerton Hospital; *RCP chief registrar

Aim

To identify the barriers to accurate assessment and documentation of fluid balance.

Methods

Fluid status monitoring was identified as an essential component in the care of patients with a presenting diagnosis of heart failure, sepsis, acute kidney injury and severe hyponatraemia. To measure the assessment and documentation of fluid status monitoring, data was collected from the electronic patient system (EPR) using a snapshot review on two wards over 48 hours pre- and post-intervention. Data collected included patient demographics, presenting diagnosis, early warning score, initial assessment of fluid status, if fluid monitoring was requested and fluid balance chart percentage completion.

Data was collected at baseline and following the plan, do, study, act (PDSA) cycle. PDSA cycle one included a session with 23 doctors and nurses that outlined the key aspects of fluid balance monitoring and provided room for discussion of barriers and mechanisms for improvement.

Questionnaires were used to assess nurses' and doctors' understanding of the importance of, barriers to and improvements in the assessment and documentation of fluid balance monitoring.

Results

The baseline data showed 30.5% of sample patients had no information documented on the fluid chart, 69.5% had some data documented and 0% were fully completed. The questionnaires reflected the data, showing 95% of nurses and 63% of doctors feel that fluid balance is managed suboptimally or poorly. The main barriers highlighted were time pressures, patient compliance, challenges with documentation on EPR, staff education and handover. The PDSA cycle one session highlighted the need for better communication and handover and staff education, and the issue of time constraints. Following PDSA cycle one there was no identified improvement in fluid balance documentation, with only 44% of patients having some fluid balance monitoring documented compared to 69.5%.

Conclusion

Both quantitative and qualitative data indicate that fluid status monitoring is poorly documented. Barriers to accurate monitoring were identified as time constraints, poor handovers, poor staff education and confidence and patient compliance. This is a large topic which has the potential for significant improvement. Further PDSA cycles and interventions are required to improve documentation of fluid balance. Some planned future interventions are bulleted below.

- Teaching sessions for doctors and nursing staff to improve confidence in assessing and documenting accurate fluid balance.
- A handover checklist to improve medical–nursing communication.
- Fortnightly snapshot data collection to generate a run chart to understand the random variation of fluid balance documentation and therefore clearly identify shifts and trends suggesting improvement.

Conflicts of interest

None declared.

Tattooing will benefit patients with colorectal cancer

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Introduction

'Tattooing of all lesions ≥20 mm and/or suspicious of cancer outside of the rectum and caecum should take place in 100% of cases following local trust guidance'.[1] Therefore, an audit was performed with the main goal being to determine if a tattoo was completed in accordance with the national guidelines, where the tattoo was made and if the result of the biopsy was a cancer diagnosis. The expected result of the audit is to show the importance of tattooing in all the suspected cancer polyps. This would support the implementation of best practice in the surgery department by all the doctors and surgeons carrying out future procedures.

Materials and methods

A cohort of procedures was chosen comprising all the patients that had had a colonoscopy between 1 October 2017 and 31 October 2018 (1 year and 1 month). An excel sheet was built based in the hospital data program 'Endobase', with the following information: patient NHS number; the date of the procedure; if cancer was diagnosed; if a photo was taken; if the polyp was tattooed; if it was placed correctly; who did the procedure and other observations. Following these, in each procedure, the information was registered in the 'Endobase' and the histological patient report was crossed, to verify if the final diagnosis of the colonoscopy biopsy was cancer or not.

Results and discussion

From the 401 sets of patient data reviewed, 194 patients had complete data with colonoscopy results. Overall, 131 patients (68%) were diagnosed with cancer and 63 patients (32%) did not have cancer. When we started analysing the endoscopies that were diagnosed with cancer, we concluded that 86 procedures (66%) were not tattooed. 16 (12%) were tattooed incorrectly and only 29 (22%) were tattooed correctly according to the guidelines.[1] When reviewing the procedures that did not lead to a cancer diagnosis, 57 (90%) were not tattooed, one (2%) was not tattooed correctly and 5 (8%) were tattooed correctly. The majority of the endoscopies were not tattooed or the procedure was not done correctly.

The cost of having to repeat procedures because the polyp was not tattooed and the patient needs to be submitted to surgery is too high.[2] Both cancer and non-cancer lesions that need to be surgically removed (that are not in an area that can be easily identified like the rectum) need to be tattooed in the submucosa with an injection of black carbon ink in 3 or 4 quadrants around the lesion.[3] Colorectal cancer is still one of the largest causes of death in the United Kingdom and the adoption of best practice not only benefits patients but also contributes to the saving of NHS money.[4]

Conclusion

Raising awareness of the importance of tattooing during colonoscopies has the potential to improve patient outcomes and reduce costs to the NHS.

Conflicts of interest

None declared.

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Evaluation of the impact of limited-sequence MRI brain protocol (fast brain MRI) on diagnostic accuracy and length of hospital stay for patients with stroke-like symptoms

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Introduction

A significant number of patients are admitted under the stroke team with symptoms mimicking cerebrovascular events. Their diagnosis can be challenging, delaying discharges and impacting management. This imposes a significant burden on bed spaces and incurs significant costs to the NHS.

We aim to review the use of 'fast brain' magnetic resonance imaging (MRI) in patients admitted with stroke-like symptoms and to assess their impact as a diagnostic aid in the management of the patients, including initiation of new medications and facilitating discharge.

Method

We collected data on the stroke unit at Princess of Wales Hospital, Bridgend. The data were extracted retrospectively from the admission registry for the stroke ward as well as from the discharge summaries on the health board's clinical portal. The Synapse system was used to get results of CT of the head and MRI of the brain during the admission. The length of stay between 2016 and 2017 was compared (2017 being the year when MRI of the brain were used to help in the diagnosis of stroke in patients admitted to the stroke unit).

Results/analysis

During 2016, 627 patients were admitted to the stroke unit at Princess of Wales hospital. The average length of stay (LOS) was 9.4 days. The number of admissions to the stroke unit in 2017 was 665. The average LOS was 8 days. This was a 15% reduction in LOS in 2017 compared to 2016 (Fig 1).

Of the 665 admissions in 2017, 159 patients had fast brain MRI to help confirm their diagnosis. The average waiting time for the scan was 2.7 days with 36.5% having their scan on day one after admission. The average LOS was 6.5 days, with 72% being discharged within 5 days of admission (Fig 1).

All patients except one had a head scan on admission (n=158). 13 patients had CT reported as a new or recent infarct. Of those seven (54%) had a confirmed infarct on MRI and six (46%) had a recent infarct excluded. Of the patients with negative CT of the head for new/recent infarct, 56 (38.6%) had a confirmed new event on fast brain MRI.

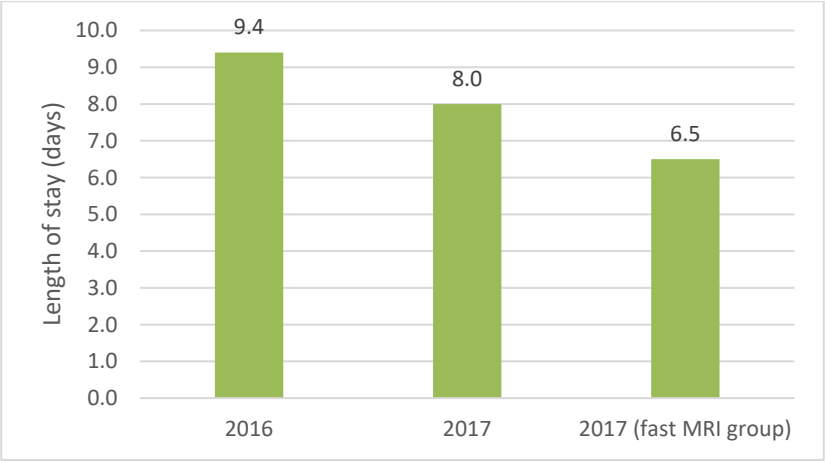
75% of patients with positive MRI were started on clopidogrel, 11% had a new diagnosis of atrial fibrillation, and 10% were anticoagulated on discharge.

Conclusions

There was a 31% reduction in LOS in the MRI group compared to the average LOS in 2016 on the stroke ward with 461 bed-days saved. This amounted to £207,450 saved in 2017. The MRI was superior to CT of the head in the diagnosis of new infarcts. Early specialist stroke input and early confirmation of diagnosis reduced the length of stay, saving on the cost of beds and staffing on the stroke ward, and allowed risk stratification for future stroke events. This impacted the medical management of stroke-positive patients, including the introduction of anticoagulation in patients with atrial fibrillation and initiation of clopidogrel when appropriate (Fig 2).

Fig 1. Length of hospital stay. a) Change in length of hospital stay. b) Length of stay in magnetic resonance imaging group.

(a)



(b)

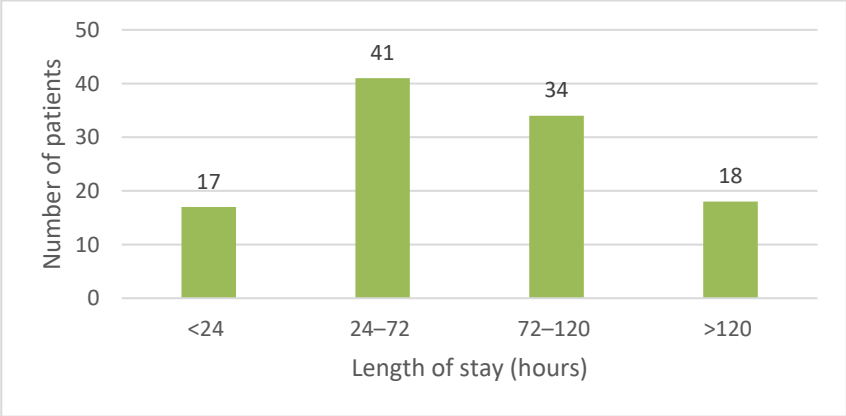
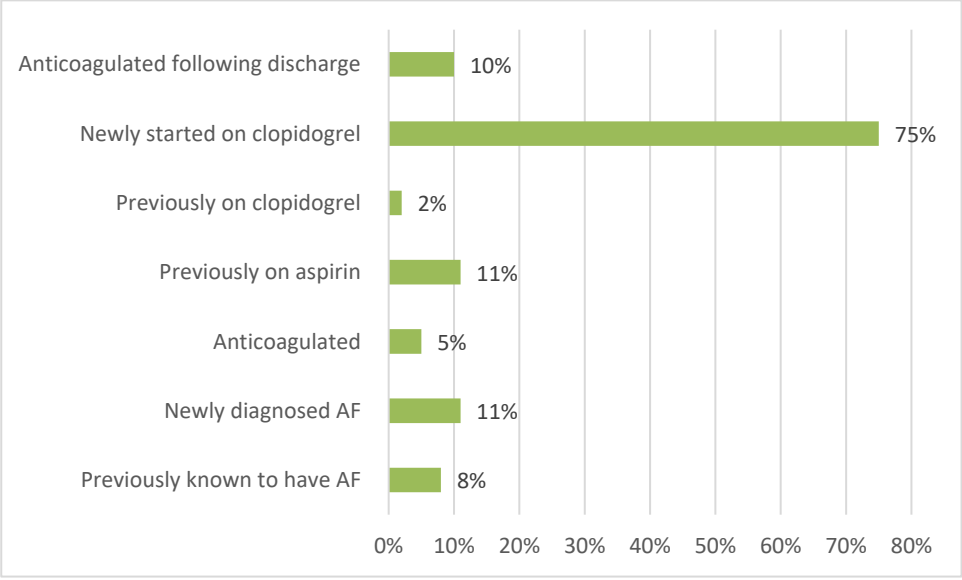


Fig 1. Group with positive magnetic resonance imaging, giving details on change of management strategy.



Conflicts of interest

None declared.

A clinical practice improvement project on inappropriate intravenous phosphate replacement

Authors: Chaozer Er,[A] Joelynn Qiao Bin Tay,[A] Hejing Tan,[A] Clarissa Hui Wen Aw,[A] Nicholas Wong Wai Cheong[A] and Nurul Atiqa Binte Mohd Tahir[A]

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Introduction

Our hospital's reference range for phosphate is 0.85–1.45 mmol/L. Oral replacement is generally adequate for mild and moderate hypophosphataemia >0.3 mmol/L).[1,2] Intravenous (IV) phosphate replacement carries many potential side effects and is therefore given for severe hypophosphataemia (<0.3 mmol/L) only.[1,2] Inappropriate IV phosphate replacement was common in our ward. We carried out a clinical practice improvement project (CPIP) to address this problem.

Materials and methods

We retrospectively reviewed the clinical record of all patients with hypophosphataemia admitted to two of our medical wards (total 68 beds) from February to April 2019. 350 hypophosphataemia results were reviewed. They were analysed in blocks of two weeks.

A median of 66% of hypophosphataemia cases with phosphate >0.3 mmol/L were inappropriately given IV phosphate (Fig 1). A previous study reported a prevalence of 85% in an American hospital.[3]

We formed a team of six members consisting of two pharmacists, three internists and one nurse. A flow chart to describe the process of hypophosphataemia management and a fishbone diagram were constructed.

After two rounds of multi-voting, our Pareto chart showed the top three root causes to address were:

- inadequate published guidance on hypophosphataemia management
- mindset of rapidly correcting laboratory abnormalities
- unfamiliarity with 'oral fleet' phosphate solution.

Two interventions were devised:

- A poster (rolled out on 29 July 2019) providing guidance on hypophosphataemia management and educating doctors and nurses about 'oral fleet' (sodium phosphate solution), as oral phosphate replacement as phosphate tablet is not available in our hospital.
- A plenary session (conducted on 20 August 2019) educating doctors and pharmacists about the rationale and scientific basis of our hypophosphataemia guideline, with the aim of changing their mindset of using IV phosphate for rapid correction. Concerns on medication safety, cost and time saving were shared.

We applied plan, do, study, act (PDSA) methodology.

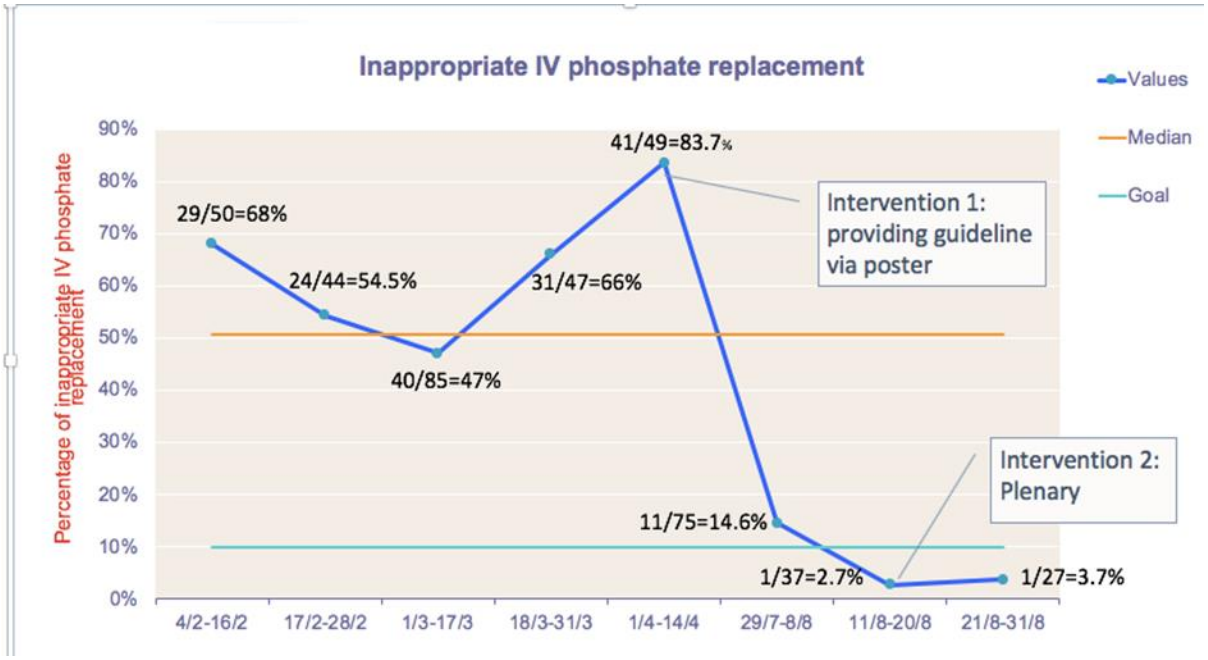
Results and discussion

With the two interventions implemented, the percentage of inappropriate IV phosphate replacement dropped to 3.7% (Fig 1). Estimated cost saved per year is about 20,000 GBP. There are other benefits such as nurses' time saved, improved patient comfort and lower risk of medication error.

To ensure sustainability, we propose to

- raise the awareness of hypophosphataemia guideline by introducing it during orientation
- repeat the education talk every 6 months
- set up online module on hypophosphataemia
- upload hypophosphataemia guidelines to the intranet
- encourage nurses to speak up and discuss concerns with doctors about potential inappropriate IV phosphate replacement.

Fig 1. Run chart showing the prevalence of inappropriate intravenous phosphate replacement in two medical wards.



Conclusion

We have successfully carried out a CPIP to reduce the percentage of inappropriate IV phosphate replacement in our medical wards from 66% to 3.7% within 6 months.

Conflicts of interest

None declared.

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Clinical appropriateness of the use of early warning scores in medical wards

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Background

Early warning scores (EWS) are vital tools in the identification of clinically deteriorating patients. They use a combination of physiological parameters to create an aggregate score, alerting medical teams to the acute deterioration of patients. This score impacts on the frequency of patient reviews, and triggers referral to critical care. However, in some patients with persistently altered physiology or patients approaching the end of their life with a do not attempt resuscitation (DNAR) order, EWS scoring can be inappropriate. Local and Royal College of Physicians (RCP) guidelines[1] stipulate that a patient's clinical condition may necessitate action from 'resetting' NEWS thresholds to stopping scoring to ensure patient-centred comfort-targeted care. We hypothesised that the proportion of inpatients with DNAR decisions in place who also have EWS addressed (threshold reset or stopped) is an effective metric of clinician awareness of the appropriateness of the use of EWS.

Methods

We performed two cycles of snapshot audits on acute medical (admissions and short stay unit) and medical wards in 2018 and 2019 before and after improvement measures. We identified patients with DNAR decisions and counted how many of them had adjustments made to their EWS threshold. The first intervention (after the 2018 cycle) was the Trust-wide switching from the Modified EWS (MEWS) to the National EWS2 (NEWS2). The second set of interventions was targeted at medical wards only: two announcements at the departmental meetings, two group emails to the consultant body, a targeted email to senior ward nurses and documented discussions at two morbidity and mortality meetings, creating a control arm (acute medical wards) and an intervention arm (medical wards). Chi-squared test was used (SPSS version 24) for statistical analysis.

Results

In 2018, 28/64 patients had an amendment made to their MEWS (43.8%). In 2019, 67/125 patients had an amendment made to their NEWS2 (53.6%). This trend towards improvement was not statistically significant (p=0.200). There was no significant difference in EWS amendment in the control group between 2018 and 2019 (Table 1). However, the intervention arm did show a statistically significant improvement in amendment to EWS (37.2% vs 59.1%; p=0.017).

Table 1. A comparison of the number of patients with amended early warning scores in 2018 and 2019

Group	Number of patients with EWS amended 2018	Number of patients with EWS amended 2019	p-value
Control	12/21 (57.1%)	12/32 (37.5%)	0.160
Intervention	16/43 (37.2%)	55/93 (59.1%)	0.017

EWS = early warning score.

Conclusion

Our results indicate that the proportion of inpatients with DNAR decisions in place who also have EWS addressed (threshold reset or stopped) can be improved by targeted communication. This has measurable

effects like reduction in futile emergency calls as well as less measurable effects like allowing dying patients to receive appropriate end-of-life care and reducing stress of futile activity in clinical staff. The results also suggest that the NEWS2 chart alone is not enough to prompt medical staff to think about the appropriateness of EWS. Targeted communication is essential to significantly reduce the number of patients being inappropriately escalated. Interestingly, a recent study showed that nurses' pattern recognition can provide important information for the detection of acute physiological deterioration.[2] Therefore further data is required from different healthcare settings where EWS are implemented to limit futile activity, avoid distress for dying patients and their relatives and make more appropriate use of nursing resources.

Conflicts of interest

None declared.

References

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Acute management of Addisonian crisis – a quality improvement project

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Introduction

Adrenal crisis is a life-threatening emergency contributing to the excess mortality of patients with adrenal insufficiency. Studies in patients on chronic replacement therapy for adrenal insufficiency have revealed an incidence of 5–10 adrenal crises per 100 patient years and suggested a mortality rate from adrenal crisis of 0.5/100 patient years. Our aim was to improve acute management of Addisonian crisis in patients with adrenal insufficiency admitted to a large teaching hospital.

Methods

We carried out a retrospective review of the management of Addisonian crisis in 27 patients (age range 18–55) admitted between January and May 2018. We collected data on patients' hospital numbers from Medical Informatics and requested medical notes from Medical Records. Further to this we reviewed the case notes of each patient admitted with Addisonian crisis and their discharge letters and clinic letters. We revisited the patient journey from admission to discharge.

Results

Initial cycle showed guidelines were followed in the acute treatment of patients who presented with Addisonian crisis. 70% of patients were seen by the Endocrine team within 24 hours. Only a few patients were made aware of sick day rules before discharge. Following the first cycle we disseminated our recommendations about the importance of sick day rules via emails and posters. We delivered teaching to all healthcare staff who were involved in the acute care of patients with Addisonian crisis. Following a plan, do, study, act (PDSA) cycle and interventions we noted dramatic improvement in the results. More than 80% of patients were reviewed within 24 hours. Sick day rules were communicated to 83% of the patients in the second cycle as compared to 7% in the first cycle.

Conclusion

Further improvement in education regarding sick day rules are required to achieve a 100% result. This needs to be done consistently by all medical professionals to reduce mortality and morbidity. With regular PDSA cycles we intend to further reduce unnecessary hospital admissions and reduce the associated costs in various NHS hospitals.

Conflicts of interest

None declared.

Abdominal paracentesis: use of a standardised pro forma improves patient safety with good record keeping

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Introduction

Paracentesis, the aspiration of fluid from the abdominal cavity, is a diagnostic and therapeutic procedure frequently performed in gastroenterology wards. Paracentesis is generally a safe procedure but there are variations in practice and some potential complications such as bleeding and injury to internal organs. These potentially serious risks can be reduced by using safety checks and optimal technique. Following several near-miss incidents involving ascitic drains in our Trust, we undertook an audit cycle in order to improve patient safety.

Materials and methods

A total of 15 documentation components were identified as essential for safe ascitic drain insertion, management, and removal based on the current British Society of Gastroenterology guidelines[1] and expert opinion. We audited a representative sample of 17 sets of patient medical notes who had undergone paracentesis on Ward 91 and 92 (gastroenterology wards) over a period of 6 weeks. Based on these results we designed a poster for junior doctors and a novel paracentesis pro forma in order to standardise the safety check and documentation process and facilitate best practice (Fig 1). Printed copies were made available on the wards with an electronic copy available on a shared drive. To assess its long-term effect and direct further work, two cycles of re-audit were completed over a period of 12 weeks after each intervention.

Results and discussion

The initial audit demonstrated that 100% of paracentesis entries included a record of verbal consent. However, there was a large variation in the quality of documentation, with an average of 47% (n=8) compliance with the essential documentation components. In particular, explanation of procedure-related complications, amount of local anaesthetic used, time of drain removal, total volume drained, and post-procedure care instructions were poorly recorded. In order to encourage better compliance with the essential documentation components, we designed a poster for the doctors' office. Insignificant improvement was detected as a result of this intervention. However, the introduction of the paracentesis pro forma resulted in an immediate and sustained increase in documentation compliance to 83% (n=14). The greatest improvement was seen in recording pre-procedure safety checks and post-procedure care instructions (100%; n=17).

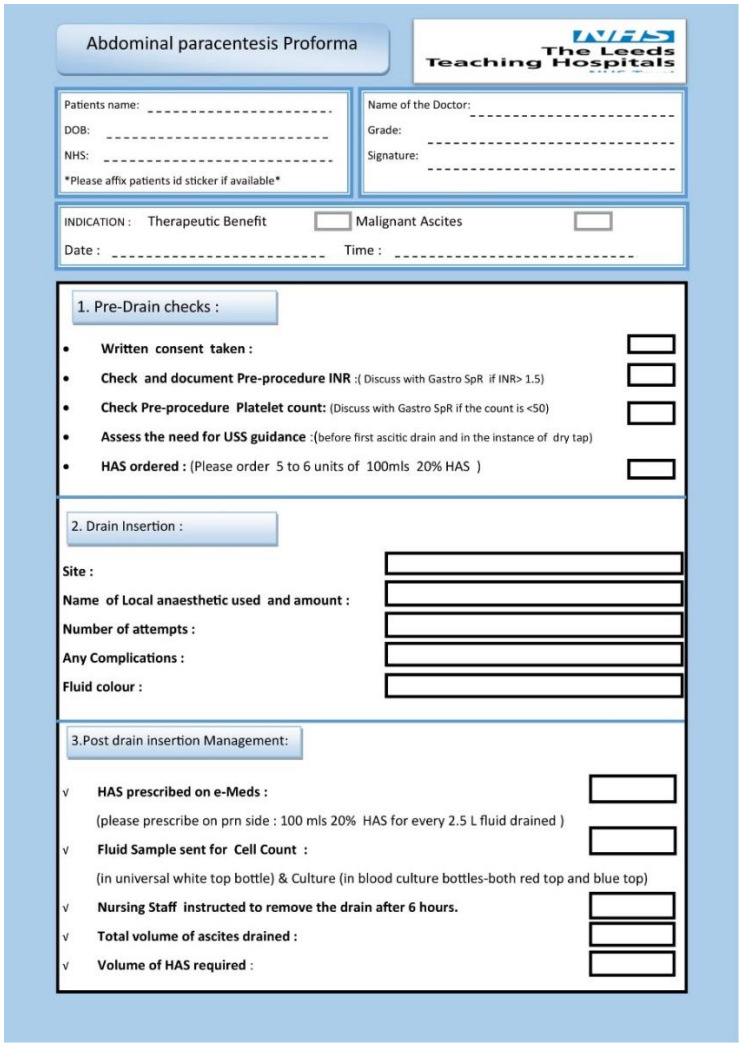
Conclusion

Introduction of a simple, standardised pro forma improves documentation in abdominal paracentesis, promoting best practice and safeguarding patient safety. It also boosts the confidence of junior doctors in performing the procedure.

Conflicts of interest

None declared.

Fig 1. Paracentesis pro forma to standardise the safety check and documentation process.



Abdominal paracentesis Proforma

The Leeds Teaching Hospitals

Patients name: _____
DOB: _____
NHS: _____
Please affix patients id sticker if available

Name of the Doctor: _____
Grade: _____
Signature: _____

INDICATION : Therapeutic Benefit ☐ Malignant Ascites ☐
Date : _____ Time : _____

1. Pre-Drain checks :

- **Written consent taken :** ☐
- **Check and document Pre-procedure INR :**(Discuss with Gastro SpR if INR> 1.5) ☐
- **Check Pre-procedure Platelet count:** (Discuss with Gastro SpR if the count is <50) ☐
- **Assess the need for USS guidance** :(before first ascitic drain and in the instance of dry tap)
- **HAS ordered :** (Please order 5 to 6 units of 100mls 20% HAS) ☐

2. Drain Insertion :

Site : ☐
Name of Local anaesthetic used and amount : ☐
Number of attempts : ☐
Any Complications : ☐
Fluid colour : ☐

3.Post drain insertion Management:

√ **HAS prescribed on e-Meds :** ☐
(please prescribe on prn side : 100 mls 20% HAS for every 2.5 L fluid drained)
√ **Fluid Sample sent for Cell Count :** ☐
(in universal white top bottle) & Culture (in blood culture bottles-both red top and blue top)
√ **Nursing Staff instructed to remove the drain after 6 hours.** ☐
√ **Total volume of ascites drained :** ☐
√ **Volume of HAS required** : ☐

References

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The management of influenza and its complications within the Guy's and St Thomas' NHS Foundation Trust

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Background

The peak number of admissions to hospital intensive care unit (ICU) for influenza-related complications was higher during the 2015/16 flu season than previous seasons.[1] This coincided with a lower uptake of flu vaccination in targeted groups including the elderly, those clinically at risk and healthcare workers across the UK.[1] This highlights the importance of optimal vaccination uptake in target risk groups.

Aims

We aimed to quantify vaccination uptake among over 65s and clinically at risk groups as defined by Public Health England (PHE) in *The Green Book*.[2] Furthermore, we wanted to evaluate current practice in the management of influenza against national guidelines and its complications, particularly community-acquired pneumonia (CAP) against local guidelines.[3,4]

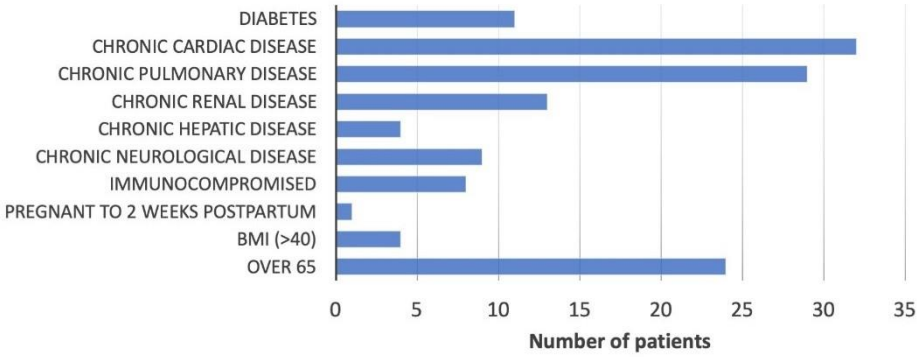
Methodology

Electronic records were interrogated for all influenza-positive ICU patients presenting to Guy's and St Thomas' NHS Foundation Trust (GSTT) between the 2015/16 and 2016/17 winter flu seasons. 97 patients were found to fit the inclusion criteria. Demographic, clinical, laboratory and outcome data were extracted using a standard data collection form. Chapter 19 of *The Green Book* defined clinically at-risk groups who should be offered annual flu vaccination.[2] Antiviral drug selection was directly taken from national PHE 2016 guidance.[3] Local GSTT guidelines defined diagnostic and management standards for CAP.[4]

Key findings

- 69/97 (71%) patients featured at least one co-morbidity, which qualified them to receive annual flu vaccination. However, vaccination records were only documented in 4 (4%) patients. This made evaluating vaccination uptake against national targets set by the Department of Health difficult (Fig 1).[5]
- 24/47 (51%) H1N1 patients and 14/50 (28%) non-H1N1 patients were not treated in compliance with national PHE guidance.
- 47/68 (69%) patients with CAP were not given guideline antibiotic therapy; piperacillin/tazobactam was the most commonly misused antibiotic.
- 10/16 (63%) of penicillin-allergic patients were either given the wrong antibiotic cover or a contraindicated antibiotic.

Fig 1. Presence of comorbidity which qualified patients to receive annual flu vaccination.



Conclusion

Current management of influenza and its complications remains inadequate. Increasing vaccination uptake in clinically at-risk groups remains a priority. Poor documentation of vaccination status makes evaluating vaccination status against national targets difficult. Lack of data hinders the development of targeted campaigns that could potentially improve uptake of flu vaccinations among target groups. Other actions include:

- Mandatory screening of all patients presenting to hospital with influenza-type symptoms for flu vaccination records.
- Require viral strain data to be sent, if available, with anti-viral drug requests, with the intention of restricting oseltamivir use to treat non-H1N1 influenza and zanamivir for H1N1 influenza.
- Arrange a meeting between the ICU pharmacists and infectious disease department to formalise the process of appropriate step-up/step-down of antibiotic regimes used in ICU for CAP based on CURB-65 score and formalise the use of piperacillin/tazobactam.
- Weekly review of all patients with known drug allergies currently in ICU to be conducted by ICU pharmacists and/or infectious disease department.

Conflicts of interest

None declared.

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Management of low-risk chest pain in ambulatory medical assessment area and the role of the heart scoring system in identifying risk

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Introduction

Low-risk cardiac chest pain at Birmingham City Hospital (BCH) is managed through its ambulatory medical assessment area (AMAA). The pathway receives referrals from two streams, the emergency department (ED) and general practice. It follows a clear pathway, including patients being pain free with non-dynamic ECGs. Over the past 4 years we have seen the number of referrals increasing, with a large proportion of end diagnoses not being cardiac. Currently, we do not use any risk stratification tools and we present this data to promote the usage of the HEART scores[1] in AMAA.

Materials and methods

This is the fourth year that this data review has been completed. We retrospectively reviewed the notes of patients referred as 'chest pain' between the dates 1 July 2019 and 31 August 2019. Patients that did not attend, self-discharged, or those with missing notes were excluded. We reviewed data regarding duration of stay, age, gender, initial diagnosis, outcome/follow-up for patients and any adverse events within 30 days of discharge.

We have also collated data to retrospectively apply HEART scores to our patient cohort.

Results and discussion

Four-hundred and twenty-two patients' notes were reviewed. Some patients were given multiple diagnoses; 38.4% of patients were diagnosed with musculoskeletal chest pain, this being the most frequent diagnosis, and only 2.8% of patients were diagnosed with acute coronary syndrome.

92.4% of patients were discharged from AMAA with or without follow-up. 32 patients were admitted, of which 13 were admitted under cardiology, while a further seven patients were either discussed with or reviewed by the cardiology team.

Thirty-five return events occurred within 30 days of the initial assessment; some patients returned more than once. One person underwent an inpatient angiography, but no significant disease was found. One patient had an angiography following an outpatient cardiology review. Two patients required inpatient cardiology reviews. Two patients were referred to outpatient cardiology. It was noted that one patient died, but this was unrelated to their initial assessment. One patient's notes were unavailable.

Retrospective application of HEART scores identified that cardiology involvement was 2.3% in those scoring in the low-risk group, 18.0% in the medium-risk group and 16.0% in the high-risk group.

Conclusion

AMAA at Birmingham City Hospital continues to assess and manage low-risk cardiac chest pain safely and robustly, with low numbers being re-admitted and requiring inpatient care. Each year the numbers seen in AMAA have increased; a large proportion of these patients are diagnosed with musculoskeletal chest pain, which was traditionally managed in the ED but which is now being now being sent across to medicine.

HEART scores could be used to ensure the right patients with low-risk cardiac chest pain are being seen in AMAA. We will be adapting our pathways to incorporate the HEART score to ensure the appropriate

patients follow the correct pathways, which will empower our clinicians with confidence to discharge patients.

Conflicts of interest

None declared.

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Can iFOBT (immunochemical faecal occult blood test) for bowel cancer screening be safely deferred for five years after a colonoscopy?

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Background

Australian and international guidelines suggest that immunochemical faecal occult blood test (iFOBT) for colorectal cancer (CRC) screening may be deferred for 5–10 years after a negative colonoscopy. However, it is not uncommon for community health practitioners to repeat iFOBT at earlier than recommended intervals after a previous colonoscopy due to concerns over potential missed detection of neoplasms. The aim of this retrospective multicentre observational study was to evaluate the outcomes of patients who had a repeat colonoscopy for iFOBT positivity within five years of a previous colonoscopy showing low risk or normal findings, to assess the risk of interval CRC and advanced colorectal neoplasia (ACRN). We sought to determine if having a prior colonoscopy with normal or low risk findings within the last five years would predict for negative findings on a repeat colonoscopy in asymptomatic patients who were iFOBT positive.

Methods

We retrospectively identified patients who underwent a repeat colonoscopy for iFOBT positivity within five years of a previous colonoscopy showing normal or low risk findings from November 2016 to November 2018. Patients identified from Provation, Auscare and the Viewer databases were included from four sites, including The Prince Charles Hospital in Brisbane, Cairns Base Hospital, Innisfail Hospital and Atherton District Hospital in Northern Queensland. We excluded patients with a past history of CRC, patients with a familial malignancy syndrome, patients with poor bowel preparation and patients who were symptomatic.

Result

Among 3,795 patients who underwent colonoscopy for a positive iFOBT in the study period, 239 had a previous colonoscopy in the five-year window that met inclusion criteria. Of these, 4 (1.7%) patients had locally advanced CRC at two regional sites, and 19 (7.9%) patients had ACRN. 42 (17.6%) patients had high risk adenoma, 21 (8.8%) patients had sessile serrated adenoma and 87 (36.4%) patients had adenoma of various sizes. Inadequate bowel preparation in the previous colonoscopy was associated with the findings of subsequent high-risk adenomas and CRC.

Conclusions

Our study observed that a substantial portion of patients have interval ACRN associated with a positive iFOBT performed outside of guidelines. These finding were not uniform between the study sites and may reflect local differences, highlighting the importance of interpretation of guidelines, the ability of the clinician to override guidelines if clinically indicated, the need for colonoscopy care standards and teamwork that may facilitate excellence in practice.

Conflicts of interest

None declared.

Point of care ultrasound in acute kidney injury – rapid and reliable imaging at the point of admission

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Introduction

The aim of this study was to assess the accuracy of renal tract point of care ultrasound (POCUS) according to focused acute medical ultrasound (FAMUS) curriculum to identify and grade hydronephrosis in patients admitted to the acute medical unit (AMU) with acute kidney injury.

Materials and methods

This was a prospective observational study of a convenience sample of patients older than 18 years admitted to AMU with acute kidney injury. A POCUS was performed by acute physicians according to FAMUS curriculum. A departmental renal ultrasound / computed tomography of the renal tract was then conducted; the radiologist was blind to POCUS result. The objective was to determine the diagnostic performance of POCUS performed by acute physicians for the detection of hydronephrosis using a departmental scan as a gold standard.

Results

A total of 54 patients were included in the study conducted from July 2018 to December 2018. Out of 54 patients, one patient had a single kidney (left nephrectomy), one patient had three kidneys (transplant) and two patients were found to have atrophic kidneys. A total of 106 kidneys were scanned, with 102 (96.2%) adequately imaged by POCUS; 96 kidneys were used for comparative analysis; hydronephrosis was noted in five patients on POCUS. Sensitivity of POCUS was 90% while its specificity was 100% with a positive predictive value of 100% and negative predictive value of 99%. The average time to POCUS from initial scan request was 40 minutes and time to departmental scan report from initial scan request was 19 hours 22 minutes. The average time saved by POCUS was 18 hours 20 minutes.

Conclusion

Our study demonstrates that POCUS as a part of patient management in acute kidney injury is quick, accurate and saves time compared to traditional departmental imaging. It highlights that acute physicians can accurately identify hydronephrosis in patients with acute kidney injury.

Conflicts of interest

None declared.

Catastrophic antiphospholipid syndrome – a case report of a highly fatal disease

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Aim

The aim was to highlight the importance of recognising a highly fatal disease, catastrophic antiphospholipid syndrome (CAPS).

Summary

The following is a case report of a 58-year-old man that presented with left leg cramp after returning from a holiday. While the Doppler ultrasound showed no evidence of deep-vein thrombosis, he presented a few days later with chest pain and shortness of breath. Computed tomography (CT) pulmonary angiography showed that he had bilateral pulmonary emboli and also evidence of mediastinal and cervical lymphadenopathy. The scan also raised the possibility of lymphoma. He was commenced on anticoagulation and referred to the haematologist who arranged a CT of the neck, chest, abdomen and pelvis which confirmed multiple bilateral lung nodules with mediastinal and low-volume neck lymphadenopathy. He was then referred to the respiratory physicians who suggested a biopsy.

Within a few days, the patient developed left arm weakness, left-sided facial droop and slurred speech. A CT of the head showed incidental aneurysm, and further imaging with magnetic resonance imaging revealed likely brain metastasis. The patient was commenced on steroids and went on to have the lung biopsy, which later confirmed adenocarcinoma of the lung. The patient presented similarly and was diagnosed with multiple cerebral and cerebellar infarcts as well as infarcts in the kidney and spleen.

At his next presentation, the patient was septic in type 2 respiratory failure with new parenchymal infarcts in the kidneys and spleen with a high suspicion of a bowel infarct. Fever, thrombocytopenia, neurological abnormalities, acute kidney injury and the presence of schistocytes in the blood film with an elevated lactate dehydrogenase suggested a diagnosis of thrombotic thrombocytopenic purpura. The patient underwent plasmapheresis and blood results showed normal ADAMTS13 activity with positive anticardiolipin antibody and anti-beta-2 glycoprotein I antibody.

Results

A diagnosis of CAPS was made, and the patient eventually succumbed despite anticoagulation and plasmapheresis.

Conclusions

We hope that this case report raises awareness among physicians and helps ensure early diagnosis and prompt treatment of CAPS.

Conflicts of interest

None declared.

Adherence to new Royal College of Ophthalmology guidance for hydroxychloroquine retinal screening in rheumatology patients

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Introduction

In February 2018, the Royal College of Ophthalmology (RCO) changed its guidance on screening for retinal toxicity in those prescribed hydroxychloroquine (HCQ).[1] This was a marked change in guidelines from annual optician review to baseline screening by an ophthalmologist with optical coherence tomography (OCT) to scan the macula within the first 12 months of starting the drug or to create a new baseline for those taking the medication long term. Annual screening was also newly recommended annually after 5 years of treatment.

This change was based on emerging evidence that HCQ retinopathy is more common than previously considered. Reported prevalence is approximately 7.5% at 5 years on standard dosing (200 mg twice daily) and increases up to >20% after 20 years of treatment.[2] Known major risk factors for HCQ retinopathy are duration of treatment, high dose by weight, concomitant tamoxifen use, known retinal or macular disease, and renal impairment (Table 1).[3] The change in screening standard was not resourced and initial concerns were raised by ophthalmologists, rheumatologists, nephrologists and dermatologists – the most frequent prescribers of HCQ. Nevertheless, locally we agreed to adopt the guidance, where possible, and referral from primary care (the prescribers) was the locally agreed pathway.

We sought to assess at 1 year whether these recommendations have been implemented and documented in and estimate the prevalence of HCQ retinopathy in the rheumatology outpatient cohort.

Table 1. Risk factors for hydroxychloroquine retinopathy; presence of any risk factor warrants earlier screening

Major risk factors	Minor risk factors
HCQ dosage >5.0 mg/kg	Age
Duration >5 years	Liver disease
Renal impairment	Genetic factors
Concomitant tamoxifen use	
Known retinal and macular disease	

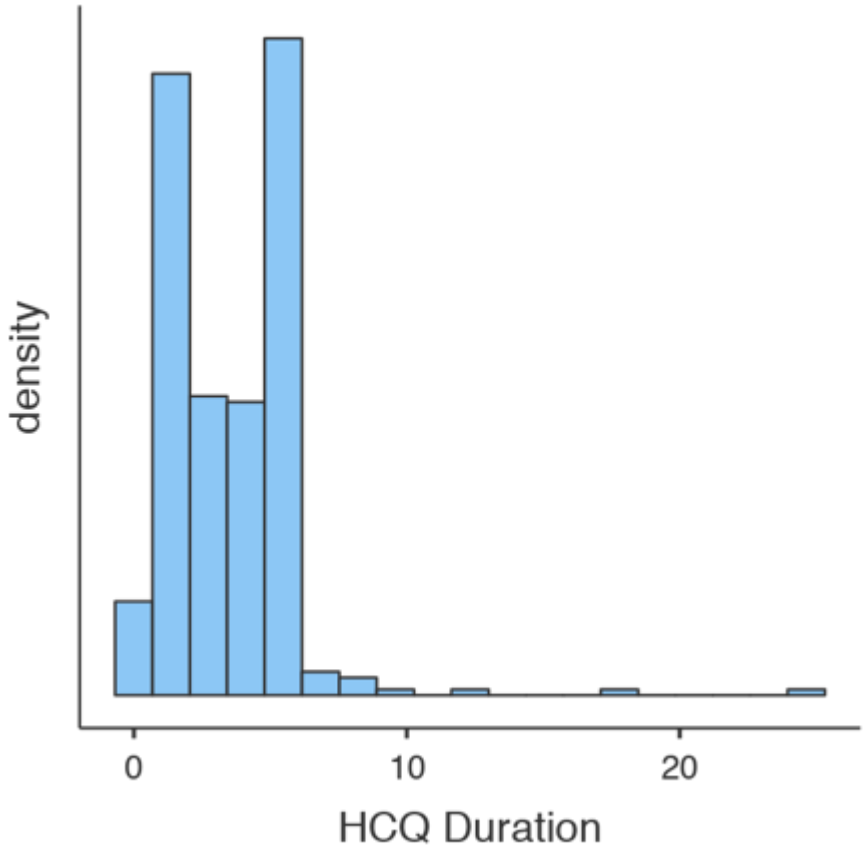
Materials and methods

The notes of 347 patients prescribed HCQ by the rheumatology department were reviewed from 2018–2019. Clinic letters were reviewed for documented HCQ start date, ophthalmology referral (direct or from primary care), eye symptoms and diagnosis of retinopathy. Simple univariate analysis was used to analyse the data with Excel (Microsoft) and jamovi (The jamovi project).

Results and discussion

Median duration on HCQ was 3.59 years (range 0.00–24.64; Fig 1); 34.9% of patients were on HCQ for ≥5 years; 254 (73.60%) of patients had been referred to ophthalmology, but 92 patients (26.5%) of these patients did not mention ophthalmology review in the general practitioner clinic correspondence; 22 individuals (6%) experienced documented new visual symptoms; six patients (2%) had diagnosed retinopathy; two cases (0.67%) were confirmed to have HCQ retinopathy. There was a lower documented referral rate for patients on HCQ ≥5 years (high risk group) of only 68.60% vs 76.33% but this was not statistically significant (chi-squared p=0.119).

Fig 1. Frequency of patients by duration in years.



Conclusions

Local practice has adopted the 2018 guideline for ophthalmology review and complied with documentation in 73.5% of patients at baseline. The remaining 26.5% of identified patients had a letter sent to their general practitioners recommending ophthalmologic screening. Future challenges include the identification of further risk factors for the development of retinopathy, using serum drug levels to allow dose optimisation to avoid over treatment, and to establish mobile HCQ screening clinics alongside rheumatology clinics.

Conflicts of interest

None declared.

References

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Making the change through acute medical team education: Inpatient risk assessment of stable pulmonary embolism cases at high risk of deterioration

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Introduction

The safety of optimal management of acute sub-massive or massive pulmonary embolism (PE) with thrombolytic agents remains unclear.[1] Thrombolytic agents reduce mortality and improve right ventricular function, but increase the risk of major haemorrhage and stroke.[2–4] Our project reviews current management of acute PE with evidence of myocardial necrosis and right ventricular strain, improving awareness by educating the medical teams and how best to investigate and treat such cases.

Method

A retrospective analysis of cases ICD-10 coded diagnoses of PE was carried out via data collected from diagnostic imaging reports, discharge summaries and case notes. Study cycles included the first cohort of 56 patients identified between August 2017 and July 2018, the second cohort of 91 patients between August 2018 and January 2019.

Educational and quality improvement interventions included presentation of data to acute and general internal medical teams and regional venous thromboembolism multidisciplinary teams, departmental teaching sessions, review and upgrade of trust policy on use of thrombolytic agents in sub-massive or massive PE. Data points of concern included evidence of myocardial necrosis via serum high-sensitivity troponin I (HS Trop I), transthoracic echocardiography (TTE) or computed tomography pulmonary angiography (CTPA) evidence of right ventricular strain, documented use of thrombolytic agents and any complications.

Results

Patients with large clot burden were identified in 26/56 (46%) of cohort 1 cases and 55/91(60%) of cohort 2. Only 19 (33%) cases in cohort 1 and 62 (68%) in cohort 2 received HS Trop I investigation. TTE was completed in 9/56 (16%) of cases in cohort 1 and 17/91(18%) in cohort 2. These results indicate a poor initial utilisation of critical diagnostic investigations for risk stratifying acute PE. Following the quality improvement intervention described, we observed significant improvement in the post-PE use of HS Trop I but not in TTE uptake.

Of particular interest were 20 patients in cohort 2 with a HS Troponin I of >100 mmol/L, indicating myocardial necrosis. Within these 20 patients were 11 mentions of right ventricular dysfunction on CTPA, and four on inpatient TTE. Overall 15 of these 20 patients met the criteria for thrombolysis.

Three acute PEs were thrombolysed with intravenous alteplase; two acute massive PEs and one sub-massive PE. There were no adverse outcomes and average length of stay was identical to that of patients not receiving thrombolysis.

Discussion

This real-world study highlights that optimal diagnostic investigations were previously grossly underutilised, potentially risking future morbidity and mortality. Clinical behaviours improve with education of the gold standards of risk stratification associated with this diagnosis. Our data identifies that thrombolysis seems to be reserved to shocked patients, with significant individual variance in using thrombolytic therapy, on a

case-by-case basis, rather than on objective risk stratification. All cases where thrombolytic therapy was utilised proved to be safe and appropriate, with no subsequent morbidity or mortality.

Conflicts of interest

None declared.

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Evaluating the launch of live electronic access to point-of-care blood glucose monitoring to reduce the prevalence of inpatient hypoglycaemia at Heartlands, Good Hope and Solihull hospitals

Authors: Adeeba Ahmed,[A] Elizabeth Morley,[B] Farah Abdel Hameed, [B] Gayle Reynolds,[A] Michele Colloby,[A] Catherine Holmes,[A] Andrew Woodburn Drayton,[A] Natasha Jacques,[A] Ali Bahron[A] and Sudarshan Ramachandran[A]

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Introduction

Hypoglycaemia is a serious complication of diabetes, increasing risk of morbidity, mortality and length of stay. Live point-of-care (POCT) blood glucose monitoring provides a graphical–visual comparison of glucose control. Successive national diabetes inpatient audits have shown a significant level of mild and moderate hypoglycaemia for inpatients with diabetes in our hospitals, on par with other hospital trusts nationally. Many of these hospital trusts already have live point-of-care blood glucose connectivity, and we were keen to ensure that our switch was linked to a sustained reduction in patient harm from hypoglycaemia. Therefore, we planned to link the launch to a full communication plan to all inpatient areas during insulin safety week in 2018, along with a QI plan to intelligently target diabetes inpatient team reviews to patients with recurrent or severe hypoglycaemia.

Methods

A high-level collaborative project between the diabetes team, POCT team and IT allowed the electronic system (transferring the patient's POCT blood glucose results to their electronic record) to go live in March 2018. The system also reports recurrent and severe hypoglycaemic readings to a separate worklist on our diabetes electronic referral system, allowing these patients to be targeted for review by the inpatient diabetes team, even before referral has been received. We also communicated the new system to all clinical staff during insulin safety week in May 2018, with quick reference cards, screensavers, and a ward insulin safety board competition with a good participation rate from inpatient wards.

We retrospectively audited the electronic records from 01–28 February 2018 (before the launch of the new system) and from 01–28 October 2018 (7 months after the launch of the system) across the three hospital sites (an analysis of over 800 patient records), looking at the prevalence of mild (3.0–3.9 mmol/L) and severe (<3.0 mmol/L) hypoglycaemic episodes among inpatients with diabetes on all three hospital sites. Patients without diabetes or not on hypoglycaemic medications were excluded.

Results and discussion

Between February and October 2018, the prevalence of total hypoglycaemic events decreased by 50% from 848 to 423 events, mild hypoglycaemic events decreased by 44% from 535 to 299 events, and severe hypoglycaemic events decreased by 60% from 313 to 124 events (Figs 1 and 2). The highest prevalence of mild and severe events occurred during the early morning period 05:00–08:59 in February and October ($p<0.05$).

Fig 1. Timed (x axis) episodic prevalence (y axis) of severe hypoglycaemia (<3 mmol/L) over 4 weeks in February 2018 and October 2018.

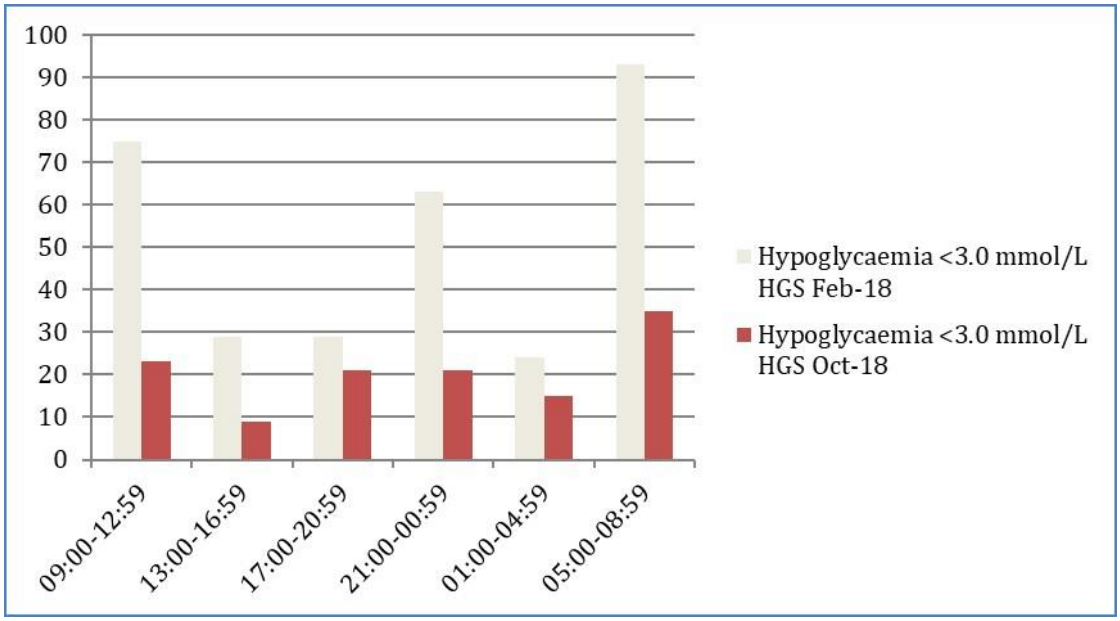
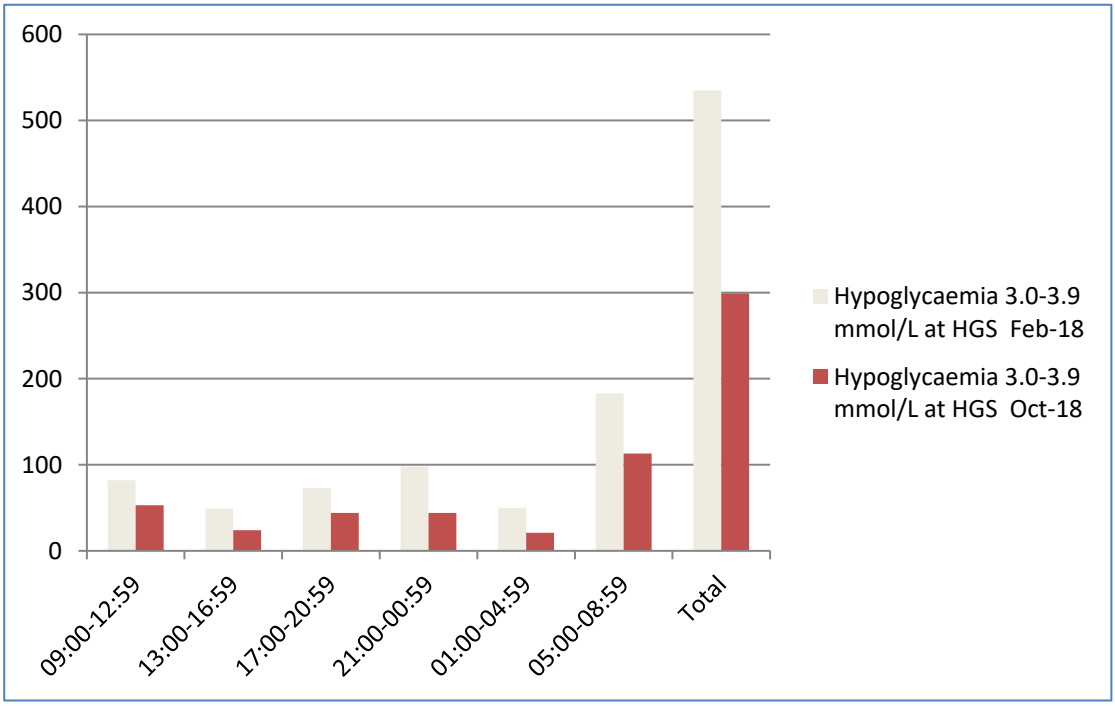


Fig 2. Timed (x axis) episodic prevalence (y axis) of moderate hypoglycaemia (3.0–3.9 mmol/L) over 4 weeks in February 2018 and October 2018.



Conclusion

Our results showed a sustained and statistically significant reduction in patient harm from hypoglycaemia with the new point-of-care glucose connectivity and QI work to intelligently target at-risk patients. The system offers an efficient and reliable method for early escalation before a referral may have been made by the parent team, and encourages ward staff to take better ownership of their patients' diabetes management. We have since extended the project further with a pilot project for prescription bedtime snacks for at-risk patients.

Conflicts of interest

None declared.

Changing the transmission-prevention strategy for pulmonary tuberculosis (TB) in an Iraqi prison: a quality improvement project

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Introduction

Tuberculosis is endemic in Iraq, and although the World Health Organization (WHO) is actively involved in its management and medication supply, there are no clear guidelines or regulation on diagnosis and treatment at the local level. Prisons suffer from higher prevalence of this illness due to multiple factors including security concerns, leading to reduced engagement and sometimes uninformed decisions relating to control infection.

Materials and methods

For the period between June 2014 and July 2015, a quality improvement project was carried out in one of Iraq's prisons to change the tuberculosis (TB) management strategy (Fig 1). A review of WHO and NHS guidelines was carried out and compared to current practice.[1,2] A proposal was made to reduce patient isolation from 6 months to only 2 weeks of medication compliance, and without the need for re-investigation. Change was made through challenging existing culture and promoting cooperation between different departments to facilitate change[3] (Table 1).

Fig 1. Quality improvement project for tuberculosis management in an Iraqi prison.

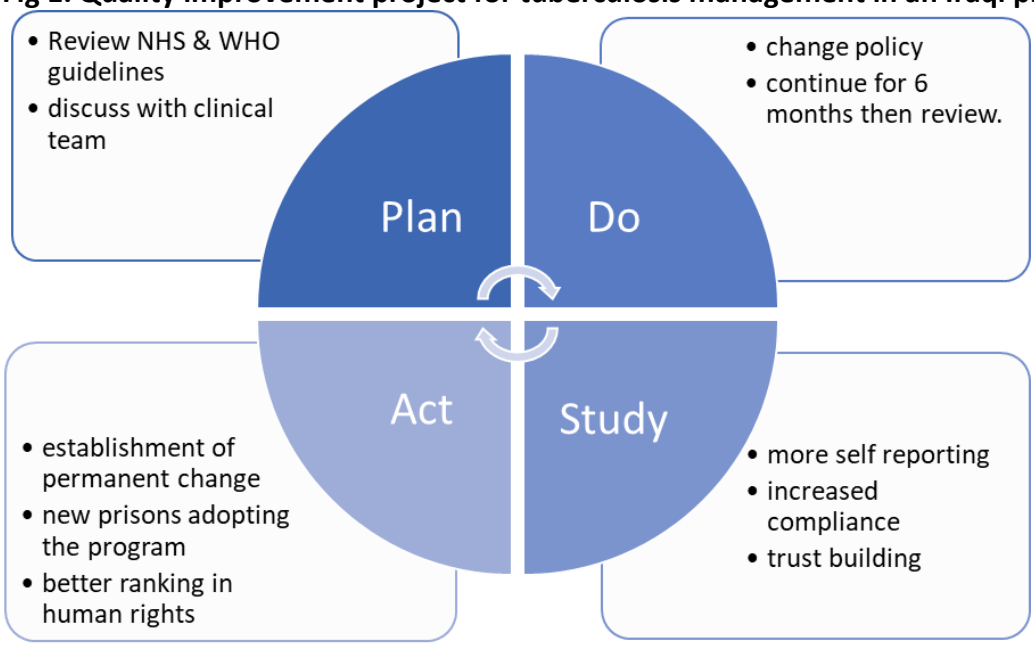

Table 1. Different authorities within the prison and mission analysis[3]

Domains/ departments	Justice department	Military department	Health ministry	Health centre
Role	Supportive	Provision of security	Logistically supportive	Healthcare
Characteristics	Adaptable, passive-aggressive	Reactionary, retaliatory, bullying	Dissonance between ideals and practices	Adaptable
People practices	Authoritarian, keeping social order	Harsh restrictions, unforgiving, dictatorial	Slow-paced, 'administrative sink'	Practical, detached, occasional heroes

Institutional practices	Status quo, detachment, demotivation	Fear, guarding, 'safety first'	Distance, unavailability	Managing expectations, minimally fulfilling its role
Context	Existing competent framework for legal requirements	True focus on security and protection from impending terror attacks	Fulfilment of role with minimal exposure and involvement	Self-protection, asserting autonomy, patient care (ideally)
Leadership styles	Situational, transactional, strategic	'Upper echelon' traits, 'great man', charismatic	Servant, adaptive, consultative	Incorporating psychodynamic skills, behavioural, contingent on circumstances
Managing vs. leading	Rigid leadership that changed into a managerial role	Strictly managerial	Minimally involved / managing	Leadership of healthcare service, managerial in handling internal conflict

Results and discussion

The common practice of requiring 6 months' isolation led to suppression of presentation and increase in prevalence. The prison was unable to handle the situation and imposed very restrictive management measures.

The change implemented was that isolation continued for only two weeks of compliance to medication, which was given directly by the medical team. Patients then re-joined other prisoners without the need for a negative test. The new procedure improved trust between the medical team and the prisoners. Through the year, the programme diagnosed 37 new cases of TB. Afterwards, the programme was adopted by another prisons, and was accepted as the policy of the prison. Also, the prison received a higher ranking in human rights performance for that year.

Conclusion

The prolonged isolation of TB suspects was due to lack of awareness of the guidelines and miscommunication between different governing organisations, as well as the tendency to find an easy solution.

Upon introduction of the new system, compliance increased, more patients reported their symptoms and the justice and medical team engaged more enthusiastically. This is a clear example of how quality improvement can be less resource-demanding and still lead to positive results.

Conflicts of interest

None declared.

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The value of embedded secondary-care-based psychology services in rheumatology: an exemplar for long-term conditions

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Introduction

Rheumatoid arthritis is an exemplar long term condition, complicated by pain, disability, comorbidities and long-term medication use. It has significant effects on mobility, work performance, social role, sexual function and relationships. It is commonly associated with fatigue and mood disturbance as a result of complex interactions of physical (disease related) and psychosocial factors.[1] National Institute for Health and Care Excellence guidance recommends the availability of psychological support for these patients.[2] We have implemented a psychology service for our patients with chronic rheumatological conditions. This study was set up to capture the value of this service.

Materials and methods

Patients were assessed before and after psychology intervention using validated questionnaires: HAQ (disability), HADS (anxiety and depression), and a measure of patient self-efficacy. Structured interviews were used to analyse the value of the service to individual service users and analysed for themes. Finally, social return on investment (SROI) methodology was used to assess the monetary value of the service.[3] SROI is a framework for measuring and accounting for the value created or destroyed by our activities – where the concept of value is much broader than that which can be captured by market prices. SROI seeks to reduce inequality and environmental degradation and improve wellbeing by taking account of this broader value.

Results

Results demonstrate no change in HAQ scores, an improvement in HADS (anxiety and depression) and an improvement in self-efficacy at the end of treatment (Fig 1).

Structured interviews identified the following themes; the service gave patients permission to tell family and friends about the impact of the disease; it gave patients 'tools' to aid management; it provided another perspective for exploring the disease; and it enabled patients to be able to pull together all aspects of the disease. SROI demonstrated that the service was highly valued by the patients.

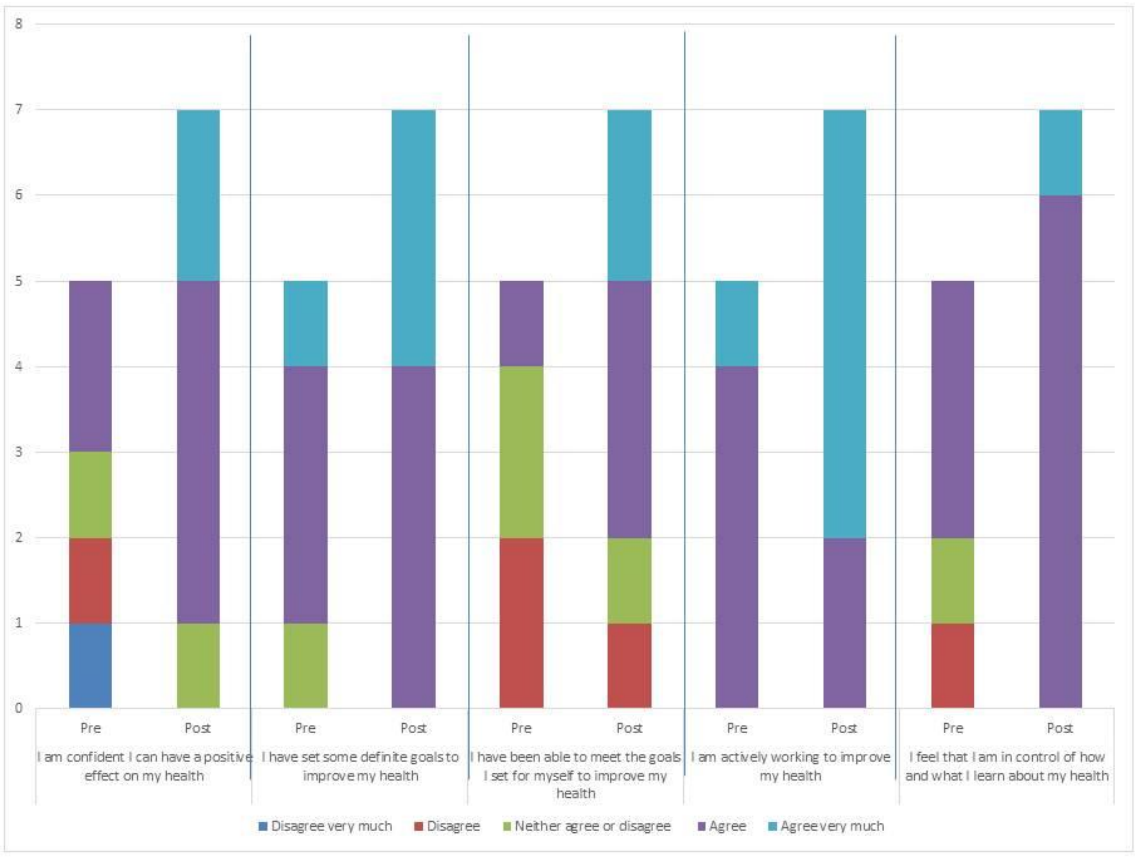
Conclusions

Psychological support was highly valuable to our patients with chronic rheumatological disease as demonstrated by SROI. It led to an improvement in anxiety and depression. Studies have demonstrated that higher levels of depression are associated with an increase in pain perception and disease activity assessments.[4] Psychology input did not lead to an improvement in disability but did lead to an improvement in patient self-efficacy which it is anticipated will lead to a decrease in health resource utilisation.[5]

Conflicts of interest

None declared.

Fig 1. Patient activation domains pre- and post-psychological intervention.



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Front door to post-take: an interdepartmental quality improvement project to enhance patient journeys from emergency department triage through to the medical post-take review

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Introduction

Ninety-five per cent of patients attending the emergency department (ED) should be treated or admitted within 4 hours of arrival.[1] Subsequently, a patient requiring hospital admission must receive consultant review within 14 hours of arrival.[2,3] In April 2019, only 81.2% of patients at Watford General Hospital were treated or admitted within 4 hours. A QI project was designed to provide in-depth analysis of the patient journey from ED triage to post-take consultant review, thereby identifying areas for improvement. This report summarises the results of the plan, do, study, act (PDSA) cycle undertaken to improve this pathway over a 4-month period.

Materials and methods

The first PDSA cycle analysed 40 patients referred to the medical take during 10 weekday shifts in March and April 2019. Data were collected on arrival time, triage time, diagnostic investigations, time until medical assessment, referral time and time until post-take consultant review. Patients were subdivided into those referred to the medical team following ED clinical assessment and those referred following ED triaging without ED clinical assessment.

As part of ongoing quality improvement, the ED team implemented an intervention to specifically select diagnostics according to patient need to reduce time to diagnostic results. Further analysis of 20 patients was performed in June 2019.

Results and discussion

Initial data showed 79.2% of patients were treated or admitted within 4 hours of ED arrival; 87% of patients received post-take consultant review within 12 hours. Steps that contributed to delays in decision to admit were blood tests (64 minutes) and imaging requests (103 minutes). Subgroup analysis identified that patients directly referred to the medical team from ED triaging received post-take consultant review faster than those referred following ED clinical assessment (338 vs 448 minutes).

Following ED intervention, 73.7% of patients were treated or admitted within 4 hours of arrival. 68.4% of patients received post-take consultant review within 12 hours. Analysis highlighted continued delay in diagnostics: blood tests (63 minutes) and imaging requests (127 minutes). Nevertheless, patients directly referred to the medical team from ED triaging consistently waited less time for post-take consultant review versus those referred following ED clinical assessment (348 vs 633 minutes).

Conclusion

Using QI methodology, the patient journey from ED triage to review by a senior decision-maker from the medical team was studied to identify areas for improvement in the experience of patients referred to the medical team. Data demonstrated that patients referred from ED triage to the medical team received consultant review faster than those referred following ED clinical assessment. ED intervention to reduce the number of diagnostic tests done at triage, to reduce referral delays, had no impact on improving time to senior speciality review for medical patients. Significant delays remain in diagnostics at the front door and more work with pathology and radiology is needed.

As part of a take pilot being run by the medical team, patients for medical review are being identified earlier at ED triage and directly assessed by specialty medical teams, aiming to improve time from ED triage to senior medical review.

Conflicts of interest

None declared.

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QI hub – creating a culture of quality improvement

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Introduction

Staff work tirelessly to deliver high quality care in demanding settings, and are keen to further improve services, but often are short of time, support or skills to do so.[1] Experience and feedback has shown that formal support for developing quality improvement (QI) skills is often fragmented and difficult to access.[2]

At our organisation there are excellent pockets of activity, but limited access to opportunities for shared learning. Our aim was to bring together this activity, while developing a community of empowered individuals and teams that drives a culture of continuous, sustained improvement within their divisions for the benefit of patients, colleagues and departments.

Methods

The QI Hub delivers a central programme open to all within the trust who are keen to undertake improvement. We support them through their QI journey by equipping them with skills, tools and a structure to lead projects.[3]

The format consists of an educational programme running in 3-monthly cycles providing fortnightly, dedicated QI education delivered by an experienced faculty. Participants take part in individualised, practical workshops together with face-to-face sessions and peer support. Model for improvement, Lean methodology and process mapping are just a few of the topics covered. This culminates in a presentation event which provides an opportunity to share project ideas and progress with the team, faculty and trust leadership.

Two cohorts have been run thus far.

Results and discussion

The programme was highly popular, with representation from several divisions and across a wide-ranging selection of multidisciplinary healthcare professionals (Table 1; Fig 1).

Feedback was collected using a Likert Survey before and after the programme, which demonstrated consistently positive outcomes. These are demonstrated in Fig 2.

The majority of participants had not had teaching or previously been involved in QI prior to the programme. All but one felt they had support from line managers and divisional leaders when carrying out their project. Encouragingly, 100% of responding delegates would recommend the programme to colleagues, with more than 90% enjoying attending the sessions delivered.

After the completion of the second cohort, we will repeat the collection of feedback in order to strengthen the validity of current analysis, and also plan to complete an impact assessment in the near future.

Table 1. Multidisciplinary healthcare professionals taking part in the programme

Staff	Number
Consultants	4
Junior doctors	16
Physician associates	2
Therapists	8

Pharmacists	4
Nurses	5
Admin staff	1
Governance staff	1
Dieticians	2

Fig 1. Graph displaying the number of programme delegates representing different departments.

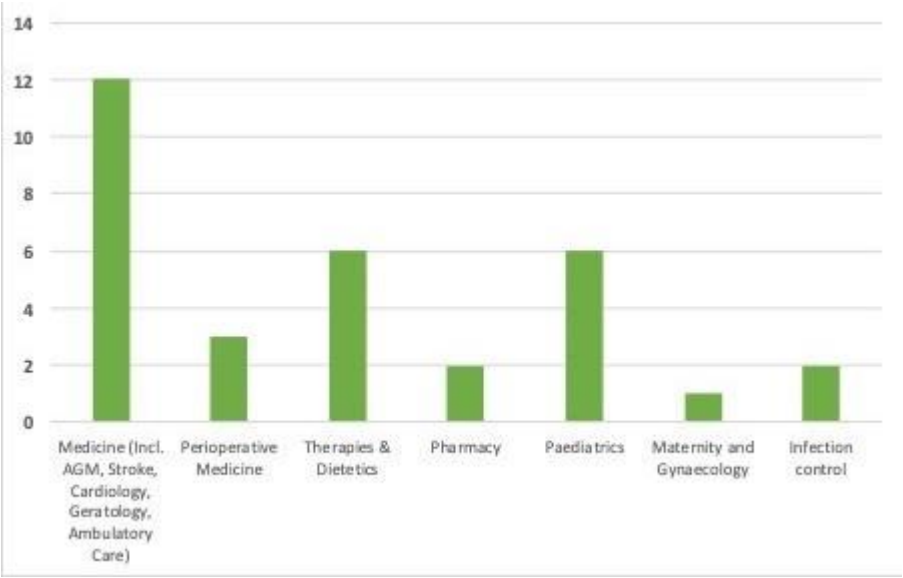
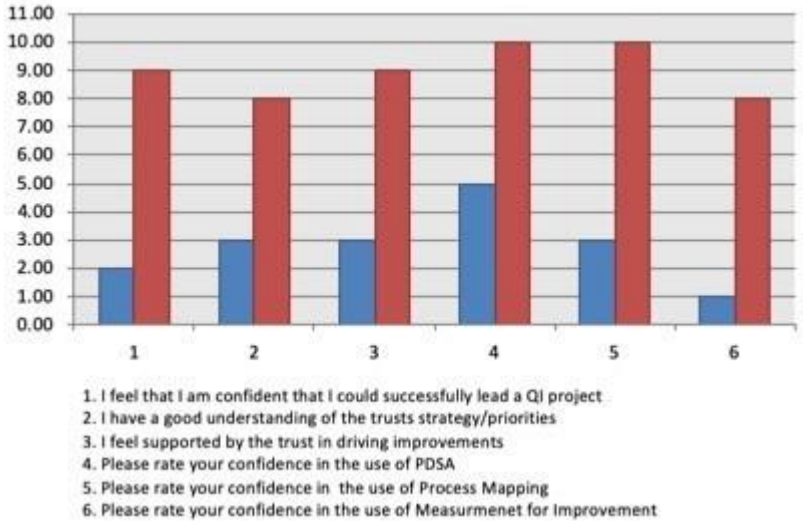


Fig 2. Survey responses before and after attending the programme. Bars show number of respondents agreeing (responses 1–3 on a Likert scale from 1 denoting strongly agree to 7 denoting strongly disagree) with the statement before (blue) and after (red) the programme.



Conclusion

We have successfully achieved our aims and demonstrated increased understanding and engagement with quality improvement. These outcomes are in keeping with the trust's key priority to improve our safety culture, and we look forward to developing the programme further.

We are currently in the second cohort of the programme with an increased number of delegates, as well as wider engagement from the trust senior management team.

Future aims include creating a platform for shared learning, partnering with Oxford University and the Deanery to incorporate QI education into the curriculum, and expanding our programme to connect with colleagues within the primary care sector. We hope to develop an online platform for alumni to stay connected, and share examples of exemplar activity that could be replicated elsewhere.

Conflicts of interest

None declared.

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A closed loop audit to analyse the documentation by medical and healthcare staff in clinical oncology patients to assess quality of inpatient documentation against a standard set by the GMC and the RCP

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Background

The main focus of healthcare delivery is to ensure patient safety while practising evidence-based medicine. While doing so the medicolegal safety of the healthcare professional is also of utmost importance. We noticed that a large number of E-noting entries made for inpatients did not have enough information to ascertain accountability for that entry. This intrigued us to look into set standards for documentation and then compare them to practice generally adopted on the ward to assess if these standards were being met.[1,2]

Aims and objective

The purpose of this audit was to assess the documented entries on inpatient notes, with the aim of improving efficiency, ensuring patient safety and supporting medical professionals in having medicolegally binding documentation.

Method

We conducted a closed loop audit to analyse inpatient e-noting documentation entries, using three main parameters:

- Name of the individual/team making the entry.
- Bleep or contact details of the person/team making the entry.
- Whether or not the entry was saved.

We collected quantitative data on a selected group of individuals (clinical oncology inpatients). The first set of data was collected in May 2019 and presented in an audit meeting in June 2019. We consulted oncology and outlier wards and spoke to healthcare professionals within multidisciplinary teams regarding the importance of accountability and accurate documentation. We have individually emailed allied healthcare professionals to alert them on the importance of being contactable when documenting on clinical records. We waited for 2 weeks after the action and then did a prospective analysis of the documented entries in first 2 weeks of October for clinical oncology inpatients to complete the audit cycle.

Results

The numbers and percentages of entries meeting each of the three parameters are given in Table 1.

Table 1. Number and percentage of entries meeting the parameters.

	Ward round						Clinic note					
	Name	%	Bleep	%	Saved	%	Name	%	Bleep	%	Saved	%
May 2019	426/444	95.94	393/444	88.51	420/444	94.59	743/924	80.41	714/924	77.27	863/924	93.39
Oct 2019	173/174	99.4	144/174	82.75	172/174	98.85	420/478	87.86	372/478	77.82	460/478	96.23

Conclusion

Based on the initial audit results, the set standard of 100% documented entries having all three parameters was not met. The re-audit results showed that overall there was a general improvement in terms of names and saved entries. This improved the accountability and safety of both patients and healthcare professionals. However, the ideal of 100% was still not achieved. There is a slight decline in number of entries including bleep numbers, suggesting that more education and training is needed within the oncology department to highlight the importance of medicolegally binding documentation for safe practice.

Conflicts of interest

None declared.

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Educating junior doctors on DNACPR and ceiling of treatment policy improves compliance with form completion and documentation of resuscitation decisions

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Introduction

Do not attempt cardiopulmonary resuscitation (DNACPR) orders are important in avoiding inappropriate CPR attempts. Clear and full documentation of decisions about CPR, the reasons for them, and the discussions with those involved in the decisions, is an essential part of high-quality care.[1] A new combined Queen Elizabeth Hospital King's Lynn DNACPR and Ceiling of Treatment form was implemented in July 2018. A new audit tool was developed by the resuscitation department to ensure accurate completion of DNACPR forms was captured. Subsequent re-audits did not show any significant improvement in compliance with set standards and in some cases showed deterioration. Therefore, in January 2019 teaching sessions on the importance of DNACPR and Ceiling of Treatment documentation were introduced.

Materials and methods

Teaching sessions were delivered to junior doctors in small and large group settings between 10 January 2019 and 10 June 2019. Each session was around 10–15 minutes long. Awareness of the audit tool used in monthly audits was raised during the teaching sessions. DNACPR and Ceiling of Treatment orders and mental capacity assessment forms were explored, and accurate documentation was discussed. Prospective evaluation of teaching session effectiveness was done by reviewing monthly re-audit results on DNACPR and Ceiling of Treatment documentation performed by the Resuscitation department.

Results and discussion

In total 101 (76%) junior doctors from a wide range of specialties were educated on DNACPR documentation. There has been a significant improvement in overall compliance with DNACPR and Ceiling of Treatment order documentation, rising from 84% in January to 90% in June (Fig 1). There was a marked improvement in decision making and documentation of Ceiling of Treatment increasing from 73% in January to 86% in June (Fig 2). Improvements were also noticed in other standards, including documented decisions and discussions in forms and medical notes, forms being signed by appropriate team members, and clearly recorded indefinite decisions. Compliance with mental capacity assessment has been poor most of the time and was worse in June (39%) than in January (65%); however, May results showed overall compliance in this standard of 87%. We expect that these metrics can be improved even further with continued training and education of the doctors at all levels.

Fig 1. Overall compliance with do not attempt cardiopulmonary resuscitation documentation.

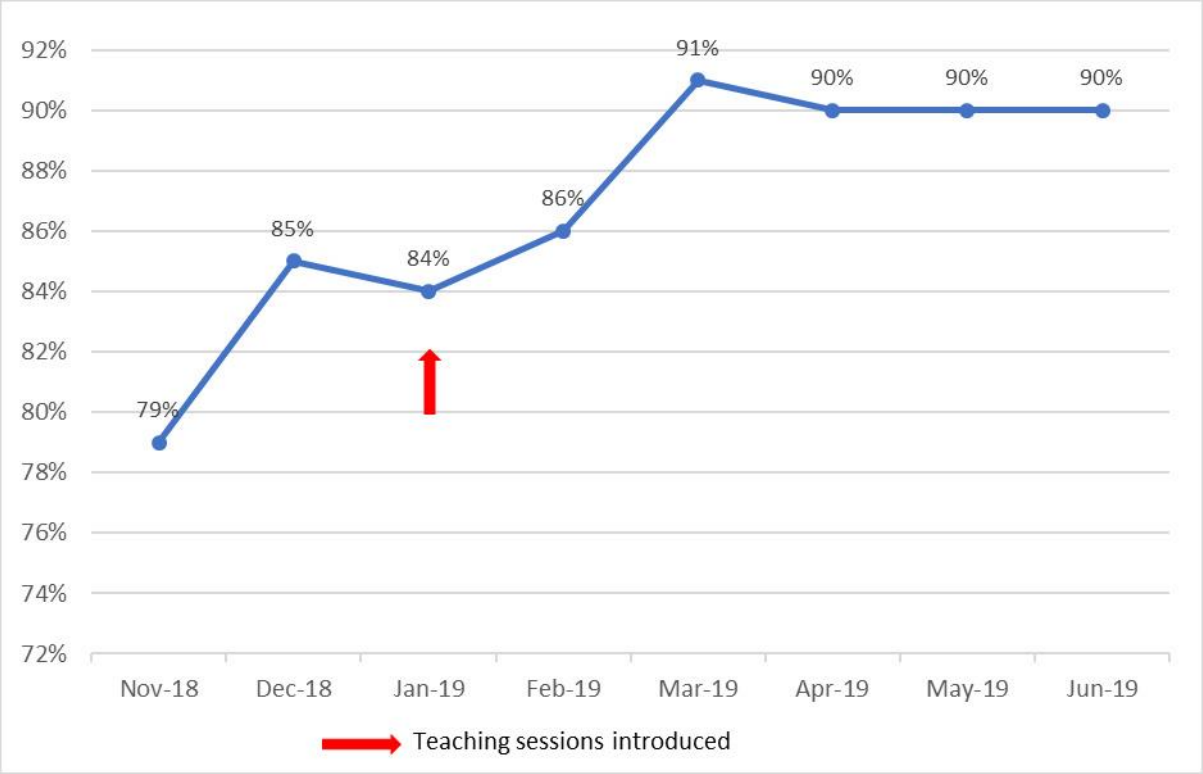
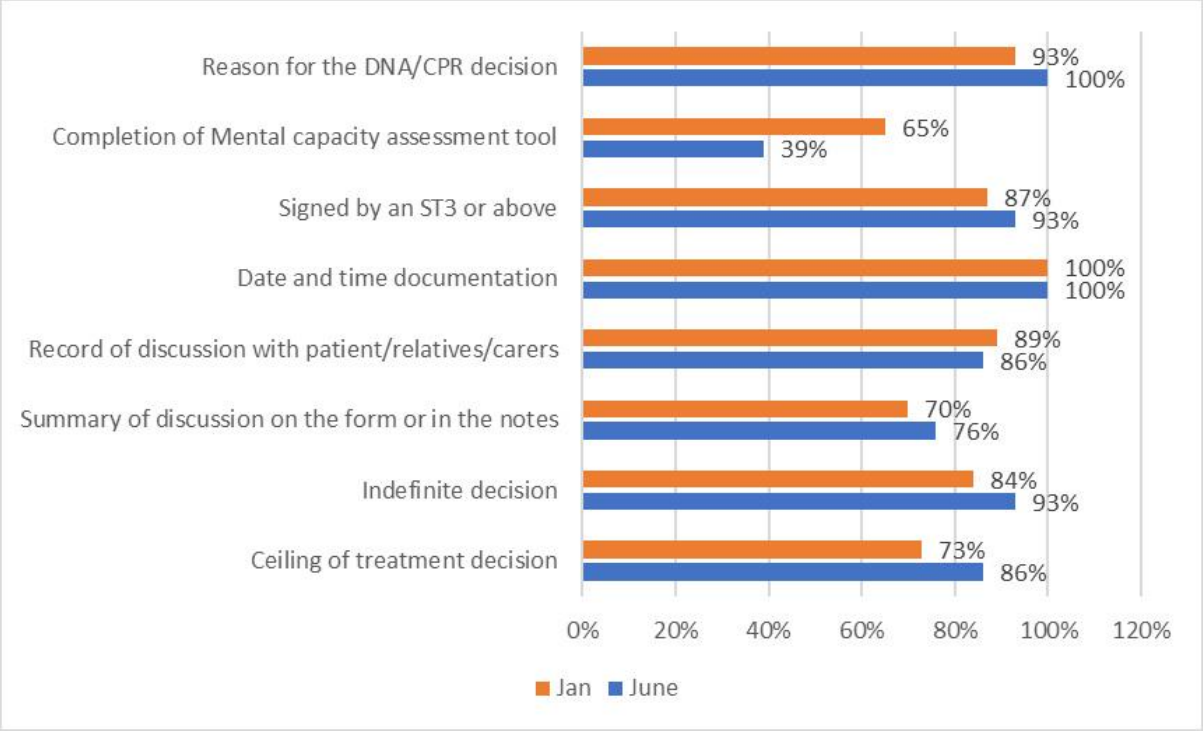


Fig 2. Compliance with standards.



DNA/CPR = do not attempt cardiopulmonary resuscitation.

Conclusion

Accurate documentation of DNACPR and Ceiling of Treatment forms is crucial for high-quality care. Correct completion of these orders can be improved by effective teaching sessions. There is room for improvement in all standards especially in mental capacity assessments.

Conflicts of interest

None declared.

References

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Senior oversight of rapid TTO and information exchange (SORTIE) discharge letter: a pilot evaluation

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Introduction

Organising timely hospital discharge can be a challenge. In this hospital trust, a perceived barrier is delay in generating a TTO ('to take out' or discharge summary) letter. There are further steps dependent on this correspondence that must be undertaken before leaving hospital, including pharmacy check of discharge medication, dispensary, arranging transport, nurse sign-off and additional correspondence (eg anticoagulant handover). Projects to facilitate opportune TTO writing have met with limited success: principal barriers being precedence of clinical work, continuity of care at junior doctor level and unwieldy templates (a standard stroke discharge template comprises over 30 mandatory fields). A group of consultant physicians wished to evaluate an abbreviated TTO template, SORTIE (senior oversight of rapid TTO and information exchange) which was to be co-authored by the consultant at the point hospital discharge was indicated on clinical grounds. It would consist of a set of minimum required headings, allowing for a narrative summary to be written comprising information deemed to be necessary for the effective handover of care.

Materials and methods

We did a prospective before (Phase 1: 05 August 2019 to 13 September 2019) versus after (Phase 2: 18 September to 11 October 2019) study of the use of the SORTIE template on two acute medical wards (stroke medicine and geriatric medicine) involving three consultants. On the stroke medicine ward, SORTIE letters were written immediately after the morning board round for patients who could leave hospital that day, and on the geriatrics ward, junior doctors commenced the letter on admission and it was finalised by the consultant. Process data (to include time of discharge and length of stay) were compiled from hospital audit systems. Qualitative feedback from care providers, service users and carers/relatives was sought by listing the consultant mobile phone number on the template with an explanation that this was a pilot evaluation. The effect on pharmacy services and medical coding was included.

Results and discussion

Quantitative data from the study are shown in Table 1. Regarding qualitative data, junior doctors reported being more enthusiastic and engaged in writing TTOs and appreciated the freer-form nature of the template. One phone call was received from a relative praising its user-friendly nature. One care provider commented how poor quality the TTO was in Phase 1. Having a pharmacist present when the consultant generated the discharge medication list appeared to reduce the chance of prescribing errors.

Table 1. Quantitative data on the impact of SORTIE

Metric	Phase 1 (Standard TTO)	Phase 2 (SORTIE TTO)
Discharges	96	53
Median time to write TTO	33 mins	18 mins
Median time of day TTO submitted to pharmacy	14:21	11:07
% of TTOs submitted to pharmacy before midday	29%	57%
Time of leaving hospital (same day)	18:12	16:07
Median length of stay	6.6 days	6.4 days

TTO = discharge summary.

Conclusion

This pilot evaluation appeared to demonstrate a beneficial effect of an abbreviated, consultant-led TTO document on timelier hospital discharge and was generally accepted by hospital staff and service users. A full statistical analysis is to be carried out and we plan a broader and lengthier evaluation.

Conflicts of interest

None declared.

RESS-Q: reducing errors in sexual health samples – a quality improvement project

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Introduction

Our integrated sexual health service (ISHS) does not have electronic requesting for sexual health samples. In mid-2019, healthcare assistants (HCAs) reported an increased workload in completing declaration forms, to support the processing of mislabelled samples by the laboratory. If they were unable to be completed, time was spent recalling patients to repeat their sexual health samples, resulting in repeat attendance and patient inconvenience.

Our electronic pathology reporting system confirmed 600 samples were not processed between January and June 2019, affecting 500 patients: approximately 2.5% of all new and re-registered patients.

Upon further analysis, an estimated one-third of non-processed samples resulted in a missed opportunity to test, due to patients not being informed, or not attending repeat appointments. This is a concerning statistic in a city where rates of gonorrhoea and syphilis continue to climb, recognising that delays in diagnosis and treatment can increase the pool of infection within the community.

Our aim was to reduce the number of non-processed samples from our ISHS by 80% within 4 months.

Materials and methods

Pareto analysis of 600 non-processed samples highlighted that >80% were due to labelling error or leaking in transit (Fig 1).

Using the Pareto principle, by addressing labelling error and reasons for leaking, we would achieve our biggest improvements. Plan, do, study, act (PDSA) cycle 1 entailed engaging HCAs for improvement ideas regarding labelling, ensuring frontline staff felt supported. We agreed the HCAs would implement a second check of all patient identifiers on samples and request forms. These would then be stamped and initialled by HCAs, prior to transport.

Background data were presented to our ISHS prior to this PDSA, with clinicians being asked to ensure patients screwed sample lids on tightly to reduce the chance of leaking. A standard operating procedure was created.

Results and discussion

The weekly number of non-processed samples from January 2019 was plotted on a statistical process control (SPC) chart. The mean weekly number of non-processed samples from January to mid-April (baseline period) was 22.5. While highlighting the issue, and engaging staff within the planning stage, there was a significant step reduction in mean from 22.5 to 20.9 (Fig 2).

Upon implementation of the second check on 2 September, we had >7 successive weeks of improvement, creating a step-change and a statistically significant new weekly mean of 10.2. There was a >50% reduction of non-processed within the first 2 months.

Fig 1. Pareto analysis of reasons why samples were not processed.

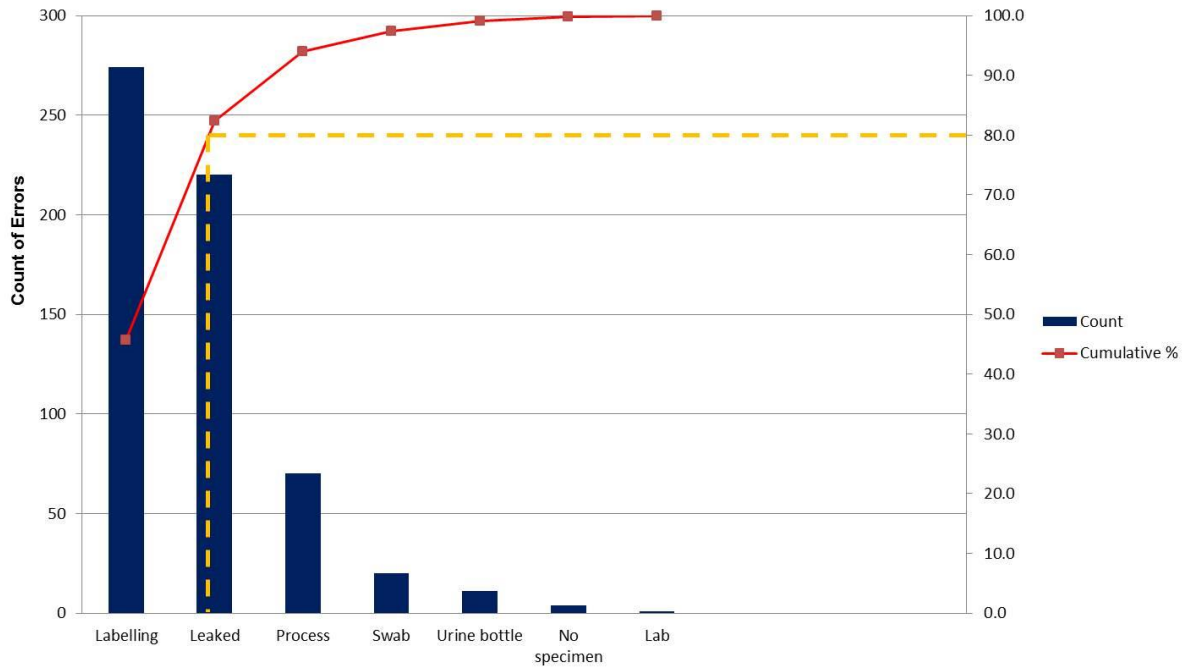
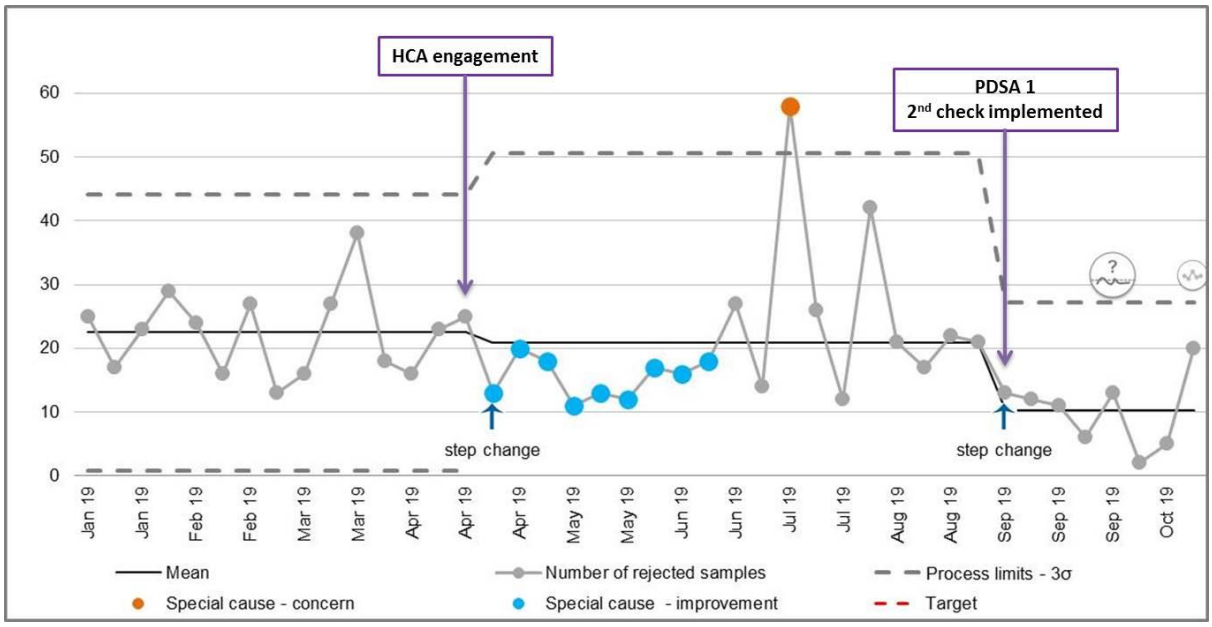


Fig 2. Statistical process chart showing weekly number of non-processed samples.



Conclusion

This project shows that engagement of frontline staff enables people to feel empowered to second-check specimens, and be a part of improvement science, enhancing the culture of patient safety within our ISHS.

Further work is ongoing to reach our aim of 80% improvement within 4 months. PDSA cycle 2 includes upscaling the second-check process to five spoke clinics, and quality-assuring leaked samples with the laboratory.

Weekly feedback of data continues to drive improvement. Staff enjoy seeing how small interventions, through PDSA cycles, can improve patient outcomes. They are envisioning how improvement science may be applied to other workstreams within our ISHS.

Conflicts of interest

None declared.

Implementation of a chest drain bundle at Stepping Hill Hospital has improved the quality of chest drain insertion and patient safety

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Background

Intercostal chest drains are required in a number of clinical settings. Despite the move towards Seldinger chest drains, concerns have remained about patient safety and the number of serious complications seen.[1] The British Thoracic Society released guidance in 2010 relating to chest drain insertion and management.[2] Chest-drain-related incidents are under-reported, so we undertook a project to monitor the quality of our chest drain insertion and whether the introduction of a bundle could improve outcomes.

Aim

To investigate the effect of introducing a trust-wide chest drain bundle on the quality of chest drain insertion and patient safety.

Method

We performed a retrospective study of case notes on all patients admitted requiring an intercostal chest drain between March 2016 and March 2017; we gathered information about whether patients gave consent, ultrasound usage in effusions, documentation of the procedure and overall complications. The chest drain bundle, consisting of a quick view chest drain insertion guide and procedure proforma, written consent form, observation chart, and patient information leaflet, was then launched in August 2018. Simultaneously, a new chest drain standard operating procedure (SOP) was released and multiple educational training sessions for all members of the clinical team were held around the Trust. Using the plan, do, study, act (PDSA) principles we then re-evaluated patients requiring chest drains following implementation of the bundle and SOP (September 2018 to March 2019).

Results

50 patients (mean age 68.2; male 62%; female 38%) were identified pre-implementation of the bundle and 41 post-intervention (mean age 64.7; male 50%; female 50%).

Implementing a chest drain bundle increased written consent in non-emergency situations from 52.6% to 80.0% and the use and documentation of bedside ultrasound in effusions from 80% to 96%.

Overall documentation of the procedure improved from 74.0% to 94.0% (site of insertion, asepsis, type and size of drain). Although drain chart records were equally well kept prior to and after bundle implementation (92%), escalation to doctors if drains were not working greatly improved following the bundle (62% vs 87.8%).

26% of patients experienced pain before bundle implementation and 9.7% after, and overall complications reduced from 26% pre- to 20% post-bundle.

Table 1. Chest drain bundle results

	Pre bundle implementation (n=50, % patients)	Post bundle implementation (n=41, % patients)
Written consent (non-emergency)	52.6	80
Bedside ultrasound (effusions)	80	96
Documentation (site, asepsis,	74	94

size, type)		
Escalation to doctor if drain not functioning	62	87.8
Patients experiencing pain	26	9.7
Overall complications	26	20

Conclusion

Introduction of a chest drain bundle has shown to be a simple yet effective way of improving our practice of chest drain insertion and reducing complications at our DGH. The bundle could be developed for use in other trusts around the UK. We plan to continue the PDSA cycle with further educational sessions aimed at medical and nursing staff across the Trust. A further evaluation is planned to ensure we are seeing consistent improvement.

Conflicts of interest

None declared.

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Improving compliance to controlled drug prescription guidelines through the introduction of an EMIS template

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Introduction

Due to their significant potential for misuse and harm, controlled drug prescriptions are required to fulfil specific legal requirements. In particular, it is essential to clearly document reasons for issuing controlled drug prescriptions for more than 28 days and discussions around the adverse effects of controlled drugs, and these requirements have medico-legal implications for practitioners. We aimed to audit baseline documentation adequacy around controlled drug prescriptions and improve any inadequacies found through a two-stepped intervention.

Materials and methods

In September 2018 baseline data from all patients issued a controlled drug prescription in the previous 2 months were collected, capturing demographic data and documentation of discussions of the adverse effects of controlled drugs. Patients prescribed a controlled drug for longer than 28 days were further surveyed for clearly documented indications for this. Following this a two-stepped intervention, comprising an educational session and the introduction of a controlled-drug prescribing EMIS template, were implemented. A re-audit was performed in February 2019.

Results and discussion

Baseline data showed that of 20 patients prescribed controlled drugs for more than 28 days, clear documentation was present for 0; documentation of discussion of adverse effects present in 4 of 163 patients. Post-intervention, 3 of 12 patients had clearly documented reasons for prescriptions longer than 28 days (significant: chi-squared = 5.517; p=0.0188). Adverse effects documentation post-intervention was 24 of 154 (significant: chi-squared = 16.345; p=0.0001).

Conclusion

The study highlights patient safety and medico-legal implications for practices with inadequate documentation of controlled drug prescriptions. Our intervention showed significant improvement in documentation adequacy and represents a quick and efficient method for improving controlled drug prescription practices that is reproducible in different settings.

Conflicts of interest

None declared.

Findings from the first round of the National Audit of Care at the End of Life (NACEL)

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Introduction

NACEL is a national comparative audit of the quality and outcomes of care experienced by the dying person and those important to them during the last admission leading to death in acute, community hospitals and mental health inpatient providers in England and Wales.

Materials and methods

The audit, first undertaken during 2018/19, comprised:

- an **organisational-level audit** covering trusts (in England) and health boards (in Wales)
- a **case note review** completed by acute and community providers only, reviewing all deaths in April 2018 (acute providers) or deaths in April–June 2018 (community providers)
- a **quality survey** completed online, or by telephone, by the bereaved person.

Data were collected between June and October 2018. 206 trusts in England and 8 Welsh organisations took part in at least one element of the audit (97% of eligible organisations). A total of 11,034 case note reviews were included.

Results and discussion

Documentation that a person may die imminently was high. For half of patients, imminent death was recognised less than one and a half days before they died, leaving a limited amount of time to discuss and implement an individual plan of care.

People's experience of care was good, excellent or outstanding in most cases (80%), as reported by the quality survey. However, 20% felt that there was scope to improve the quality of care and sensitive communication with both the patient and the family/others.

Governance of end-of-life care was strong.

Improvement is required in the documentation of an individual plan of care (there was documented evidence of a plan for 62% of people who died). Similarly, for one-third of people who died, a discussion about the plan of care, and discussions about medication, hydration and nutrition, had not been recorded.

Conclusion

The full audit findings from the first round were published on 11 July 2019.[1]

The second round of NACEL is running in 2019/2020 and data collection is currently underway, involving acute and community hospital providers. Mental health providers are not participating in round 2 of NACEL.

Conflicts of interest

None declared.

Reference

1 Healthcare Quality Improvement Partnership. *The National Audit of Care at the End of Life: First round of the audit (2018/19) report for England and Wales.* HQIP, 2019.

Watchpoint: an NHS-grown electronic communication system shown to improve patient safety

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Introduction

The safe function of an out-of-hours hospital presupposes the coordination of its staff. Colchester General Hospital has deployed 'Watchpoint', an effective new electronic communication system developed entirely by front-line NHS staff. It is shown to significantly reduce the number of preventable adverse outcomes resulting from failures in continuity of care.

Clinical tasks must be identified, evaluated, allocated and actioned by the relevant team. Failure is possible not only within but between each step, as a result of miscommunication. The main mechanisms for preventing this are high quality handovers, standardised and formal allocation and escalation procedures, and each team's awareness of the number and scale of remaining tasks, particularly concerning unwell patients.

Specific problems addressed

Electronic handover systems have been developed in many hospitals globally, with varying effectiveness. The following problems prompted Watchpoint's development:

- The lack of a system to identify and handover patients requiring review. Paper patient lists were lost or difficult to access, outdated, and of variable information.
- The take list: staff lacked up-to-date appreciation of the take list, particularly its size.
- Task management: bleep-related inefficiency, particularly interruption of the bleep holder.

Materials and methods

The aim was to achieve a robust, efficient and formal handover of patients for review, and tasks, both during nights and weekends. We envisaged staff members using a large screen showing a list of unstable patients as a focal point of the handover meeting.

Features thus included: colour-coded lists, with red lists denoting sick patients requiring review and blue lists denoting patients requiring daily weekend review; a take list, displaying the clerking status of to-be-admitted patients; and a task management system (allowing central allocation of tasks). Moreover, we installed Watchpoint on phones, ensuring its secure and efficient access.

The project was conceived in March 2014. By mid-2015, take list functions were installed; by August 2015, task management functions, and August 2016, handover functions. It was fully operational in 2016–17.

The development team (entirely Trust personnel: one consultant physician, junior doctors, project nurse, site team service manager, and two computer programmers) constantly received informal feedback from doctors. Total cost of development was £70,630; for comparison, commercial alternatives price at £250,000, with £70,000 updates. Finally, audit of clerking times by Deteriorating Patient Group.

Results and discussion

Since the introduction of Watchpoint, a marked reduction in preventable adverse events was measured.

- 52% reduction in serious incidents involving deteriorating patients. ($p<0.004$; Fig 1)
- 87% reduction in cardiac arrests resulting from failure to escalate. ($p<0.001$; Fig 2)

Take list: there has been a reduction in clerking waiting time of 158 to 102 minutes (p=0.012) following introduction in 2015.

Task management: 100 ward nurses were asked to evaluate Watchpoint (numbers denote: 0 = strongly disagree, 10 = strongly agree). Median ratings were ease of use (10), reliability (9), speed of contacting doctors vs. bleeping (7), speed of escalation to senior doctor (8), overall patient safety (9).

Fig 1. Serious incidents relating to deteriorating patients. Rolling 12 months.

Fig 2. Avoidable cardiac arrests due to failure to escalate. Rolling 12 months.

Conclusion

This case highlights NHS staff addressing the needs of clinical teams through delivering a highly cost-effective product demonstrated to improve patient safety by systematic, electronic facilitation of communication.

Conflicts of interest

None declared.

Direct referrals from emergency department streaming to ambulatory care: improving same-day emergency care

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Introduction

Same-day emergency care is one of the many ways the NHS is working to provide the right care, in the right place, at the right time for patients. It aims to benefit both patients and the healthcare system by reducing waiting times and unnecessary hospital admissions.

In our organisation patients presenting to the emergency department (ED) with common medical conditions like chest pain / shortness of breath (SOB), palpitations, headache, chest infection or deep vein thrombosis / pulmonary embolism were initially triaged in ED streaming. There were delays due to initial assessment by emergency care doctors and subsequent assessment by the on-call medical team.

We developed a pathway of direct referrals from ED streaming to ambulatory care for clinically suitable patients with common conditions like chest pain, palpitations, headache or SOB / chest infection. The aim was to avoid unnecessary hospital admissions and therefore reduce the risk of infections and de-conditioning for patients, improve patient experience by reducing waiting times, improve patient flow and reduce congestion in the ED, and achieve financial benefits and cost savings for the hospital.

Method

Patients were identified from ED streaming with chest pain, SOB, palpitations and headache and fast tracked to ambulatory care. Exclusion criteria were used to ensure safety.

Results and discussion

During a 4-day period in September 2019, 33 patients were taken directly from ED streaming. Only two of these patients were admitted, achieving 93.93% of the patients being discharged safely the same day.

In contrast, during the month of August, 20 patients, specifically with suspected PE, were admitted from the ED. In retrospect, 11 of these patients would have been suitable for the same day emergency care as part of our direct referrals pilot.

One of the critical factors leading to unnecessary admissions was the extended period of time associated with the traditional referral process between the ED and the medical take, especially the patients who presented later in the afternoon and were reviewed out of hours. The average waiting time for ED during the week of pilot was 5 hours 44 minutes as compared with 49 minutes in ambulatory care during the same time period.

Conclusion

The new pathway ensures that clinically suitable patients are reviewed earlier through ambulatory care by the medical team, hence avoiding unnecessary hospital admissions. This leads to reduced waiting times and improved patient flow between ED and the medical team.

Conflicts of interest

None declared.

The positive impact of Medic Bleep, an asynchronous communication platform versus existing communication methods: an observational study

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Background

Healthcare systems revolve around intricate relations between humans and technology. System efficiency depends on information exchange, which occurs on synchronous and asynchronous platforms. Traditional synchronous methods of communication may pose risks to workflow integrity and contribute to inefficient service delivery and medical care.

Aim

To compare synchronous methods of communication to Medic Bleep, an instant messaging (IM) asynchronous platform, and observe Medic Bleep's impact on clinical workflow, quality of work life, patient safety outcomes and hospital core operations.

Methods

Cohorts of healthcare professionals were followed using the time–motion study methodology over a 2-week period, using both the asynchronous platform Medic Bleep and synchronous methods like the non-cardiac pager. An 11-item questionnaire was sent out pre- and post-implementation of Medic Bleep and 24 interviews were conducted to identify staff attitudes towards both platforms.

Results

A statistically significant figure ($p<0.01$) of 20.1 minutes' reduction in average task completion was seen with asynchronous communication, saving 58.8% of time when compared with traditional synchronous methods. For doctors, $p<0.0495$ and for nurses and midwives, $p<0.01$. A statistically significant reduction in mean task time was seen with 'to-take-out' (TTO), patient review, 'discharge and patient transfer' and 'escalation of care and procedure'. 67% of staff found implementation easy and a Likert scale value of 8.7 favoured asynchronous communication.

Conclusion

The asynchronous platform improved clinical communication compared to synchronous methods, contributing to efficiencies in workflow, and may positively affect patient care.

Conflicts of interest

None declared.

Improving handover between medical rotations for doctors in training – a quality improvement project

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Introduction

Handover is an essential part of ward induction for doctors rotating into new medical specialties. There is a lack of formal handover or communication from the previous team, resulting in loss of key knowledge and continuity of care. This hinders new doctors from being effective on the first day and contributes to doctors not feeling adequately prepared before starting in a new rotation. Poor communication is the biggest contributor to hospital errors,[1] and poor-quality handover jeopardises patient safety.[2] An up-to-date dedicated handbook or reference guide produced by junior doctors, for junior doctors, has been found to boost doctor confidence, and helped improve their efficiency.[3–5] We present a pan-trust project aimed at improving handover between doctors during changeover of medical rotations.

Methods

Three pilot sites were identified across both hospital campuses – oncology, gastroenterology and rheumatology. A baseline assessment and two further plan, do, study, act (PDSA) cycles were completed in one year period.

PDSA cycle 1 – establish current situation

We surveyed doctors to evaluate how they rated their current handover (on a scale 0–100) and whether they had received key items of information (with yes/no questions). These data were used to guide the creation of an induction document.

PDSA cycle 2 – refinement

Survey repeated with the second rotation and compared against baseline. The qualitative feedback was used to further refine the booklets. Short video interviews, entitled ‘Doctors Voices’, were filmed with outgoing doctors to help pass on ‘top tips’.

PDSA cycle 3 – assess usefulness of videos

A final survey was completed in the third rotation which included additional questions evaluating the impact of the videos.

Results

Responses were received from 28 doctors at baseline, 18 after cycle 2 and 16 after cycle 3.

The usefulness and quality of handover has improved since the introduction of our changes. The induction booklets were very well received gaining 89/100 from survey respondents and the videos having 77/100 (Table 1). Feedback on the induction booklets and videos include:

- ‘This is an excellent tool and helped calm my nerves before starting.’
- ‘The list of useful numbers and description of a typical day on the ward were really useful.’
- ‘The booklet had everything I needed for day one on the job.’
- ‘The videos were easier to digest, especially their tips for the job.’

Table 1. Quantitative feedback over quality improvement programme cycles

Feedback	Baseline (cycle 1)	Cycle 2	Cycle 3
Usefulness of handover?	57%	77%	80%
Quality of handover?	41%	72%	66%
How prepared were you?	48%	55%	59%

Conclusions

Those surveyed found the induction booklet and videos useful, and subsequently more prepared to start work. We now intend to:

- roll out the standardised template to all specialties via PGME centre
- embed updating the handover booklet as part of the roles and responsibilities of the ward doctor
- upload the booklets on the intranet and onto NUH guidelines application accessible via smartphone
- create a template for handover to provide clinically relevant information to be transferred between rotations.

Conflicts of interest

None declared.

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Enhanced care – bridging the chasm

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Introduction

Medical admissions are increasing in complexity – one in three admitted in 2015/16 had five or more health conditions, compared with one in 10 between 2005/6. Concurrently, the number of patients aged 85 and over being admitted to acute medical beds has grown at a greater rate than any other age group over the past decade.[1] The acutely unwell patient who cannot be managed on a general ward but does not meet the criteria for requiring a high dependency unit (HDU) poses a difficult problem. Although the care required in these situations does not fit the criteria for admission to the intensive treatment unit (ITU) or HDU, patients cannot safely be managed in a general ward environment due to the frequency of observations or the requirement of therapies difficult to deliver in non-specialist settings, eg non-invasive ventilation (NIV). Furthermore, elderly patients with complex comorbidities, increasingly have treatment escalation plans (TEPs) that preclude escalation to HDUs.

Materials and methods

Data collected at West Middlesex University Hospital (WMUH) indicated certain illnesses (Box 1) were not managed in the most appropriate settings as per national guidelines. A six-bed enhanced care unit (ECU) at WMUH aimed to provide an intermediary facility with enhanced monitoring, 1:2 nurse to patient ratio and therapies including NIV and nasal high flow therapy.

The ECU was staffed by a dedicated consultant and registrar, who form part of the medical emergency team, working to identify suitable patients. Dedicated training was provided to nurses on the unit to achieve Level 1/1+ enhanced care competencies. Prospective data were collected to analyse the impact on patient care.

Box 1. Conditions requiring enhanced monitoring

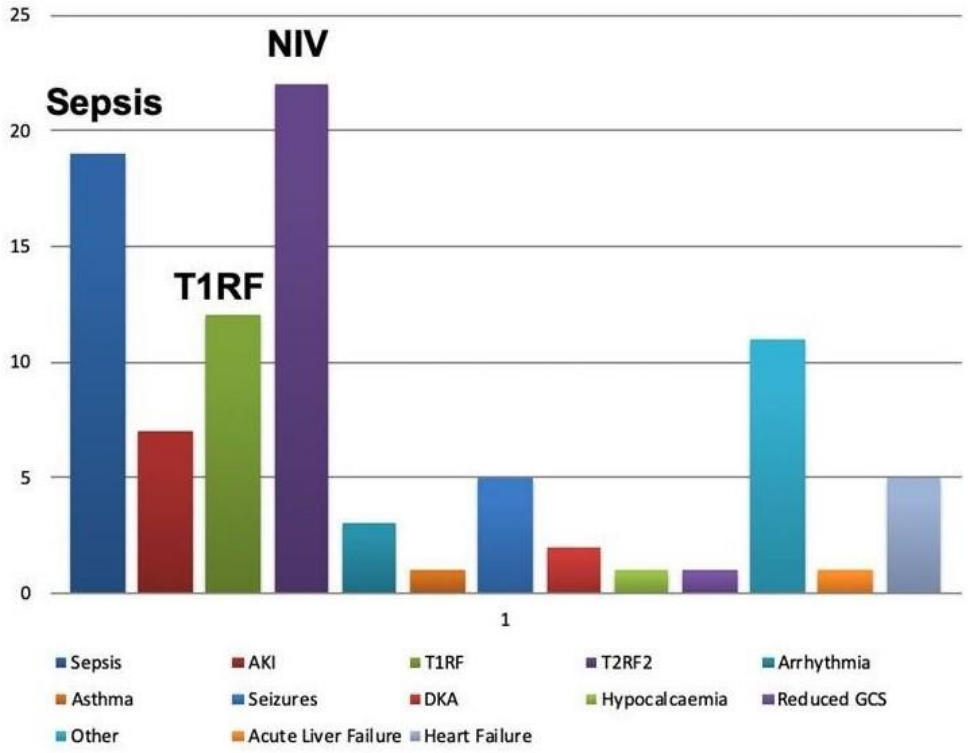
Acute hypercapnic respiratory failure (requiring non-invasive ventilation)
Acute hypercapnic respiratory failure (requiring continuous positive airway pressure / nasal high flow oxygen therapy)
Diabetic ketoacidosis
Hyperosmolar hyperglycaemic state
Stage 3 acute kidney injury (Acute Kidney Injury Network criteria)
Hyperkalaemia (>6 mmol/L)
Hypercalcaemia (>3 mmol/L)
Severe hyponatraemia (<120 mmol/L)
Reg flag sepsis

Results

Between November 2018 and February 2019 there were 102 admissions to the ECU. Sepsis and respiratory failure were the predominant reasons for admission (Fig 1). Thirty-five per cent of patients received respiratory support through NIV.

Most patients were admitted for 2 days or less; four needed escalation to HDU/ITU. Four patients died while inpatients in ECU. Thirty-day mortality was 17.6%, 70.6 % of patients survived until 100 days after admission. Fifty-six per cent of patients were at their ceiling of care, and not for resuscitation.

Fig 1. Breakdown of patients requiring enhanced care.



Conclusions

The low conversion of patients from ECU to HDU/ITU indicates patients were appropriately identified for ECU provision.

Patients requiring NIV were provided safe care in line with best practice guidelines.[2]

A new area for escalation was available for patients with hyper-acute illnesses, complex comorbidities or significant frailty with appropriate ceilings of care placed.

Next steps

Following the success of the unit we have sought to establish a new level of care provision nationally. A national working group has been put together with representation from the three medical royal colleges, British Thoracic Society, Society for Acute Medicine and Faculty of Intensive Care Medicine to establish recommendations and standards for the delivery of enhanced care in medicine. This will include access to reproducible standard operating procedure documents and model business cases. We will seek to gain regulatory alignment with these standards to promote best practice.

Conflicts of interest

None declared.

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A regional quality improvement project to improve the standards of care for people with diabetes who are on maintenance haemodialysis

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Introduction

People with end-stage renal disease (ESRD) caused by diabetes account for 29.4% of people on maintenance haemodialysis (MHDx). When taking into account those with diabetes not causing ESRD, this figure rises up to 40% in some units.[1] People with diabetes and kidney disease are at a particularly high risk of complications such as non-traumatic lower extremity amputation, cardiovascular events and death, with overall survival on MHDx in people with diabetes being approximately half that of their non-diabetic peers (3.7 vs 7.0 years).[2–4] In 2016, guidelines were published by the Joint British Diabetes Societies in conjunction with the Renal Association, aimed at defining good-quality care for a person with diabetes on MHDx.[5] These guidelines have been disseminated widely but evidence is lacking in their use in the day-to-day management of patients. This quality improvement project (QIP) uses a multidisciplinary team (MDT) approach to develop a set of standards based on the national guidelines, identify areas of substandard care and put interventions in place to improve this across the Leicester Renal Network.

Materials and methods

The standards highlighted in Table 1 apply to all people with diabetes on MHDx. Data were collected in May to August 2019 from a combination of paper medical records, IT systems and patient questionnaires.

Results and discussion

A total number of 151 MHDx patients with diabetes were identified from three dialysis units. Baseline data identified differences in organisational care between the NHS hospital-based dialysis unit, NHS non-hospital-based (satellite) unit and non-NHS satellite unit (Fig 1).

The differences in certain standards (1a, 1c, 4, 5a and 5b) could be attributed to many factors, including:

- different dietitian referral pathways (routine review vs referral-based only)
- different staffing contracts (NHS vs non-NHS)
- geographical proximity to secondary care services.

We identified patients who were not getting annual diabetic reviews, eye screening and foot checks. Similarly, patients at high risk of hypoglycaemia were recognised. Areas of good practice were also seen.

- NHS non-hospital-based unit achieved 100% compliance with standards 3a, 3c and 5a by utilising a diabetes care plan inserted in each patient's dialysis folder

There was a difference between patient perceived care (from patient questionnaire) and objective documented care given (medical records), with the discrepancy rate being up to 41.3% for some standards. This highlights the potential factors, such as memory/recall, clear communication and documentation that influence patient experience.

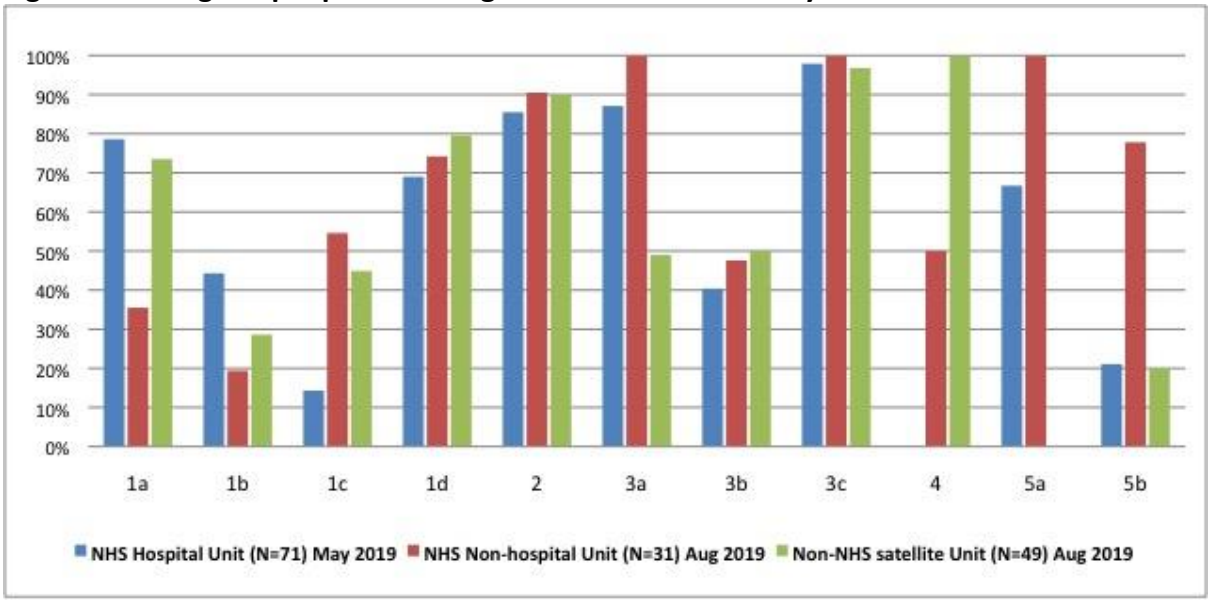
Table 1. Standards of care for people with diabetes on maintenance haemodialysis

Number	Criteria
1a	100% are under a named doctor/nurse to support the delivery of their diabetes care (general practitioner, consultant or DSN)

1b	100% have had a documented annual review of their glycaemic control by a diabetes specialist or DSN
1c	100% have had a documented dietary review of their diabetes by a renal dietitian in the last 12 months
1d	100% should have documented annual eye screening
2	100% of people on insulin and/or SUs should be undertaking a personalised method of assessing glycaemic control
3a	100% should have an HbA1c done every 4 months
3b	0% of people on insulin therapy or SUs should have HbA1c <58 mmol/mol (<7.5%)
3c	100% of all people on insulin and/or SUs have capillary blood glucose measured immediately before and after MHDx
4	100% of those with HbA1C >80 mmol/mol must have had access to diabetes team in the preceding 4 months
5a	100% receive regular weekly foot inspections on MHDx unit
5b	All people with diabetes have documented foot risk assessment annually

DSN = diabetes specialist nurse; HbA1c = glycated haemoglobin; MHDx = maintenance haemodialysis; SUs = sulphonylureas.

Fig 1. Percentage of people achieving standards at three dialysis units in Leicestershire.



Conclusion

This QIP has identified areas where standards, based on national guidelines, are underachieved across different units and the barriers to achieving them. Interventions to implement change include:

- presenting results to renal dietitians
- creating a virtual diabetes-renal MDT to discuss complex cases and bridge both aspects of care
- diabetes education days for dialysis nurses designed and delivered by 'Diabetes Care in Haemodialysis' working group

- creating and using a hypoglycaemia risk assessment tool.

These interventions are currently being implemented, with re-audit planned to assess any improvement in the care provided. Despite the barriers, there are areas of good practice, that when shared with other units, may benefit the wider dialysis population.

Conflicts of interest

None declared.

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A retrospective audit to assess the safety and efficacy of apremilast use in chronic plaque psoriasis

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Introduction

Apremilast is a small molecule inhibitor of phosphodiesterase 4, an intracellular enzyme which modulates the expression of cytokines and mediators including tumour necrosis factor α and interleukin 23.[1] It was licensed for use by the European Commission in 2015 and, following a recent review, the National Institute for Health and Care Excellence (NICE) has also recommended it as a treatment option for patients with severe plaque psoriasis from November 2016. The purpose of this audit was to assess the safety and efficacy of apremilast use in adult patients with moderate to severe plaque psoriasis.

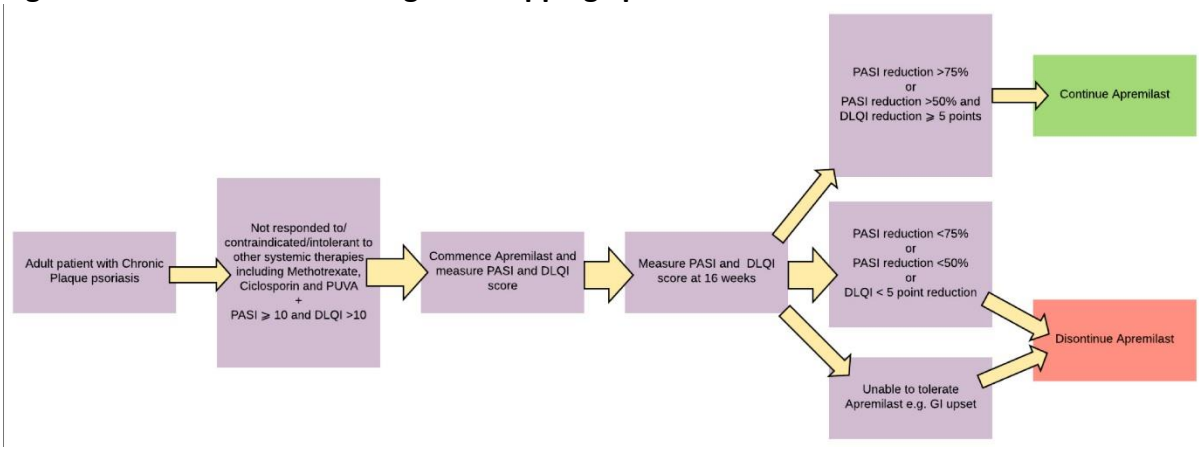
Material and methods

Retrospective analysis was conducted using individual patient medical documents and an online clinical portal. Patients prescribed apremilast for the indication of plaque psoriasis between 01 September 2017 – 12 March 2018 were included in the audit (n=44). Two hospitals of a health board in the UK were involved in this study. The gold standard used to compare safety and efficacy of apremilast was the NICE technology appraisal guidance (TA419).[2] Clinical efficacy of the drug was determined by assessing the Psoriasis and Severity Index (PASI) and Dermatology Life Quality Index (DLQI) scores.

Results and discussion

Fig 1 displays an overview of commencing and stopping apremilast according to NICE guidance. Findings show that 13 patients (30%) met the NICE guidance inclusion criteria for the use of apremilast. Twenty-five patients had a PASI and DLQI assessed pre-treatment and 28 patients had exhausted other systemic therapies (or had contraindications to) including methotrexate, ciclosporin and psoralen-UVA therapy. Of those 28 patients, 13 also had a PASI ≥10 and DLQI ≥10. An inadequate response was determined by calculating the score reduction percentage of PASI and DLQI prior to and following 16 weeks of treatment. In terms of drug efficacy 25 patients (57%) responded to apremilast according to medical notes and continued treatment, 16 patients (36%) discontinued treatment including 14% due to associated side/adverse effects. Gastrointestinal upset was the most common side effect and 9% of patients developed new depression during treatment. Three patients had not completed 16 weeks at the end of the audit period.

Fig 1. Overview of commencing and stopping apremilast.



Conclusion

Findings show that NICE guidance standard was largely not met with respect to assessing the severity of psoriasis using the PASI and DLQI scores in combination with exhausting alternative systemic therapies before considering apremilast. However, medical notes documented improvement in psoriasis from clinician and patient perspectives in responders. Although we found depression in 9% of patients, it must be noted that this was based on patient views and a validated tool was not used to calculate depression. Advantages to the use of apremilast include its oral administration, minimal drug interaction potential and tolerable side effect profile. Given that treatment of psoriasis is highly individualised, apremilast will likely be of value to patients who cannot tolerate and/or are unresponsive to conventional systemic non-biologic agents. Furthermore, the cost of apremilast (£555 for a 28-day pack after initial titration) is lower than that of biologic therapy and will potentially have a bigger role in treating more patients with psoriasis in the future.[1]

Conflicts of interest

None declared.

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Low-value care and endoscopy in dyspepsia: A retrospective observational study from a metropolitan Australian hospital

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Introduction

Recent literature suggests that young patients aged <55 years without any alarm features are at low risk of having significant endoscopic findings (SEF) including malignancy, ulceration and erosive oesophagitis. Guidelines recommend that this patient subgroup should undergo a trial of proton pump inhibitors (PPIs) and potentially *Helicobacter pylori* testing before being considered for endoscopy. Hence, endoscopy has been identified as a potential source of unnecessary expense and low-value care for health services.

We sought to assess the yield of performing endoscopy in young patients aged <55 years with dyspepsia referred by primary care physicians; and to assess the utility of alarm symptoms, and of nonresponse to PPIs for predicting significant endoscopic findings.

Methods

We retrospectively reviewed all endoscopies at our tertiary centre between January 2018 and July 2019 for investigation of dyspepsia. We excluded patients aged <18 years or ≥55 years, endoscopies performed for surveillance reasons and endoscopies performed for non-dyspepsia related indications.

Results

Three-hundred and two endoscopy exams met inclusion criteria, with a mean patient age of 41.0±9.5 years and 43% were male. 246 (81.5%) endoscopies were performed in accordance with the guideline indications, consisting of 80 (26.5%) patients with alarm features, with 226 (74.8%) patients having had a trial of PPIs prior to referral.

The most common alarm features were iron deficiency anaemia and dysphagia, but also included unintentional weight loss, persistent vomiting, upper gastrointestinal bleeding, family history of upper gastrointestinal malignancy and abnormal imaging of the of upper gastrointestinal tract.

On endoscopy, 151 (50.0%) patients had a normal examination while 24 (7.9%) patients had a significant endoscopic finding including one case of gastric adenocarcinoma, three cases of ulceration, two cases of Barrett's oesophagus and 19 cases of erosive oesophagitis (Los Angeles grade B or higher).

The rate of SEF in patients with alarm features was 4/80 (5.0%) compared with 20/222 (9.0%) in patients without alarm features, with an odds ratio of 0.53 (0.18–1.61; p=0.263).

The rate of SEF in patients who had endoscopy performed within guidelines was 21/246 (8.5%) compared with 3/56 (5.4%) done outside of guidelines, with odds ratio of 1.65 (0.47–5.73; p=0.432).

Conclusions

We identified that 18.5% of endoscopies for investigation of dyspepsia in patients aged 18 to 54 years were performed outside of guidelines as they did not have any preceding alarm features nor a trial of PPI beforehand. However, this subgroup of patients had a clinically significant SEF rate of 5.4%, hence they do not clearly represent low value care episodes. A negative endoscopy itself has direct clinical utility as it relieves patient anxiety from the fear of having an underlying cancer or serious disorder and facilitates a

diagnosis of functional dyspepsia so that more targeted management can be provided for these patients. A substantial number of patients did not have a PPI trial prior to referral, suggesting that many primary care physicians are unaware of the dyspepsia guidelines, which can be addressed with focused education and clear referral guidelines.

Conflicts of interest

None declared.

Normal withdrawal time correlates with polyp detection rate and adenoma detection rate: A quantitative observational study from a metropolitan Australian hospital

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Introduction

Colonoscopy is the gold standard bowel cancer screening test but it has reduced effectiveness for lowering colorectal cancer (CRC) rates due to the reported 20% missed detection rate for adenomas in a meta-analysis of tandem colonoscopy studies. The true missed detection rate for significant lesions is likely to be higher as these findings came from an era where the sessile serrated adenoma had not yet gained international consensus as a possible precancerous lesion.

In our retrospective observational study featuring 10 colonoscopists and 3,169 colonoscopies, we measured the correlation between normal withdrawal time (NWT) and adenoma detection rate (ADR), between NWT and polyp detection rate (PDR), and between NWT and sessile serrated adenoma detection rate (SSADR) to assess the validity of the NWT as a determining factor of colonoscopy performance. We additionally measured the correlation between ADR, PDR and SSADR to assess the validity of the SSADR as a colonoscopy performance measure.

Methods

We excluded patients with age <50 years, CRC history, inflammatory bowel disease history, poor or fair bowel preparation, and excluded colonoscopists who performed <50 procedures or had <6 months data. NWT was calculated from colonoscopies where no polyps were detected, and where no procedures were performed such as polypectomy, mucosal biopsy, haemorrhoid banding or thermal therapy. Linear regressions were used to calculate the strength of association between variables.

Results

The 10 colonoscopists had mean NWTs ranging from 5.8 to 9.6 minutes, ADR from 24.1 to 65.7%, and PDR from 31.3 to 77.9% (Table 1). Mean NWT correlated strongly with both ADR and PDR (r=0.64 and r=0.72, respectively; $p<0.05$; Table 2). The correlation between NWT and SSADR did not reach statistical significance. The optimal NWT was between 9 to 10 minutes which was associated with the highest ADR and PDR in our group. SSADR correlated very strongly with both ADR and PDR with r values of 0.91 and 0.86, respectively.

Table 1. Mean normal withdrawal time vs adenoma detection rate, sessile serrated adenoma detection rate and polyp detection rate

Mean colonoscopist normal withdrawal time, minutes	Adenoma detection rate, %	Sessile serrated adenoma detection rate, %	Polyp detection rate, %
5.8	24.1	4.8	31.3
7.1	61.6	12.8	74.7
7.7	34.9	4.4	48.7

7.7	60.6	16.8	73.0
8.0	59.7	14.4	73.5
8.1	48.5	11.3	65.5
8.2	57.6	13.9	76.8
9.1	63.2	11.8	77.9
9.5	50.6	11.2	73.0
9.6	65.7	15.2	75.5

Table 2. Correlation between normal withdrawal time and detection rates

	r value	p value
Mean normal withdrawal time vs adenoma detection rate	0.64	0.0458
Mean normal withdrawal time vs sessile serrated adenoma detection rate	0.49	0.1529
Mean normal withdrawal time vs polyp detection rate	0.72	0.0179

Conclusions

Our results reaffirm findings from previous studies, strengthening the likelihood that longer NWT is an independent factor that lead to improved adenoma detection, hence lowering future colorectal cancer rates. This one key performance indicator may allow more focused education and retraining to facilitate excellence in colonoscopy quality standards.

Conflicts of interest

None declared.

Patient reported outcome measures (PROMS) – 30-day mortality and adverse events post colonoscopy: A prospective observational study from a metropolitan Australian hospital

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Introduction

Colonoscopy has an excellent internationally proven and accepted safety profile, with large scale studies demonstrating very low rates of post-procedural mortality and severe complications. Little information exists about patient reported outcome measures (PROMs) in Australia. PROMs have been demonstrated to be an advanced measure of quality incorporating patient/user feedback. We performed a patient reported outcome measure quality assurance study of our metropolitan hospital colonoscopy service to identify and assess the incidence of adverse events and mortality occurring at or within 30 days of colonoscopy.

Design

Prospective, single-centre study with PROMs from all patients having inpatient and outpatient colonoscopy procedures from January 2018 to June 2018.

Setting

Tertiary/quaternary metropolitan hospital (regional centre for congenital heart diseases, cystic fibrosis, complex cardiology, cardiothoracic surgery, and heart and lung transplantation services).

Methods

Patients were provided with a feedback form to record any adverse events that occur at or within 30 days post colonoscopy and were required to return the form to the hospital. If not received after two attempts, patient clinical databases were interrogated to examine for unexpected hospital admissions, pathology or additional procedures undertaken in the 30-day period post colonoscopy. The primary endpoints were mortality that occur ≤30 days of colonoscopy, and adverse events which were categorised into minor (defined as not requiring medical attention), moderate (defined as requiring attention from the general practitioner) and severe (defined as requiring either an emergency department presentation or hospital admission).

Results

1,416 of 2,237 patients (63%) responded with the feedback form on adverse events; the patient mean age was 59 years (standard deviation ±15 years) and 51.7% of them were males.

The primary outcome of 30-day mortality in the outpatient cohort was 0%. However, three unrelated deaths were recorded in the non-responding cohort (3/821 or 0.37%). These inpatients were found to have had significant comorbidities and died 9–18 days after their procedure from unrelated causes including chronic lung allograft rejection in one patient, critical lower limb ischaemia in the second patient, and ventilator associated pneumonia post coronary artery bypass and valve replacement in the third patient.

The rates of minor, moderate and severe adverse events were 4.07%, 1.70%, and 1.48%, respectively, (incidence rates of 40.68, 16.99, and 14.75 per 1,000 exams, respectively; Table 1). Of the patients with

severe adverse events, only one patient suffered a perforation post outpatient colonoscopy for bowel cancer screening which improved with medical management (incidence 0.45/1000 exams).

Table 1. Outcome measures (n=2,237)

	Rate (%)	**Incidence per 1,000 exams (95% confidence interval)**
Replied to questionnaire	1,416 (63.30)	
Adverse events		
Nil	1,254 (56.06)	
Minor	91 (4.07)	40.68 (33.25–49.68)
Moderate	38 (1.70)	16.99 (12.40–23.23)
Severe	33 (1.48)	14.75 (10.52–20.64)
Perforation	1 (0.04)	0.45 (0.08–2.53)
Mortality		
Deaths ≤30 days	3 (0.13)	1.34 (0.46–3.94)

Conclusions

The results of our single centre quality assurance PROMs study in colonoscopy is consistent with international standards with regards to published and accepted outcome measures for complications post outpatient and inpatient colonoscopy. We identified three deaths that took place in the inpatient cohort, occurring in patients with significant comorbidities, independent assessment confirms that the colonoscopy did not contribute to mortality. This is the first Australian PROMs study in colonoscopy and reaffirms a favourable safety profile of colonoscopy in our institution.

Conflicts of interest

None declared.

MDT approach to improve attendance of outpatient appointments and scans for geriatric inpatients

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Introduction

While working on a geriatric ward, I noticed many of the patients were not responsible for their own care and that often it was done by family/community teams. Thus, when they came into hospital, they were often missing planned outpatient appointments/investigations which were scheduled for them. This led to poor patient care and increased missed appointments. Imperatively many of these patients were vulnerable and it would improve their quality of life greatly to have all investigations while an inpatient rather than coming back repeatedly for single appointments

Method

I was able to assess the extent of this issue by discussing with our IT team, they ran a model which displayed all patients on geriatric wards who had upcoming outpatient appointments/investigations. I then discussed with local teams on wards and decided that doctors, head nurses and ward clerks would be notified twice weekly about upcoming appointments. My analysis was based on looking at how many of those who had appointments attended them and, if they did not, why not.

Results

My research directly tackled the initial challenge as it has allowed elderly inpatients to get to previously scheduled appointments, they have benefited from reviews which they were meant to get and are not having duplicate imaging/appointments. The benefits include improved patient care, improved outpatient attendance, lower return to hospital for appointments and fewer missed appointments. The main problems included getting the various multidisciplinary team members to fully participate in the project and incorporate it into their daily board round.

Conclusion

The results identified the various differing appointment types and ensured that the majority of patients attended these. The result of these outcomes was that when the new electronic system came into play at the hospital, all outpatient appointments were made visible to the accessing healthcare professional, hence ensuring that all inpatients had the opportunity to attend upcoming appointments.

Conflicts of interest

None declared.

Non-invasive ventilation in acute exacerbation of chronic obstructive pulmonary disease: Results from an anonymous survey of physicians

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Rationale

Non-invasive ventilation (NIV) is an evidence-based treatment modality for patients with acute exacerbation of chronic obstructive pulmonary disease (COPD) with acute hypercapnic respiratory failure (AHRF). It has been shown to reduce mortality, in-hospital complications, length of stay and is cost effective compared to invasive ventilation. Despite this, data from UK has shown higher mortality and a wide variation in practice in the use of NIV in AHRF.

Aims and objectives

To aim was to evaluate the knowledge of physicians in the use of NIV in patients with acute exacerbation of COPD in a district hospital setting.

Method

The study was carried out through means of a voluntary response by physicians (general internal medicine and emergency medicine) at Epsom and St Helier University Hospitals NHS Trust through a standard anonymous online survey (based on British Thoracic Society (BTS) guidelines for the use of NIV in COPD). Respiratory and intensive care physicians were excluded from this study.

Results

A total of 89 physicians completed the questionnaire, this included 36% consultants (n=33), 24% registrars (n=21) and 40% senior house officers (n=36). Seventy-five per cent of the doctors had initiated or looked after patients on NIV in the past 12 months. In addition, only 48% of the doctors had some formal training in the use of NIV. Furthermore, 82% of doctors were not completely aware of the BTS guidelines in the use of NIV in COPD. Interestingly, 59% of the respondents felt that they were comfortable in looking after patients on NIV.

Conclusion

This study showed that a significant number of physicians had managed patients with COPD on NIV, with high confidence levels despite having inadequate knowledge in its use. Furthermore, it highlighted the lack of a formal training in the use of NIV in physicians. The above raises concerns regarding the safety and adequate delivery of NIV in an acute care setting. This, however, is easily remedied with simple education. We recommend that regular training in the use of NIV be organised for physicians who work in acute care setting.

Conflicts of interest

None declared.

Introducing a formal night-to-morning handover on the acute medical unit Princess Royal University Hospital (PRUH)

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Background

Handover allows responsibility for immediate and continued care to be transferred between healthcare professionals. The National Confidential Enquiry into Patient Outcome and Death and the Royal College of Physicians identified handover as a high-risk step of the patient pathway.[1] Thus, lack of handover such as that at Princess Royal University Hospital (PRUH) is a major preventable cause of patient harm and critical to patient safety.

Aim

The aim was to develop a formal, structured AMU night-to-morning handover, to enable safe recognition and handover of unstable and unwell patients, and to highlight priority tasks and specialty referrals.

Method: Defining the problem

A qualitative questionnaire was sent to all PRUH acute medical unit (AMU) junior doctors and consultants via online survey.

100% of respondents defined current handover practice as unsafe and 100% identified need for morning handover. Handing over unwell patients in a timely and reliable manner to relevant team was raised as a primary issue. A 15-minute (100%) morning handover, led by registrars (80%) involving night and day junior doctors (95%) and AMU consultants (75%) was felt best placed to address the issue.

Cycle 1

Interventions

Introduction of daily verbal and written handover using a formatted whiteboard, which identified all staff members, highlighted any unwell patients, priority tasks and potential staffing issues.

Use of a consultant cue-card to standardise the handover.

Feedback

Informal verbal feedback post cycle 1 – highlight overnight adverse incidents, hospital operational concerns and giving a learning point of the day to morning team.

Cycle 2

Interventions

Improved visual clarity of whiteboard and development of laminated handover cue-cards produced and printed to guide succinct handover delivery by night team.

Remeasure

Repeat online survey re-sent to all junior doctors and consultants on AMU 6 months post cycle 2 interventions. Overall positive response to introduction of AMU morning handover: 90% agreed new handover safely identifies unwell patients to day team; 50% improvement in handing over to the relevant team; 40% suggested an electronic handover would be useful.

Cycle 3

Development of an electronic handover request. This provides formal electronic log of handover, enables night team to document accurate details to aid morning handover.

Sustainability

We plan to repeat further cycles and re-assess interventions, to appoint a handover champion, to embed the handover within inductions, to collect feedback from consultants and to involve senior nursing staff and hospital managers.

Strengths and limitations

It enabled the introduction and implementation of a simple, cost-effective, formal AMU morning handover at PRUH that follows elements of the *BMJ*'s 'good handover' practice. It has shown demonstrable improvement in addressing trainees' concerns. It follows the structure of a quality improvement project and involved three cycles with interventions reviewed after each cycle. Direct impact on patient safety was not measured as it did not use patient safety outcome measures.

Conclusion

Handover should be a priority given it is a high-risk step in the patient pathway. This project achieved the introduction and sustainment of a standardised night-to-morning AMU handover, which has undoubtedly had a positive role in improving patient safety by more efficient handover of unwell patients and has addressed concerns of the healthcare team.

Conflicts of interest

None declared.

References

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The management of urinary tract infections in a district general hospital – a closed loop service review and comparison with SIGN guidelines

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Introduction

Elderly patients with new onset of confusion or being 'off legs' is a common presenting complaint on the acute take. Urinary tract infections (UTI) are common in the elderly population, often a diagnosis is made based on a positive urine dipstick in the absence of urinary symptoms. However, these patients may actually have asymptomatic bacteriuria (AB).

The prevalence of AB in institutionalised women above the age of 65 have been reported to be as high as 57%.[1] Bacteriuria is not a disease, and treating it is not advised under the Scottish Intercollegiate Guidelines Network (SIGN) guidelines.[2] We looked to investigate the rate of over-diagnosing and over-treating patients with AB.

Method

A total of 50 female patients over 65 with a discharge diagnosis of UTI were analysed retrospectively. All had positive urine dips, no concurrent infection and without long-term catheters. We re-audited 25 patients after our interventions were in place for 5 months to evaluate the efficacy of our interventions.

Results

The primary objective was to investigate the rate of over-diagnosing and over-treating of patients with AB. Our secondary objective was to determine adherence to trust guidelines for the treatment of complicated and uncomplicated UTI.

We found 22% (11/50) of patients without any urinary symptoms or signs of infections (raised inflammatory markers, new confusion, non-mechanical falls or abnormal temperature) were inappropriately started on antibiotics. This clearly shows the inappropriate use of antibiotics. Of the 39 patients identified to have a UTI, 74.4 % (29/39) of patients received the recommended antibiotic. However, only 27.6% (8/29) received it for the correct duration. This demonstrates poor adherence to local antimicrobial guidelines.

Following these findings, we worked with microbiology to produce a flow chart on how to manage patients with AB and UTI. We also presented in grand round to highlight our shortcomings.

After 5 months, we found no patients who did not have signs of urinary symptoms or signs of infections to have been inappropriately started on antibiotics. This shows a clear improvement from our previous findings. However, antibiotic compliance was still poor with only 12% (3/25) of patients receiving the correct antibiotic and none of them receiving it for the recommended duration.

Following the second cycle and analysis, we edited our original flowchart to target poor antibiotic adherence found in the repeat analysis. We made it more memorable by including a captivating title 'Think Nitro Bro!' We placed it in the doctor's office and in the mess for maximum exposure.

Conclusion

In summary, we demonstrated incorrect management of AB and UTI, which was addressed in the form of education and the production of a flowchart. This appeared to have reduced the over-diagnosing and over-treating of patients with AB, however incorrect antibiotic choice and treatment duration still remained a problem. We worked with pharmacy and microbiology to edit the first poster and address the poor

compliance to local antimicrobial guidelines. Changes were made to the poster to make it more appealing for doctors to read and memorable. This will be audited in 5 months.

Conflicts of interest

None declared.

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Enhancing teamwork to create a high-performance team in the acute stroke unit at Worcestershire Royal Hospital – quality improvement project

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Introduction

The acute stroke unit (ASU) in Worcestershire Royal Hospital has a multidisciplinary team including consultants, junior doctors, nurses, physiotherapists, occupational therapists and speech and language therapists focusing on delivering hyperacute stroke treatment and rehabilitation. However, it is felt there are difficulties in multiple levels such as staffing issues, disorganised ward rounds and teamwork, lack of communication between teams, lack of local induction, hindering our multidisciplinary team to become a high-functioning team. This quality improvement project (QIP) focused on identifying the areas of improvement and to try and devise strategies to make high-performance team utilising resources within.

Methods

Plan, study, do, act (PDSA) cycle 1 focused on identifying the areas of improvement through a survey among members of the multidisciplinary team. Likert-scale questionnaire divided and organised into four different logical constructs, general organisation, junior doctor accessibility, patient care plans were used for the survey. Resurvey with the same questionnaire followed the implementation of changes to identify the outcome of changes which led to improving morning huddle.

PDSA cycle 2 improved the morning huddle with introducing a local checklist from SAFER patient flow bundle, NHS improvement and Royal College of Physicians recommendations for best practice in medicine.[1,2] Data over the QIP period for patient safety elements such as venous thromboembolism documentation and completion of discharge summaries, and patient experience element on number of compliments received, were collected.

Outcome

The PDSA cycle 1 showed significant change within the four variables: general organisation ($t(13) = 4.266$; $p<0.05$); junior doctor accessibility ($t(13) = 7.659$; $p<0.05$); efficiency ($t(13) = 2.474$; $p<0.05$); and patient care ($t(13) = 10.617$; $p<0.05$).

There was a 16% increase in the venous thromboembolism prevention documentation and a 1.3% increase in discharge summary completion in 24 hours. Additionally, there were 27 more compliments received for the ASU during the QIP period.

Conclusion and discussion

There is unequivocal evidence of improved outcomes when patients are treated in a stroke unit by multidisciplinary teams.[3] Evidence from observational studies suggests that explicit communication (eg task allocation, prioritisation of patients and task ownership) facilitates behaviours associated with patient safety (eg prescription of thromboprophylaxis, removal of unused cannulae etc).[2] The significant change in four variables – organisation, patient care, efficacy and junior doctor accessibility – by cycle along with the introduction of improvement strategies in morning huddle showed 16% increase in the venous thromboembolism prevention documentation and a 1.3% increase in discharge summary completion. Additionally, there were 27 more compliments received for the ASU during the QIP period. As a part of cycle 2, a local induction booklet was introduced.

Conflicts of interest

None declared.

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Therapies in ACS: the pitfalls of prescribing

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Acute coronary syndrome (ACS) is a significant health burden in NHS Lanarkshire.[1] Although innovative anticoagulant and antiplatelet therapies have aided treatment of ACS in recent years, these drugs can cause prescribing errors.[2] This was identified as an area of improvement at University Hospital Wishaw following recent adverse events and continued use of out-of-date ACS guidelines.[3]

The aim of the project was to improve prescribing of anticoagulant and antiplatelet therapies in patients presenting with ACS. Data were collected and analysed from patients presenting to the medical receiving unit with 'chest pain' and prescribing errors related to ACS loading treatment were recorded. DATIX incidents related to anticoagulant/antiplatelet prescribing were also analysed pre- and post intervention.

An ACS infographic was designed to increase prescribing awareness and help reduce errors. This was displayed in all clinical areas and nursing medication trolleys. Education sessions on prescribing safety and medication types were also delivered to all medical and nursing staff.

Two quality improvement cycles were conducted in April–June 2019 and July–September 2019. DATIX incidents decreased from 1.3 per month pre-intervention to 0 per month post intervention and this trend was mirrored in DATIX incidents related to anticoagulant prescribing as a whole. Patients who had a prescribing error during ACS loading treatment decreased from 36% in cycle 1 (8/22) to 29% in cycle 2 (6/21).

In conclusion, education and a simple infographic can reduce the number of adverse incidents and prescribing errors in patients presenting with ACS. Further work will focus on wider awareness of these issues as the project is launched across other hospitals in the health board.

Conflicts of interest

None declared.

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Looking at cancellation rate among renal patients and ways to reduce cancellation at the time of admission and improve utilisation of theatre list: a quality improvement project

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Introduction

Cancellation on the day of surgery is a major challenge faced by the UK NHS and it was estimated that it costs the NHS £400 million per year on lost operating theatre time costs.[1]

It was reported that renal patients have a higher than average cancellation rate on the day of surgery (eg elective renal access procedures) due to illness. The standard should be that no patients cancel on day of surgery and all renal patients should be prepared for surgery adequately (eg had dialysis the day before).

Aim

Our aim was to investigate the cause of the high cancellation rate among renal patients, to reduce the cancellation rate by at least 50%, to improve the patients' experience and to improve utilisation of the theatre list.

Method

We looked at cancellation rate of renal patients on the day of surgery by looking at elective renal access procedures. Data were collected retrospectively and analysed. We implemented some changes based on findings from two plan, study, do, act (PDSA) cycles. Another PDSA cycle (non-intervention) was carried out 6 months following implementation of the action plans to assess cancellation rate.

Results and discussion

Prior to the implementation of our action plans, we found 22% cancellation rate of renal patients on the day of surgery, therefore not meeting the standard. Reasons for cancellation included high blood pressure, unwell patient, hyperkalaemia, uncontrolled bowel movements etc. We implemented some changes, including for patients to be seen by a renal physician 1 day preoperatively to review health status and to maximise condition.

The first PDSA cycle reported a significant improvement in terms of cancellation rate of renal patients. There was a 0% cancellation rate due to illness, but 6% cancelled due to administrative error in booking. Further action plans were implemented to reduce the cancellation rate due to administrative error.

Second PDSA cycle (non-intervention) reported further improvement and a 0% cancellation rate on day of surgery.

Conclusion

In summary, this quality improvement project had led to a significant improvement in healthcare services. It improved patient safety and quality of care, reduced cancellation rate at time of admission and improved utilisation of the theatre list. The changes that were made can also be easily applied in other hospitals nationwide to reduce cost on lost operating theatre time.

Conflicts of interest

None declared.

References

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Inappropriate use of naloxone in a hospital setting compromising patient safety: a quality improvement project

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Introduction

Life-threatening opioid toxicity is a rare but recognised complication of opioid use. In 2014, NHS England released a patient safety alert on inappropriate prescribing of naloxone in patients with chronic opioid use, citing two fatal cases.[1]

A retrospective audit (2017) of naloxone use in an acute hospital demonstrated that 90% (18/20) of administrations did not meet recommended standards. This prompted a quality improvement project to improve practice.

Methods

A trust guideline was developed using the *Palliative care formulary* and UK Medicines Information's naloxone evidence review.[2,3] This was disseminated through education sessions and email updates. An alert was created on the trust electronic prescribing system which was visible to both prescribers and those administering the medication. This detailed the clinical parameters recommended before naloxone is to be given.

Following this, repeat data were collected retrospectively over 3 months for all adult hospital inpatients (excluding intensive treatment unit and emergency department) administered naloxone. Electronic clinical notes were reviewed for the reason for naloxone use, respiratory rate, oxygen saturation, level of consciousness and dose given.

Results

Repeat audit (2019) demonstrated three administrations of naloxone, two of which did not meet the guideline standard; an 89% reduction in inappropriate administrations of naloxone compared to baseline. The dose which was appropriately administered was also of the recommended dose.

Discussion

The clinical guideline introduced a 'traffic light system', grading severity of opioid toxicity based on clinical parameters. A closed-loop flowchart was created, which provides clear descriptions of how to manage a patient on chronic opioids with suspected opioid toxicity. In addition, there are sources of help identified and recommendations for follow-up and continuous monitoring once the acute toxicity has been addressed.

A comprehensive education programme has enabled the learning from the audit and guideline to be disseminated to all grades of clinical staff through presentations at trust grand round, departmental education meetings, clinical governance meetings and junior doctor teaching sessions.

Ongoing efforts focus on continued dissemination of the guideline, particularly with rotation of clinical staff. Teaching on opioid toxicity and use of naloxone is now part of the annual teaching programme to trust internal medicine training and foundation year doctors.

The trust is due to undergo modernisation of its IT systems, including its electronic prescribing system. It is important that the prescribing alert for naloxone is maintained on future prescribing systems.

Conclusion

There has been a marked decrease in inappropriate administrations of naloxone in patients with chronic opioid use since the interventions. However, continued work is needed as a reduced conscious level often triggered naloxone use despite absence of respiratory depression or hypoxia.

Education sessions and update emails were helpful to highlight the concerns raised in the initial audit and to familiarise staff with the new guideline. These will remain important due to the rotation of staff however the prescribing alert was more effective in establishing sustained change in practice as it is visible and current at the time of prescribing and administration of naloxone.

Conflicts of interest

None declared.

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Improving door to needle time in neutropenic sepsis

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Aims

Neutropenic sepsis is a potentially fatal complication for patients receiving systemic anti-cancer treatment (SACT). Mortality rates range between 2–21% among adults, and the use of aggressive intravenous antibiotics shows a significant reduction in both morbidity and mortality.[1] The National Institute of Health and Care Excellence (NICE) guidance and local policy state that all patients who present to hospital as unwell post-chemotherapy should receive antibiotics within 1 hour.[2] We aimed to reduce the presentation to antibiotics time among this group of patients and fundamentally improve patient safety and outcomes.

Methods

We identified all solid tumour and haematological oncology patients presenting to hospital as unwell post-chemotherapy using the electronic patient record (EPR) and referrals to the acute oncology service (AOS). We analysed compliance with NICE guidance and collected data over 6 months to establish a baseline. Firstly, we designed and implemented a robust standard operating procedure for neutropenic sepsis and the AOS delivered 6-monthly teaching to staff. Following this, to further improve our service, we introduced a cancer flagging icon within the EPR and on the emergency department (ED) whiteboard to immediately alert clinicians to patients who had recently undergone SACT. Posters were placed in the ED waiting room to educate patients for them to highlight to clinicians if they had also recently received treatment. We evaluated post-intervention data after both sets of interventions using the same criteria.

Results and conclusions

The implementation of both sets of interventions significantly improved the proportion of patients with suspected neutropenic sepsis who received antibiotics within 1 hour (42% to 45% to 64%). To further improve our results, we plan on introducing further neutropenic sepsis training to the trust induction and creating neutropenic sepsis grab packs within the ED.

Conflicts of interest

None declared.

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Improving frailty identification and comprehensive geriatric assessment (CGA) completion on the wards

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Introduction

Comprehensive geriatric assessment (CGA) is known to deliver substantial and measurable health improvements to frail older people, including increased independence and a reduction in mortality.[1] The Clinical Frailty Scale (CFS) can detect older adults at higher risk of complicated course and longer hospital stay.[2] Despite the known benefits, previous audits have shown poor documentation on geriatric wards at Southend Hospital. Therefore, we devised a quality improvement project to improve the uptake of both these.

Method

A total of two plan, do, study, act (PDSA) cycles were completed where CGA completion and CFS documentation were audited. Each cycle lasted 2 weeks (25 patients). Qualitative feedback was obtained from the members of the multidisciplinary team to aid improvements. The baseline audit was based on the introduction of a two-page ward pro forma for all new patients. The first intervention was an improved two-page ward pro forma. The second intervention was a one-page ward pro forma.

Results

Originally, 40% of new patients admitted onto the ward had a CGA and CFS score. After the first intervention, 79% (19) patients had a CFS score and a CGA; 21% had a full CGA completed and 58% had partial CGA. Feedback included wanting a single page pro forma to increase uptake. Questions needed to be more unambiguous and more tick boxes. After the second intervention 100% (25) patients had a CFS score and a CGA; 40% (10) had a full CGA completed and 60% (15) had a partial CGA. Feedback include incorporating the ward round documentation to avoid repetition.

Conclusions

The results show that by using a focused, concise and user-friendly pro forma, uptake of GCA and CFS can be significantly increased, bringing substantial and measurable health improvements to frail older people admitted to elderly care wards.

Conflicts of interest

None declared.

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Effective strategies in recruitment and clinical orientation programme to manage NHS junior doctor workforce shortfall: a district general hospital experience

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Introduction

There are significant vacancies of qualified medical professionals across the UK.[1] This has partially been filled by locum doctors causing a major financial burden on the NHS.[2] To address workforce shortages, the British government has proposed to open five new medical schools to expand national intake by 25%.[3] The step rise in medical workforce is unlikely to be felt before 2025.[3] International medical graduates (IMGs) currently contribute significantly towards the NHS care provision.[4] Recently there has been an increase in the number of IMGs applying to take the UK medical licensing examinations.[5] Recruitment of more new entrant IMGs may be the short- to medium-term solution to the junior doctor shortfall. However, IMGs seeking first-time employment in the NHS face multiple challenges.[6] A robust orientation programme would anticipate and mitigate such challenges and facilitate smooth transition into productive working in the NHS.[7] There is no standardised orientation programme available for IMGs working in departments of general internal medicine (GIM) in the NHS.

Methods

We performed quality improvement interventions of recruitment and a clinical orientation programme (COP) for new entrant IMGs in our organisation employed between December 2017 and April 2019 and developed a framework to anticipate outcomes of these interventions using the realist evaluation methodology.

Results

Twenty-three IMGs were recruited, 96% successfully completed the COP with a mean contract duration of 13 ±5 months. To date, 83% of eligible IMGs have successfully completed their formal annual appraisal. Over the intervention period from academic year 2017/2018 to 2018/19, the mean junior doctor position occupancy has risen from 54 ±3 junior doctors to 73 ±4 ($p<0.001$). There has been a £1.9 million reduction in agency and locum junior doctor spend in the division. Exception reporting by trainee junior doctors has fallen by 56%. Formal complaints from patients and their families have fallen by 11%. Length of stay has reduced from 9.3 ±16.4 days to 8.9 ±15.6 ($p=0.035$) over the same intervention study period. For the first time since its inception, the Care Quality Commission has rated our organisation including the medicine division as 'Good' (from 'Requires Improvement') during the academic year 2018/2019. Context-mechanisms-outcomes configurations detailing the methodology of the behavioural changes implicit to the quality improvement work are shown in Table 1.

Table 1. Methodology of behavioural changes

Contexts	Mechanisms	Outcomes
Shortage of junior doctors resulting in increased recruitment of temporary staff at premium rates and inconsistent clinical care	Employing new entrant international medical graduates at standard NHS salary	A stable workforce leading to improved clinical care and financial position of the trust
Poor performance and low level of wellbeing in the initial stages at the workplace among new entrant	Structured intervention during the orientation period including a good learning environment, adequate	Improvement in the participation, self-efficacy and learning of these doctors

international medical graduates	mentoring and pastoral support	
Risks to patient safety due to poor knowledge of contextual factors including policies and procedures by the new entrant international medical graduates	Providing clear communication of curriculum competencies along with peer support to these doctors	Improvement in the awareness among these doctors of the contextual factors contributing to the provision of high-quality patient care
Managers' uncertainty about recruitment and orientation of new entrant international medical graduates	Holding meetings with managers to discuss the design and implementation of the intervention	Increased participation and support of managers for the intervention
Lack of standardised communication channels between junior doctors, their supervisors and the trust management	Developing a standardised communication strategy will facilitate effective communication of critical success factors	The stakeholders perceive that their voice is being heard and they are valued resulting in their increased satisfaction
Availability of on-site staff accommodation in the trust	Providing free accommodation to doctors doing honorary clinical attachment	Improved cost efficiency of the trust by attracting overseas junior doctors into honorary posts, increasing their recruitment
Lack of criteria for assessment and unrealistic expectations from new entrant international medical graduates during their orientation	Tailoring the intervention based on requirements of junior doctors, their supervisors, and managers of the trust	Clarity of roles and requirements and better participation of the stakeholders

Conclusion

Our recruitment strategy and structured COP provides a stable, trained, and financially sustainable junior doctor workforce. Application in broader NHS settings is recommended.

Conflicts of interest

None declared.

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Going for gold in COPD – a quality improvement project to reduce the inappropriate use of inhaled corticosteroids in the over 65s

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Introduction

Inhaled corticosteroids (ICS) are associated with increased rates of pneumonia, fracture, diabetes and mycobacterial infection in a dose dependent manner. They have limited short- and long-term benefit in chronic obstructive pulmonary disease, and cessation of steroids in selected patients has been proven safe. We observed that a large number of patients in the geriatric population were prescribed steroids, and set out to describe the incidence of steroid inhaler prescription among elderly care inpatients; we then sought to optimise respiratory care within an elderly care department in a central London teaching hospital.

Method

We conducted a retrospective analysis of patients discharged from a geriatric service over a 3-month period. Sequential discharges were assessed for the presence of inhaled therapies, the documented diagnosis and the proportion on inhaled therapies. After identifying high rates of inhaled therapy usage, we undertook a series of quality improvement interventions aimed at optimising respiratory care in these elderly patients. This included a guideline-based protocol for reviewing respiratory diagnoses and prescriptions.

Results

In the retrospective analysis, 67/297 (22.5%) patients were discharged on inhaled therapy; 55/67 (82%) were discharged on inhaled steroids, of which 20/67 (36%) were on high-dose equivalent (>1,000 µg equivalent beclomethasone); 1/67 of these patients had evidence of inhaled therapy review during admission; and 15/55 of these patients were given a discharge diagnosis of pneumonia while only 6/55 were admitted with an exacerbation of their chronic obstructive pulmonary disease. Our preliminary data suggest that a single-paged protocol aimed at improving adherence to best practice lead to practice change; dose modification has occurred in 50% of patients on inhaled therapy, leading to a reduction in steroid burden and an annual reduction in prescription costs of £75 per patient reviewed.

Conclusion

By introducing measures to assist in the review and modification of inhaled therapies, we were able to change practice. The alteration in practice led to reduction in prescription costs, and a reduced burden of ICS. We propose that widespread encouragement of geriatrician-led respiratory review could lead to harm reduction and cost saving in the elderly.

Conflicts of interest

None declared.

Why does the AAU need a palliative care room?

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Approximately 15% of all emergency hospital admissions in England belong to the 1% of people in their final year of life. The average number of admissions a person will have in their final year of life is 3.5 admissions (cancer patients = 5.1); the average number of bed days in the final year of life is 29.7 days; 29% of hospital inpatients are in the last year of life; a higher proportion for those over 85 years or under a medical specialty; and an estimated 20% of the NHS budget is spent on care for those in the last year of life.

Data were collected over 8 weeks; 34 patients were identified as palliative care patients and were categorised at end-of-life; these figures were presented to management and funding has been secured by the charity CW+ to build a palliative care room on the acute assessment unit.

It is important to recognise uncertainty and identify dying, place appropriate ceilings of treatment for patients and communicate better with patients, family and between members of staff. The palliative care room will provide comfort and a ‘safe environment’.

Conflicts of interest

None declared.

A quality improvement project on improving the compliance of 'oxygen prescription with target saturations' in a district general hospital

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Introduction

Giving an appropriate oxygen therapy plays an important role in the management of the patients. Inappropriate and improper use of oxygen can bring risk to the patients including hypercapnia.

The British Thoracic Society (BTS) states that oxygen must be prescribed within desired target saturations of 94–98% and those at risk of hypercapnia should receive restrictive oxygen with a target saturation of 88–92%.[1,2]

We aimed at improving the rate of oxygen prescription in compliance with the BTS guidelines in a 300-bedded small district general hospital through education, training and staff awareness to improve the quality of healthcare.

Objectives

The objective was to achieve over 95% prescription rate of oxygen for patients who are to be given oxygen as part of their treatment during their stay in the hospital.

Oxygen should be prescribed on the drug chart within the target saturations and also the target saturations should be mentioned on the nursing observations chart and signed by the prescriber.

Methods and strategy

A quality improvement project was undertaken at Furness General Hospital (a district general hospital) across the medical wards over a period of 4 months and studied on two different occasions.

Aim

The aim was to improve the oxygen prescription rate and to increase awareness about its importance among doctors and nurses.

The initial phase of data collection was done during December 2018 which included all the patients who were given oxygen as a part of their treatment from their admission, and the results were presented in the medical meetings (n=34 (male 21; female 13); mean age 78 years).

We also sent the questionnaires to medical staff which included all grades of doctor to find out about their awareness of prescription of oxygen as a drug. We found out that they are not fully aware of the oxygen prescribing methods as a drug and needed teaching and training about it.

Thereafter, steps were taken to raise awareness among the medical and nursing staff about the importance of oxygen prescribing. This was achieved by displaying posters on the wards and clerking areas, updating the e-learning on the trust intranet, local teaching, sending out e-posters through emails and conducting online surveys.

After implementation, we collected the data again to study the post-intervention results (n=30 (male 16; female 14); mean age 71 years).

Results and discussion

We were able to achieve the improvement in oxygen prescription with correct target saturations from 14% in our first cycle to 66% in our second cycle done in March–April 2019. Although the overall prescription rate improved from 24% to 95% (including both online prescription and paper observation charts), the rate of prescription with correct target saturations improved from 14% to 66%. We were also able to achieve a reduction in the percentage of patients being given high-flow oxygen despite being at risk of hypercapnia from 12% to 0%.

Conclusion

The aim of the quality improvement project was to achieve 95% prescription rate with correct saturations. We achieved to increase the correct prescription rate to 66% (from 14%) which was a significant improvement. Although we couldn't achieve the 95% target, we made a significant improvement to the current practice by simply educating, training and creating awareness. We also made arrangements for future medical teams in the trust to achieve higher targets by updating the mandatory e-learning to create awareness and also through posters. We were also able to identify areas of improvement which could improve future results.

This is in line with previous oxygen prescription audits which had shown improvements after interventions. Areas of improvements in future were identified and interventions were planned such as to deal with (either prescribe or delete) a mandatory oxygen prescription form before prescribing regular medications, a mandatory check of prescription during the post-take ward round and also further teachings of medical and nursing staff could improve the results further.

Conflicts of interest

None declared.

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Current red cell transfusion practice: are we too liberal with this precious resource?

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Introduction

Current National Institute for Health and Care Excellence (NICE) guidance recommends restrictive thresholds for red cell transfusion, dependent upon patient factors such as haemodynamic status.[1]

NICE also recommends that individuals should be provided with information regarding the risks and benefits of blood transfusion and those patients should give informed consent prior to blood transfusion.

Informed consent is a recurrent theme in the Infected Blood Inquiry.[2]

We audited red cell transfusion (RCTx) practices according to NICE guidelines and examined documentation around consent.

Materials and methods

The study consisted of 4 parts.

- Part 1: Audit of medical inpatients in receipt of RCTx between January and March 2018. Data were collected on indication for transfusion, comorbidities and eligibility for a restrictive approach.
- Part 2: Review of written documentation in the patient records on information given and consent to RCTx.
- Part 3: Data on length of stay and mortality following RCTx.
- Part 4: Online survey of doctors questioning practice around documentation of information provided and consent to RCTx. The survey also included two clinical cases to examine whether clinicians used a restrictive threshold or not.

Results and discussion

Part 1

Records of 82 patients were evaluated. Table 1 outlines the main indications for RCTx using the national blood transfusion codes.[3] Median baseline haemoglobin (Hb) pre-transfusion was 69 g/L (interquartile range (IQR) 66–76) and post-transfusion was 85 g/L (IQR 80–96); median number of units of blood transfused was 2 units; 89% of patients were eligible for a restrictive approach but this was practised in only 40% of patients; 86% of patients had their Hb checked in the 12–24 hours following transfusion and 57% had Hb checked after each individual unit excluding those that died.

Part 2

Sixty-nine records were reviewed for documentation around consent and information, Table 2 shows the breakdown. It was assumed patients with cognitive impairment were treated in their best interest. In patients with no history of cognitive impairment (n=48), only 35% had evidence of consent documented.

Part 3

Haematological or solid organ palliative malignancy was recorded in 24 patients. Median length of stay was 13.5 days; 55% of patients died within 6 months of discharge and 60% within 12 months.

Part 4

There were 37 responses from a wide spectrum of training grades; 73% stated they always or sometimes obtained consent prior to RCTx, but only 40% document this consent process; 90% of respondents gave the

reason for transfusion but about 50% would discuss the risks; over 75% of individuals would use a restrictive transfusion threshold depending on clinical history.

Table 1. Main indications for red cell transfusion

Indications	Not suitable for restrictive transfusion, n (%)	Suitable for restrictive transfusion, n (%)	Total, n (%)
Acute bleeding with haemodynamic instability	3 (3.7)	4 (4.9)	7 (8.5)
Haemoglobin ≤70 g/L (stable target 70–90 g/L)	1 (1.2)	55 (67.1)	56 (68.3)
Haemoglobin ≤80 g/L (stable target 80–100 g/L if cardiovascular disease)	1 (1.2)	12 (14.6)	13 (15.9)
Chronic transfusion dependent anaemia	3 (3.7)	2 (2.4)	5 (6.1)
Radiotherapy haemoglobin ≤110 g/L	1 (1.2)	0 (0)	1 (1.2)
Total	**9 (11.0)**	**73 (89.0)**	**82 (100)**

Table 2. Breakdown of records reviewed for documentation around consent and information

Consent	Information given, n (%)	Information not given, n (%)	Unknown, n (%)
Assumed	1 (1.2)	18 (22.0)	2 (2.4)
No	0 (0)	31 (37.8)	0 (0)
Yes	11 (13.4)	5 (6.1)	1 (1.2)
Unknown	0 (0)	0 (0)	13 (15.9)

Conclusion

Despite clear guidelines, restrictive transfusions were not used: most patients received two units regardless of target or initial Hb; most patients did not have an Hb checked post each unit – which would guide the need for further units; and consent to transfusion and provision of information surrounding it is poorly documented.

We plan to deliver education sessions to all clinicians in our trust and re-audit our practice following this.

Conflicts of interest

None declared.

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Improving compliance to addressing important aspects of patient care on consultant ward rounds

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Introduction

Escalation of treatment decisions are not documented properly on consultant ward rounds resulting in increase in out-of-hours workload and inappropriate intensive treatment unit referrals. Moreover, antibiotics duration is not defined satisfactorily resulting in over- or under-treatment.

Methodology

This piece of work was undertaken as a quality improvement project (QIP) with retrospective data collected from using the RCP audit tool.[1]

Results

Prior to starting the project, 11 medical registrars and senior house officers were given a single-point questionnaire as part of this QIP and all of them unanimously agreed that escalation plans were not given satisfactorily on consultant/post-take ward rounds.

In the first cycle, 51 patient medical notes of consultant ward rounds from four different medical wards were audited over a period of 3 weeks randomly, 63% of patients had no escalation plan defined while, out of those patients on antibiotics, only 49% of patients had planned duration of treatment defined. In contrast, 88% of the patients had venous thromboembolism assessment completed in those patients.

In the 2nd stage, a small pilot project was conducted on a gastroenterology ward using stamps for consultant ward round where we managed to obtain escalation of treatment plans for all of the 15 patients involved.

Conclusion and recommendations

Escalation of treatment plans are often not documented in consultant ward rounds. We recommend using some sort of prompts focused on antibiotics duration and escalation plan. Our pilot project using customised stamps has shown improved results but other types of prompts (based on personal preference) can also be used. Also, adding a mandatory box for post-take ward round for escalation plan decision can potentially increase compliance as well.

Conflicts of interest

None declared.

Reference

1 Royal College of Physicians. *Record keeping audit tools.* RCP, 2015. www.rcplondon.ac.uk/projects/outputs/record-keeping-audit-tools

Alcohol history at the front door: what's all this social drinking about?

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Introduction

For patients who drink excess alcohol, their alcohol history in admission clerking isn't always assessed properly resulting in under-estimation of their health risk related to alcohol intake.

Methodology

This piece of work was undertaken as part of a larger quality improvement project (QIP) with retrospective data collected from admission clerking sheets using the RCP audit tool.[1]

Results

Fifty patient clerking pro formas were audited over a period of 5 weeks on consecutive Mondays (10 random patients selected on each Monday); 32% of patients had no alcohol intake history and a further 36% of patients had 'social drinking' documented with no quantification in volume or units; 32% of patients had an accurate current unit intake alcohol history, but only 75% of these had a relevant previous alcohol history of maximum intake and longest period of drinking. In contrast, 98% had a relevant current and previous smoking history, including e-cigarette use. Two per cent of patients had a relevant screening tool score quoted in their history (AUDIT-C was used in this patient).

Conclusion

Alcohol history in admission clerking is commonly overlooked in medical clerking, and the use of pro formas do not appear to have improved this. We recommend using a systematic approach focused on current intake, maximum past intake and previous attempts in reducing alcohol intake (if any) and the use of formal tools in identifying hazardous or dangerous drinking. Creating an 'alcohol year' similar to smoking pack years is an appealing area for future research and we plan to develop this idea further.

Conflicts of interest

None declared.

Reference

1 Royal College of Physicians. *Record keeping audit tools.* RCP, 2015. www.rcplondon.ac.uk/projects/outputs/record-keeping-audit-tools

Retrospective validation of Digital Evaluation of Ketosis and Other Diabetes Emergencies (DEKODE) algorithm: automated auditing system for diabetic ketoacidosis (DKA) management

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Introduction

Effective management of diabetic ketoacidosis (DKA) in line with national guidelines improves clinical outcomes and may reduce length of hospital stay.[1] Regular auditing and performance feedback are key to achieving sustained and significant improvement in the management of DKA.[2,3] One of the major limitations for maximal impact of an audit is the delay from initiation to results as the latter may not be applicable to the then current practice. In order to overcome this, our department of diabetes collaborated with the hospital's health informatics team and created an automated auditing system called Digital Evaluation of Ketosis and Other Diabetes Emergencies (DEKODE). This system identifies DKA episodes based on prescriptions for fixed rate intravenous insulin infusion (FRIII). In this study, we aimed to retrospectively validate DEKODE system for monitoring DKA management.

Materials and methods

To retrospectively validate DEKODE model, all episodes identified by DEKODE from September 2018 to August 2019 was manually verified for confirmation of diagnosis. DKA duration was defined as the difference in time between FRIII prescription time and end time for DEKODE. For manually collected data, the difference in the time from diagnosis (serum glucose ≥11 mmol/L, ketones ≥3 mmol/L and pH ≤7.3 or bicarbonate ≤15 mmol/L) to resolution (serum glucose <11 mmol/L, ketones <0.6 mmol/L and pH >7.3 or bicarbonate >15 mmol/L) was considered as DKA duration.[1] Further, appropriateness of glucose and ketone measurements during entire DKA duration and fluids prescribed in the first 12 hours of diagnosis were compared between the two datasets. The difference between manual and automated data for DKA duration, FRIII appropriateness, hourly glucose and ketone measurements were analysed using Prism v6.0 (Graphpad, San Diego, USA) and results are presented as mean and standard error of mean (SEM). Difference in frequencies of hypokalaemia and hyperkalaemia between manual and automated data were analysed by chi-squared test.

Results and discussion

A total of 150 episodes were identified by DEKODE during the study period. Of these, 147 had confirmed DKA. There was no significant difference in DKA duration between DEKODE and manual data (mean±SEM 16.0 ±1.0 hours and 17.5 ±0.9 hours, respectively; p=not significant (ns)); similarly, there was no difference in FRIII appropriateness (mean±SEM 98.3% ±1.2% and 97.9% ±1.1%, respectively; p=ns), hourly glucose (mean±SEM 98.5% ±2.6% and 105.6% ±2.5%, respectively; p=ns) and ketone measurements (mean±SEM 43.3% ±2.1% and 47.1% ±2.2%, respectively; p=ns) between the two systems. DEKODE also accurately predicted the frequency of kalaemic complications with no significant difference in the number of patients recorded with hyperkalaemia (7/147 and 6/150, respectively; p=ns) and hypokalaemia (9/147 and 9/147, respectively; p=ns). However, DEKODE over-predicted proportion of fluids prescribed (mean±SEM 96.9% ±3.2% and 84.4% ±3.1%, respectively; p=0.0047). These results prove that DEKODE system could reliably predict DKA duration and management. This can help in monitoring DKA management by cutting time from collecting data to analysis, thus providing real-time performance results.

Conclusion

The DEKODE automated system uses an indigenously built algorithm that reliably predicted DKA duration and management. DEKODE has great potential as an auditing tool for providing regular performance

feedback and significantly reduces the time spent collecting data. Further prospective validation is currently underway.

Conflicts of interest

None declared.

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'What if you missed something?' – post-OGD cancer incidence and what to tell people

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Introduction

The current gold standard for investigation of upper gastrointestinal (UGI) symptoms is to perform a oesophago-gastro-duodenoscopy (OGD). The 2017 quality standards state that a post-OGD UGI cancer (POUGIC) detected within 3 years of the index endoscopy should be considered a failure to diagnose cancer earlier and that the POUGIC rate not exceed 10%. We undertook an audit of cancer after endoscopy and factors that led to a delay in diagnosis of malignancy.

Method

We carried out a prospective audit of people who had an OGD in 2014 at Glan Clwyd Hospital, using the endoscopic database to identify indications and findings of repeat endoscopy and how many diagnosed with UGI cancer within 3 years. POUGIC rate was audited during the same 3-year period for a 2017 cohort from the cancer database. The World Endoscopy Organization standards for post-colonoscopy cancer definitions were used to calculate POUGIC rate (cancer missed divided by cancer detected plus cancer missed) and missed cancer within 6 to 36 months of endoscopy.

Results

In 2014, 1,758 patients had an OGD, repeated in 296 (16.8%) patients with 6 (0.3%) diagnosed with cancer within 3 years of index OGD. Range of OGD to delayed cancer was 6 to 34 months. One Barrett's with low grade dysplasia (LGD) was under appropriate follow-up and one delayed surveillance. One patient had a gastric ulcer which healed but not biopsied and later found to be malignant. Another had a gastric polyp not biopsied found to be a gastric neuroendocrine adenocarcinoma later. One case of oesophagitis endoscoped by a low OGD volume endoscopist later developed oesophageal cancer. One case had oesophagitis with cellular atypia deemed to be inflammatory developed squamous carcinoma. Thirty-four patients referred for repeat endoscopy for the same non-alarm indication did not have cancer.

In 2017, 82 patients were diagnosed with UGI cancer, four had an OGD in the previous 3 years; the POUGIC 3-year rate was 4.9%.

Discussion

Our POUGIC is within standard and the incidence of UGI cancer within 3 years of a negative endoscopy is low (0.3% in our study). Repeat endoscopy for the same non-alarm symptoms appears to be an unnecessary investigation, particularly if the aim is to exclude malignancy, which has implications for prudent healthcare.

We identified learning points where cancers were missed. In two cases no biopsies taken from pathology, this may be difficult to defend if challenged, and one case was not followed up as per standard. One index endoscopy was performed by a low-volume user.

We have seen a significant improvement in the quality of colonoscopy following the implementation of auditable measures, we hope that similar implementation of standards may replicate improvement in UGI endoscopy in our unit, removing the issues identified in our study.

Conflicts of interest

None declared.

Patient safety incidents involving acutely sick adults in hospital assessment units in England and Wales: a mixed methods analysis

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Introduction

Around 6% of medical encounters result in preventable patient safety incidents, and 12% of these result in severe or fatal outcomes.[1] The acute medical unit (AMU) was introduced in 2004 to improve patient outcomes by allowing patients referred from general practice to receive specialist medical care faster.[2] However, healthcare poses risks to all patients, and it is well documented that acutely sick patients are at heightened risk of unsafe care due to medication errors, treatment delays and complications arising from multiple care handovers.[3–6]

Patient safety is predicated on understanding why errors occur and using this to redesign care to mitigate or remove risks to future patients. Incident reporting systems offer a means to learn from patient safety incidents and improve future practice. We report the first national analysis of patient safety incidents occurring in AMUs across England and Wales. This study identifies the most frequently reported incidents resulting in severe harm or death, analysing characteristics and underlying causes of harm in AMUs reported between 2005 and 2015.

Methods

A retrospective cross-sectional mixed-methods approach was used. Incidents reported between 2005 and 2015 describing severe harm and death in the AMU were identified in the National Reporting and Learning System (NRLS) using the location category 'Accident & Emergency/Minor Injury Unit/Medical Assessment Unit'. Reports from outside the AMU were excluded, such as emergency department reports. An *a priori* classification process, using an established multi-axial coding framework aligned to the World Health Organization's International Classification for Patient Safety was applied to describe incident type, contributory factors, outcome and harm level. Thematic interpretative analysis was then undertaken to gain further learning from reports, notably considering how reporters described underlying causes of incidents. Following literature searches for pre-existing interventions, findings were synthesised to understand priority areas to reduce healthcare-associated harm in the AMU and identify whether these might be amenable to existing evidence-based interventions.

Results

Three-hundred and seventy-seven AMU reports describing incidents resulting in severe harm or death were identified. The most common incident types were diagnostic errors (n=79), medication-related errors (n=61) and failures monitoring patients (n=57). Incidents commonly stemmed from a lack of active decision making in patient care and communication failures between teams, including failure to respond to early warning scores. Multiple handovers and transfers of care put patients at heightened risk of unsafe care. Meta-themes generated from qualitative analysis included implicit reliance on patient self-advocacy in the acute environment; a lack of care coordination during patients' admissions; and care decisions being made on incomplete patient information, leading to potentially inappropriate decisions being made. Evidence-based interventions that could be used to target these priority areas include electronic prescribing and monitoring systems; using forcing checklists to reduce diagnostic errors; and handover systems allowing the transfer of live patient information.[7,8]

Conclusion

The findings from this study highlight priority areas to target to improve patient safety in AMUs. System-focused evidence-based solutions exist to improve safety in the AMU but cannot fully address the risks when patients are unable to self-advocate and new initiatives are required to address this.

Conflicts of interest

None declared.

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Steps to be taken to provide quality healthcare

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Introduction

Improvement involves a substantial shift in our idea of the work of healthcare. If healthcare is going to benefit fully from the science of disease biology, we need to be sure that the changes we make systematically incorporate generalisable scientific knowledge. To guide our design of change, we need to characterise the setting in which care is actually delivered (microsystem, mesosystem and macrosystem) in sophisticated ways.[1]

Materials and methods

In this fast-growing world, daily we achieve many milestones in the field of medical science, but still there is need for improvement in quality of healthcare and patient safety. Low-quality healthcare, wrong diagnosis, over-use of steroids etc are common problems for almost every country.

According to a report of the World Health Organization, 05 July 2018, 10% of patients are adversely affected during treatment in high-income countries, and nearly 40% of healthcare facilities in low-income countries and nearly 20% of high-income countries lack sanitation.[2]

Methods by which we can improve quality of healthcare and patient safety

- Driving improvement through national quality policy and strategy.
- Setting standards for clinical practice.
- Engaging and empowering patients, families and communities.
- Use of continuous quality improvement programmes and methods.
- Strong legislation and regulations.
- Implementation of medicines, devices and technologies that are safe in design and use.
- Financing mechanisms that enable and courage high-quality care.
- Need of skilled, motivated and adequately supported health workforce.[3]

Results and discussion

Case study: Ethiopia – national healthcare quality strategy 2016–2020

Ethiopia is the second most populous country in Africa, with a population of around 100 million. Since 1995, the country's health sector has undergone significant reform through implementation of a Health Care Financing Strategy. The Health Sector Transformation Plan identifies four transformation priority agendas: ensuring the delivery of quality health services in equitable fashion; focusing on district-level transformation; strengthening health information systems; and creating a compassionate, respectful and caring health workforce.

Case study: Mexico – national strategy for quality consolidation in healthcare facilities and services 2001

A comprehensive systemwide quality improvement strategy was launched in Mexico in January 2001. The main objectives were to promote quality of care as a core value in the culture of healthcare organisations, both public and private, and to improve the quality of services across the healthcare system.

Discussion

To ensure that multiple levers are used to improve quality in healthcare, governments, policy-makers, health system leaders, patients and clinicians should work together to develop, refine and execute a national quality policy and strategy; adopt and promote universal quality goals; and monitor and report quality of care results for continuous improvement efforts.

Conclusion

Beyond the effect on people's lives, poor-quality care wastes time and money. Making quality an integral part of universal health coverage is also a matter of striving for longer and better lives. Building quality in a health system is affordable for countries at all levels of economic development, in fact, the lack of quality is an unaffordable cost, especially for the poorest countries.

Conflicts of interest

None declared.

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Using the principles of 'same day emergency care' in our new acute medical unit

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Introduction

In January 2019, Barnet Hospital opened the new acute medical unit (AMU), which uses the objectives and aims set out by NHS Improvement 'same-day emergency care' (SDEC).[1] The ambulatory emergency clinic (AEC) forms part of the new AMU, as a clinic for those patients 'fit to sit', to avoid unnecessary hospital admissions in clinically stable, ambulatory patients.

The principles of SDEC were used to answer the question: 'Why does it take so long for general practitioner (GP) expected patients to be discharged?'

The objective was to determine any factors that lead to a delay in assessment, investigation, management and, ultimately, discharge.

The overall aims of the project are to reduce the time a stable patient spends in the department and to re-triage stable patients to AEC.

Methods

Baseline data were collected in October 2018, prior to the new unit opening, on 'GP referred' patients that were discharged home the same day. Data were collected on time to triage, first medical review, senior decision maker and decision to discharge.

Plan, do, study, act cycles were used throughout the project and data were collected prospectively from January 2019.

- Moving the twilight registrar onto the unit.
- Single point of triage.
- Transferring patients from the emergency department (ED) with a GP letter.
- Access to assessment trolleys.

Results and discussion

By improving the way patients are processed, the time spent in the department was significantly reduced.

Access to an early senior decision maker allows for prompt decision making along all parts of the patients' pathway, allowing for early decision to discharge.

Implementing an additional senior decision maker improved our average time to senior review from 3 hours 19 minutes to 2 hours 56 minutes and subsequently the decision to discharge from 3 hours 28 minutes to 2 hours 30 minutes.

Having a single point of triage means that patients are processed efficiently at triage and packaged ready to be seen by a doctor. At the point of arrival all patients have observations done, a set of bloods and any other investigations needed. Having a unified triage process improved the time to triage from 39 minutes to 20 minutes.

Access to assessment trolleys allowed the unit to accept and manage those patients more acutely unwell direct from the GP without the need for an ED admission.

The burden on the medical take was also significantly reduced; 50% of the GP expected patients were seen by the medical take via the ED with 9% being reviewed in AEC; after the unit opened 47% were seen in AEC with only 7% being reviewed in ED.

Conclusion

By improving the efficiency in the patients' pathway, we successfully used the principles set out by the SDEC guidelines. The time a patient spends in the department has significantly reduced. The unit has also helped the reduce the burden on ED by accepting patients with a GP letter directly.

Conflicts of interest

None declared.

Reference

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Fluid balance chart audit in a rural district general hospital

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Background

Fluid balance charts are an important monitoring document for patient safety and clinical care. The National Confidential Enquiry into Patient Outcome and Death report shows that inaccurate fluid balance monitoring impacts patient deaths in the perioperative period.[1]

Aims

Our audit aimed to assess accuracy, completeness and attitudes towards fluid balance charts including evidence of appropriate escalation when required.

Methods

This work is part of an ongoing audit conducted over an acute surgical and medical ward in a rural district general hospital. Two subsets of data were collected: questionnaire data on attitudes towards the fluid balance charts and a data set correlating bedside fluid charts with online electronic prescribing software and medical notes. Questionnaire data were collected over 5 days using paper questionnaires on the ward; 6 weeks later the second subset was collected using the physical fluid balance charts of 86 patients and we used an MS Excel tool to allow estimation and calculation of urine output.

Results

Despite high levels of confidence in using the charts, 68% of patients' fluid balance charts did not accurately match their electronic prescribing record. Questionnaire data corresponded to chart data subsets with questionnaires indicating 40% of respondents did not know the hourly urine output at which to escalate. Seventy-seven per cent of patients had at least 1 hour where urine output was <30 mL, concordantly 73% of patients who had a weight recorded had at least 2 hours where urine output <0.5 mL/kg/hr. However only 12% of patients had their urine output escalated in medical notes; 60% of patients had an input, output or balance recorded; of those who had an overall balance recorded, 90% were inaccurate.

Conclusions

This audit demonstrated very poor compliance with, and accuracy of, fluid balance charts. Dangerously low urine outputs were not being escalated and acted upon. This has far reaching implications, not just for patient care but also for wider policy reviews given the pressurised ward environment becoming commonplace. Part of the problem is likely to be an excess of charts being used when no longer clinically indicated. Further education and changes to policy, attitudes and fluid balance chart design are required and ongoing. This includes formal teaching sessions, e-learning being developed, increasing ward awareness and potential policy changes including mandatory medical staff review of charts every 24–48hrs.

Conflicts of interest

None declared.

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Medicine 2021

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