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Benefits of inpatient contact tracing and illustration of social inequalities and their relation to increasing risk of hospitalisation by COVID-19

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Introduction

Strategies implemented to control COVID-19 transmission rates and reduce hospitalisation include vaccinations and contact tracing. With vaccinations effective in reducing hospital admissions owing to COVID-19, vaccine hesitancy may adversely affect this.[1] Hesitancy rates rise to 21% in Black, Asian and minority ethnic (BAME) communities.[2] Additionally, social inequalities negatively affect hospitalisation risk by COVID-19. Mortality rate increases in BAME communities and with social deprivation.[3]

NHS Test and Trace (NHSTT) aimed to reduce transmission through contact tracing. Following a pilot study at Sheffield Teaching Hospitals (STH) identifying 65% of inpatients failing to engage with NHSTT, an inpatient contact tracing team (IPCT) was established.[4]

Methodology

Between September and November 2021, 305 STH inpatients with COVID-19 were interviewed by the IPCT. An electronic form was completed for each patient, which included close contact details, vaccination status, NHSTT engagement and recent locations visited. The form was sent to Sheffield City Council who uploaded the relevant details to the Contact Tracing and Advisory Service. A student team compiled the data forms into an anonymised database with the aim of looking for underlying factors associated with patient hospitalisation.

Results

Patient distribution by Index of Multiple Deprivation (IMD) deciles within Sheffield showed the first (ie most deprived) decile had the largest number of individuals (32%), followed by the second decile (15%) and third decile (9%) (Fig 1). Younger inpatients (under 65 years) were more likely to reside in more deprived areas (IMD deciles 1–4) (Fig 1).

Vaccination uptake based on IMD deciles showed that mean uptake was 72%. The first decile had the lowest uptake rate of 57%, whereas the eighth decile had the highest uptake rate of 81% (Fig 2).

Fig 1. Patient distribution based on IMD deciles (inner ring) and age (outer ring).

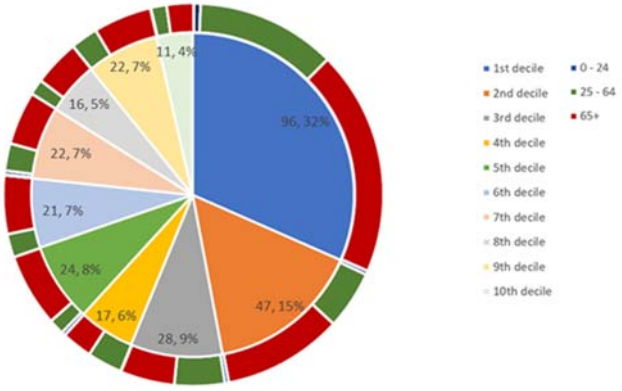
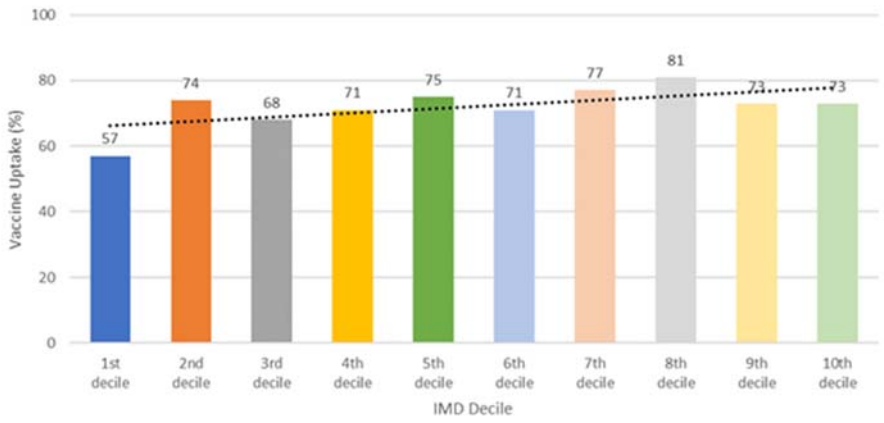


Fig 2. Vaccine uptake (%) based on IMD deciles



Discussion

Fir Vale, one of the most deprived districts in Sheffield, has many residents from ethnic minorities such as Roma and Pakistani who display feelings of hesitation and mistrust towards the COVID-19 vaccine. Members of the Muslim community expressed anxiety towards AstraZeneca and Pfizer-BioNTech vaccines as their contents were reportedly haram. However, the British Islamic Medical Association stated both vaccines are halal.[5,6] This highlights issues of poor healthcare knowledge and communication in deprived communities.[7]

Those living in most deprived areas are subject to higher levels of air pollution, significantly lower life expectancy and greater burden of ill physical health, which would lead to a higher risk of severe COVID-19 infection and hospitalisation.[5,7]

Conclusion

This study indicated that the most deprived areas of Sheffield represent the largest number of highly suspected or confirmed COVID-19-positive inpatients in an acute hospital setting. High hospital admission rates from deprived areas are attributed to poor vaccine uptake, socioeconomic inequalities in housing and occupation, and environmental factors. Misinformation around COVID-19 vaccination has contributed to low uptake. More can be done to reduce rates of transmission and infection in these areas.

Funding statement

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The use of tociluzimab in COVID-19 inpatients: experience from a district general hospital

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Introduction

Tociluzimab (TCZ) reduces mortality in COVID-19.[1] There is a concern regarding secondary bacterial infections. Locally, TCZ is given to those with a rapidly deteriorating oxygenation or needing ventilation. Neutrophil and platelet counts must be above 2 x 10^9/L and 50 x 10^9/L. Bacterial infections or immunosuppression are relative contra-indications, and blood borne viral (BBV) serology must be sent.

Methods

With Caldicott approval, all patients receiving TCZ between 1 February 2021 and 28 June 2021 were analysed.

Results

104 patients were identified. Their median age was 59 years (IQR 19); 65 were male and 39 were female. 51 received a 600 mg dose, 49 800 mg, three 400 mg and one 510 mg (weight adjusted). Procalcitonin (PCT) levels were not tested in four; of those tested, median PCT was 0.21 (IQR 0.41). 35 were receiving concurrent antibiotics and 11 had intercurrent immunosuppression. All were on steroids and all had appropriate platelets or neutrophil counts. 88 had TCZ at the time of ventilation commencement.

BBV serology was tested in 52. One was positive for HIV (testing improved over time). Liver transaminitis in was noted in 76/104 (73%); the majority improved.

There were 25 (24%) deaths. 23 infections occurred within 3 months (one severe septicaemia of unclear source; 10 pneumonias; two unknown infections; the rest were urinary tract infections, osteomyelitis, cellulitis or orchitis). Infections occurred after one 400 mg dose, 10 600 mg doses and 12 800 mg doses.

Conclusions

TCZ seems safe. Infections within 3 months approach 30%. Our cohort does not have a control group, and we have not corrected for confounders, but BBV serology must be sent and increased vigilance is required.

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Pneumothorax and pneumomediastinum in COVID-19

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Introduction

We have previously described pneumothorax (PTX) and pneumomediastinum (PM) in COVID-19.[1] Incidence is ~1%, and is usually associated with a poor prognosis.

Methods

With Caldicott approval, all patients with COVID-19 with PTX and PM are flagged to the pleural service for ongoing analysis. Demographics and outcomes are collected.

Results

46 patients with PTX and PM were identified between 1 March 2020 and 2 January 2022 from a total of 4,506 patients with COVID-19. Mean age was 57.5 years (range 19–91). 37 (82%) were male. 45 were white Caucasian, one was South East Asian. 20 were ex-smokers, eight were never smokers, one was a current smoker and the smoking status of the rest was unknown. Respiratory comorbidities included COPD (12), asthma (four), combined pulmonary fibrosis and emphysema (one), previous TB (one) and active lung cancer (one). Average estimated frailty score was 2 (range 1–6). Mean BMI was 28 (range 18.5–46.7), mean height 1.72 m (range 1.55–1.84 m). Average number of days to air leaks is 13.

29 patients had PTX. 16 had isolated PTX (including six bilateral) and 22 had PM (four isolated PNM). 18 patients had concurrent surgical emphysema. 10 patients were intubated at the time of air leak, 16 were on continuous positive airway pressure or high flow nasal cannula, 13 were on oxygen, and the rest were on air. 32 were managed conservatively. Others had a variety of small, large-bore and subcutaneous drains and one was transferred for extracorporeal membrane oxygenation. There were 10 deaths: one was directly due to PTX in a 91-year-old, Clinical Frailty Score (CFS) of 6 and intercurrent stroke; one was associated with PM, CFS 2 and lung cancer; one was an 85-year- old with CFS 4 and COPD; one was an 82-year-old with CFS 3 on CPAP; the rest were on mechanical ventilation.

Conclusions

Inpatient incidence of PTX and PM is still approximately 1%. Survival is improving as overall COVID-19 survival improves (direct mortality from air leak is ~21 %), with mortality due to other factors rather than the air leak.

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The effect of the COVID-19 pandemic on urgent referral pathway for suspected cancers

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Introduction

The 2-week-wait referral pathway from primary care was established to ensure urgent specialist assessment of individuals with 'red-flag' symptoms. We investigated the impact of the COVID-19 national lockdowns 1 and 3 on the number of urgent referrals, the interval between presentation and referral, and the interval between referral and specialist appointment for patients presenting to Star Lane Medical Centre, Newham, London.

Materials and methods

Population reporting lists were run on EMIS system for patients registered at Star Lane Medical Centre who were coded as 'fast-track' or '2-week-wait referral' during January 2020 (baseline, pre-COVID-19), April 2020 and May 2020 (peak 1, lockdown 1), and January 2021 (peak 3, lockdown 3).

Inclusion criteria were: (1) patient was referred for 2-week-wait cancer pathway; (2) patient was over 18 years old; (3) referral was accepted and an appointment was made by the hospital. Exclusion criteria were: (1) patients were minors (<18 years old); (2) referral was rejected by the hospital; (3) patient information was incomplete.

The following parameters were recorded for each patient who fulfilled the inclusion and exclusion criteria: i) type of suspected cancer; ii) date of presentation of 'red-flag' symptoms; iii) date of referral by general practitioner; iv) date of specialist appointment in secondary care.

The primary outcome investigated was the delay in the 2-week-wait referral pathway. Secondary outcomes included the number of 2-week-wait referrals made in primary care and the delay between presentation of 'red-flag' symptoms and referral.

Results and discussion

123 patients were referred via the 2-week-wait pathway. Preliminary results demonstrate a considerable decrease in the number of referrals made during peak 1, lockdown 1 compared to pre-COVID-19 (57 referrals in January 2020 vs 15 referrals in April 2020 and 16 referrals in May 2020). The percentage of patients who experienced delays in the 2-week-wait pathway increased from 5.26% in January 2020 to 6.67% in April 2020 and 12.5% in May 2020. This decreased to 5.71% in January 2021. The delay between presentation with 'red-flag' symptoms and referral was highest in April 2020, with an average delay of 5.46 days. Similarly, the delays in May 2020 (average delay of 1.5 days) and January 2021 (average delay of 2.89 days) were higher than that of January 2020 (average delay of 0.72 days).

Conclusion and future work

Delays between clinical presentation and referral to the 2-week-wait pathway, and between referral to 2-week-wait pathway and specialist appointment, were noted across the first national lockdown compared to January 2020. These changes may reflect doctor uncertainty concerning referral guidelines, hesitancy towards exposing patients to high-risk environments, and challenges adapting to the online triage system. We are currently in the process of gathering data for all months between January 2020 and January 2021,

which were not previously assessed, to have a more complete understanding of the issues. We are also planning to gather data from January 2021 to the present, and from other practices, to assess whether improvements have been made following advice.

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Is pulmonary rehabilitation an effective programme to manage post-COVID breathlessness?

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Background

Long COVID syndrome is an emerging chronic condition which presents after acute infection with SARS-CoV-2. Patients report a broad constellation of symptoms including breathlessness and reduced exercise tolerance.[1,2] The Office for National Statistics (ONS) estimates that up to 1.3 million people are living with self-reported long COVID symptoms,[3] meaning effective strategies to manage symptoms are vital to improve quality of life. NICE recommends pulmonary rehabilitation (PR) as a management option for patients with dyspnoea.[4]

In February 2021 a regional long COVID service was set up for assessment of patients in Cheshire and Merseyside. After an initial telephone consultation, patients could be referred to pulmonary rehabilitation (PR) for assessment and management of respiratory symptoms.

Methods

We carried out a retrospective review of patients referred to PR from the Cheshire and Merseyside long COVID service from March to April 2021. Respiratory symptoms were assessed during a structured telephone consultation using self-reported Borg rating of perceived exertion scale[5] score of perceived exertion and the Medical Research Council (MRC) dyspnoea scale. Scores following completion of PR were compared to initial scores.

Results

In total 131 patients were referred for PR; 88 patients were included in the analysis (43 were excluded due to incomplete records).

- 60 (68.2%) were female.
- Age range was 18–84 years (Fig 1).
- 50 (56.8%) were aged between 44 and 59 years old.

Of the 88 patients:

- 48 (54.5%) completed the PR programme
- 37 (42.0%) of all patients reported improvement in their symptoms (Fig 2), either an increased exercise tolerance, reduction in their Borg or MRC scores or improved breathing management.

Despite some patients having no objective improvement in symptoms, feedback was positive, including that it was ‘helpful and beneficial’ to their recovery. Eight (9.1%) self-discharged prior to starting PR and 23 (25%) had poor adherence to the PR programme and were discharged without completing the programme. Of all patients who completed PR, three (6.3%) required further management of their symptoms.

Conclusion

Our results show that engaging with a PR programme is an effective management strategy for breathlessness. This is supported by previous studies in patients with Long COVID.[2,5,6] We found that patients reported a positive experience even if there had been no improvement in Borg or MRC score. The educational material shared with patients improves confidence in self-managing symptoms. As studies in

the COPD patient population have shown, this also improves psychological symptoms such as depression and anxiety.[7] Further evaluation should assess reasons for poor adherence to the PR programme and strategies to improve this. Given a proportion of patient required further review for persistent symptoms, the feasibility of an extended PR programme should be considered.

Fig 1. Patient demographics of those referred to pulmonary rehabilitation between 1 March and 30 April, 2021.

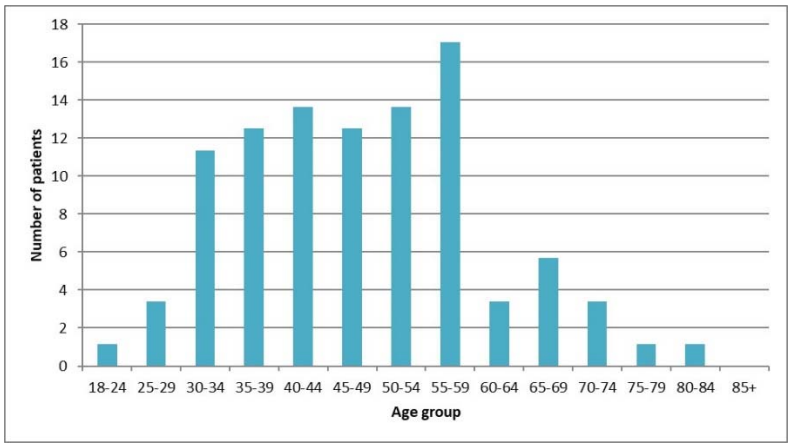
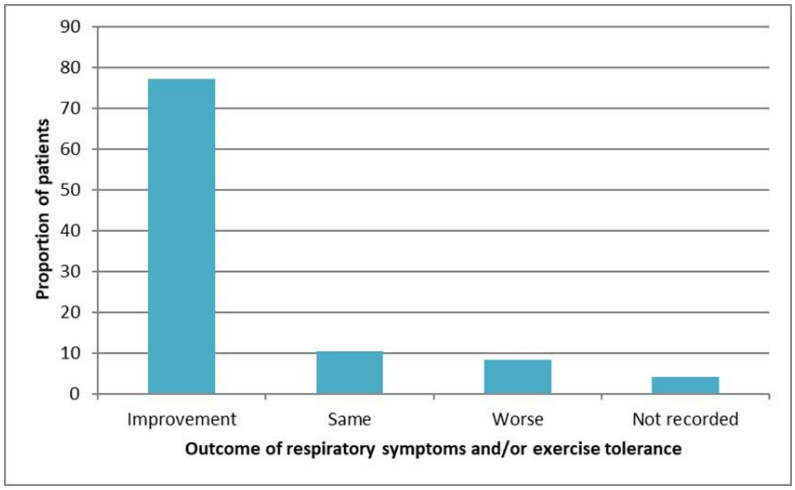


Fig 2. Patient reported outcomes following completion of pulmonary rehabilitation. Some outcomes were not recorded in the discharge reports.



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Acute management of suspected vaccine induced thrombocytopenia and thrombosis

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Introduction

In 2021 vaccine induced thrombocytopenia and thrombosis (VITT) emerged as an adverse event following COVID-19 vaccination. VITT is rare; nevertheless it can lead to catastrophic thrombosis and secondary haemorrhage with high mortality.[1] Studies show that patients with VITT have thrombocytopenia at presentation and subsequent coagulation abnormalities on available assays.[2] At our district general hospital (DGH), patients with suspected VITT but normal platelet counts were found to have had further VITT investigations such as D-dimer, fibrinogen and in some cases, neuroimaging. Unnecessary diagnostic tests have a significant financial burden on healthcare.

Methods

We conducted a retrospective analysis of adult patients (>18 years old) presenting to the emergency department (ED) with acute headache following administration of at least one COVID-19 vaccination. We audited against standards published by the Royal College of Physicians and Royal College of Emergency medicine on management of suspected VITT in April 2021 and then re-audited against updated guidance published in May 2021 to close the loop.[3]

The audit period included patients presenting to the emergency department (ED) between 1 February 2021 and 31 August 2021. An anonymised electronic reporting form was developed to capture the following data: triage presentation, discharge destination, brand of vaccine, days since vaccination, platelet count, D-dimer, fibrinogen and neuroimaging.

Results

176 patients were included in the audit. 36 patients presented before formal guidance was issued. 72 patients were included in audit cycle 1 and 68 patients were included in cycle 2. There was one case of VITT in a patient with thrombocytopenia. The median day of presentation to ED post vaccine dose was 7 days in cycle 1 and double that (14 days) in cycle 2. 67% of patients presented in the window for suspected VITT in the first cycle and 81% presented during the updated interval post-vaccine in cycle 2. In cycle 1, 2.8% of patients were thrombocytopenic; nevertheless, 37% and 31% of patients had a D-Dimer and fibrinogen sent respectively. In cycle 2 no patients were thrombocytopenic; nevertheless, 32% had a D-Dimer sent and 16% had a fibrinogen assay added. 25% of patients in cycle 1 had neuroimaging done with a normal platelet count and this increased to 40% in cycle 2.

Conclusions

VITT is a new occurrence following the roll-out of the COVID-19 vaccination program and guidance was only established in April 2021. Our data demonstrated that there were no cases of VITT with a platelet count of >150 x 10^9/L. Our data suggest we can be confident in the parameters set in national guidance. Our data also reflects current literature demonstrating that VITT is rare; nevertheless, when associated with significant clotting, abnormalities can be fatal.[2]

This audit shows that in the investigation of VITT at our DGH, that while the triaging of patients to a suspected diagnosis is high there is a poor adherence to subsequent laboratory and radiological guidance.

Reasons for this are multifactorial. Nevertheless, requesting unnecessary blood tests and neuroimaging has financial implications

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The suitability of the virtual COVID ward in a south-east London district general hospital during the peak of Omicron

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Introduction

COVID virtual wards were introduced by NHS England in January 2021 in an attempt to facilitate the early supported discharge of patients hospitalised with COVID-19 through closely supervised community follow up.[1] The 'COVID virtual ward round' is a hospital-led service wherein patients have daily virtual review from a clinician to review their progress. It differs from 'COVID oximetry @ home' which is a general practitioner (GP)-led service for the monitoring of lower acuity COVID-19 positive patients.[1]

There are several different referral pathways into the COVID-19 virtual ward as displayed in Table 1.

When COVID-19 cases began increasing in December 2021 due to the highly contagious novel Omicron variant, there were fears hospitals could become overwhelmed with COVID-19 admissions, hence a drive to utilise the COVID virtual ward service.[2]

At Princess Royal University Hospital (PRUH), a district general hospital in South-East London, we were not meeting the target COVID virtual ward referral numbers of 15% of the total COVID-19 admissions, so decided to complete an audit to review possible reasons why.

Table 1. Referral criteria for COVID oximetry @ home and COVID virtual ward round services

Cohort	Referral criteria	Referrals from	Monitoring service
Cohort 1	Low acuity COVID-19 positive patients suitable for GP-led remote monitoring	GP, 111 and emergency department	COVID oximetry @ home
Cohort 2	Patients assessed in the emergency department (ED) not meeting criteria for hospitalisation	Emergency department	COVID virtual ward
Cohort 3a	Inpatients with improving clinical trajectory who are suitable for early discharge with supported community follow up	Inpatient team (medical or nursing)	COVID virtual ward
Cohort 3b	Inpatients with improving clinical trajectory who are expected to wean from low flow oxygen or anti-hyperglycaemic treatment	Inpatient team (respiratory or diabetes team)	COVID virtual ward
Cohort 3c	Inpatients being discharged on long term oxygen therapy (LTOT), not expected to be weaned in the next 3 months	Respiratory team	COVID virtual ward
Cohort 4	Inpatients who have drug-induced hyperglycaemia requiring insulin who are suitable for remote monitoring of glycaemia	Diabetes team	COVID virtual ward

Materials and methods

At PRUH an electronic spreadsheet is produced daily detailing all adult inpatients with a positive COVID-19 PCR test. On 13 January 2022, we analysed the day's spreadsheet and reviewed the clinical notes of all COVID-19 positive adult inpatients, extracting the following data:

- If patients had symptoms of COVID-19 (ie cough, breathlessness, anosmia, coryzal symptoms, headache or myalgia) or were asymptomatic
- Supplemental oxygen requirements
- If patients required ongoing inpatient (IP) care or were medically fit for discharge (MFFD)
- If MFFD what the discharge delay reason was
- Patient suitability for step-down to a COVID virtual ward based on NHS England guidelines (see Table 1).

We excluded patients aged <18 years and those without a positive PCR swab result.

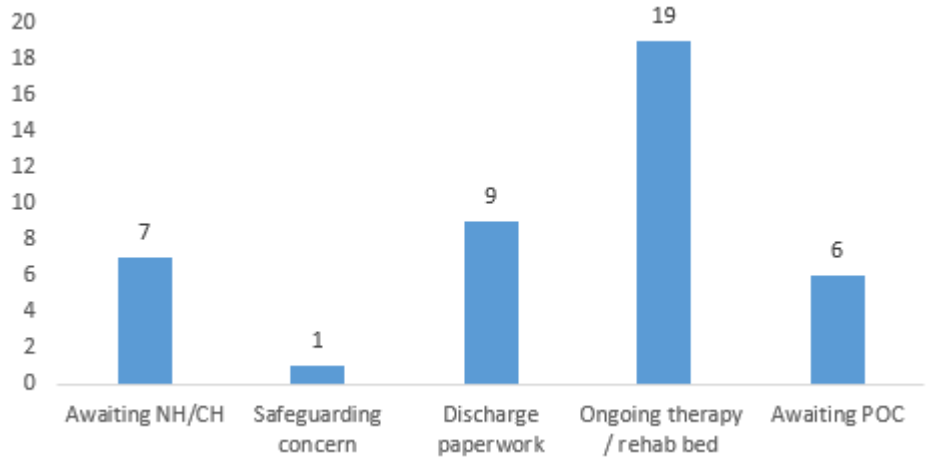
Results and discussion

On 13 January 2022, there were 85 inpatients at PRUH with a positive COVID-19 PCR test.

20 patients (24%) had signs/symptoms of COVID-19, whereas 65 (76%) were asymptomatic. Nine patients (11%) were requiring supplemental oxygen and 76 (89%) were not. 43 (51%) required ongoing IP care and 42 (49%) had been deemed MFFD. Of those needing IP care, only seven (16%) needed COVID related treatement. Only two patients (2%) met criteria for referral to the COVID virtual ward service (for low dose oxygen weaning) and the remaining 83 patients (98%) did not. The most common cause for discharge delay among MFFD patients was ongoing therapy (42%) (see Fig 1).

The majority of patients in our cohort were asymptomatic, with many identified as COVID-19 positive when admitted for an alternative cause, so most did not require step-down to the COVID virtual ward.

Fig 1. Causes of discharge delay in medically fit for discharge patients



Conclusion

The COVID virtual ward can facilitate early discharge of COVID-19 positive patients; however, the target of referring 15% of all COVID-19 inpatients to the service was unrealistic in our district general hospital, with only 2% of our cohort eligible.

We propose increasing therapy services would better improve patient flow in our trust.

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Nicotine replacement therapy for COVID-19 patients – a quality improvement project to reduce nosocomial COVID-19 infection

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Introduction

At the beginning of the COVID-19 pandemic there was much publicity and anxiety around nosocomial COVID-19 infections.[1–3] While much has been written about preventing further transmission in hospitals,[4] one issue that we believe could also be tackled is that of patient–patient spread while smoking outside the hospital.

With the recent introduction of effective vaccines, there are more patients with 'incidental' COVID-19 who do not require oxygen and therefore are often able to leave the ward independently. Nicotine replacement therapy (NRT) has been shown to increase the chance of smoking cessation as well as treating nicotine addiction.[5] This may therefore encourage patients to remain isolated on inpatient wards. We suspected that NRT prescribing levels would be low and set out to improve this.

Materials and methods

The audit office at the Trust compiled a list of patients between March 2020 to April 2020 with COVID-19 and who were current smokers. Patients on intensive care units were excluded. Inpatient documentation and prescriptions were reviewed to see if NRT was discussed or prescribed.

A poster was created for the doctors' office of the two COVID-19 wards in November 2021 highlighting the importance of NRT prescription and an order set that was available on the e-prescription system.

In January 2022, a further review was undertaken. Initially this was planned to look at patients over a 2-month period, but this was completed early due to high numbers of patients.

Results and discussion

The initial review comprised 20 patients and the subsequent review comprised 41 patients – all of whom were inpatients with COVID-19 and current smokers.

The results showed that following the intervention, rates of prescribing NRT increased from 15% to 27%. There was also an increase in documentation about offering NRT – from 25% to 49%. These results show a modest increase, although overall disappointing levels of NRT prescribing.

These results reveal high levels of patients declining NRT prescription – the reason for this is not clear.

The second review revealed an increased proportion of patients with 'incidental' COVID-19 such as patients with fractures, overdoses or falls. These patients had low levels of NRT discussion and prescribing. The intervention, when designed, had not targeted doctors from non-medical specialties. Many of these patients are more mobile than patients with symptomatic COVID-19 and therefore these patients, in particular, should have NRT prescribed.

Another difficulty encountered in this project was the high turnover of medical doctors on COVID-19 wards due to reliance on locum doctors. Levels of NRT prescription varied greatly depending on which doctor had seen the patient.

Conclusion

Preventing nosocomial infections remains an issue for UK hospitals and increasing NRT prescription rates for COVID-19 patients could be a simple and low-cost initiative. A small intervention has led to some increase in NRT prescriptions by the medical team at our trust. The rise of 'incidental' COVID-19 infection has led to an increase in numbers of COVID-19 patients being seen by non-medical doctors and as such further intervention and education for non-medical teams is required.

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Pfizer COVID-19 vaccine-induced peritonitis

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Introduction

The COVID-19 vaccine was one of the essential methods for controlling the pandemic and there was a significant decrease in mortality and morbidity after vaccine initiation.[1]

The safety of vaccines was assessed on large groups of participants and the adverse effects were frequently reported and published.[2]

We report the first case of peritonitis that was diagnosed 2 days after first dose of Pfizer BioNTech COVID-19 mRNA vaccine and that recurred after second and third dose of vaccine.

Case presentation

A 62-year-old man, with no past medical history apart from hyperlipidemia treated with statins, presented 2 days after he received the first dose of Pfizer BioNTech COVID-19 mRNA vaccine with diffused abdominal pain associated with nausea. Clinical examination showed generalised abdominal tenderness more severe in the left iliac fossa. Blood testes showed C-reactive protein (CRP) of 150 mg/L and an erythrocyte sedimentation rate of 39. CT abdomen confirmed evidence of diffused peritonitis with appendicitis and few diverticula laterally near the iliac region with thickening of its wall with surrounding edematous changes and fat stranding.

The first peritonitis required hospitalisation and intravenous antibiotic (piperacillin/tazobactam and metronidazole). Significant improvement of abdominal pain and decreased inflammatory markers were seen within a few days.

With the second and third dose of Pfizer BioNTech COVID-19 mRNA vaccine, the patient again experienced symptoms of abdominal pain 2 days after the vaccine, but the pain was less severe and the patient required no hospitalisation, although inflammatory markers were high. He received an oral antibiotic (metronidazole and ciprofloxacin), with good response.

Discussion

The patient was diagnosed with peritonitis on the basis of clinical, laboratory and radiological findings after the first, second, and third doses of Pfizer BioNTech COVID-19 mRNA vaccine.

The mechanism responsible for vaccine-induced peritonitis is unclear.

There are some data and case reports about COVID-19-infection-induced colitis and peritonitis, but no data related to vaccine induced peritonitis.[3]

Conclusions

To our knowledge, this is the first report of peritonitis post COVID vaccine. It is important to report a rare COVID-19 vaccine side effect and the manifestation of the disease to prevent serious complications by early diagnosis and management.

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An unusual case of superior vena cava syndrome

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Introduction

Superior vena cava syndrome (SCVS) is a medical emergency, which in 80% of cases is caused by malignant mediastinal tumours. However, non-malignant causes lead to 20% of cases of SVCS.[1] We present an interesting case of SVCS after receiving ChAdOx1 CoV-19 vaccine (AstraZeneca).

Materials and methods

A 52-year-old man presented with progressively worsening swelling of the face, neck, chest and arms, pleuritic chest pain, abdominal pain, and breathlessness for 7 days. He had type 2 diabetes mellitus and was on gliclazide, metformin and sitagliptin. He received ChAdOx1 CoV-19 vaccine 5 weeks prior to his presentation. Physical examination showed a classical picture of superior vena cava occlusion with collateral vessels on the chest and reduced breath sound on the right base. Routine bloods showed raised inflammatory markers with white cell count 16.4 x 109/L, neutrophil count 13.53 x 109/L and C-reactive protein 44 mg/L, with a platelet count 338 x 109/L and D-dimer 3.25 ug/ml fibrinogen equivalent units, fibrinogen 4.1 g/L. CT neck, thorax, abdomen and pelvis including a pulmonary angiogram were done with no evidence of malignancy or vessels compression (Fig 1, Fig 2). Compression duplex ultrasound of upper limbs and neck revealed bilateral inferior jugular vein thrombosis, bilateral subclavian vein thrombosis extending into proximal axillary veins and superior vena cava thrombosis, right sided pleural effusion, no pulmonary embolism. Prothrombin time, activated partial thromboplastin time, renal and liver function tests, C3, C4, IgG4 levels were unremarkable. Vasculitic screen, connective tissue disease screen, anticardiolipin antibody, anti-beta2-glycoprotein antibody, lupus anticoagulant, NPH and JAK2 mutation were all negative. Anti-platelet Factor 4 ab (anti-PF4) was positive. He was managed with low-molecular-weight heparin with good response and was switched to apixaban with a follow up appointment in the deep venous thrombosis clinic.

Fig 1. CT thorax coronal view: yellow arrow showing the thrombus in the superior vena cava.

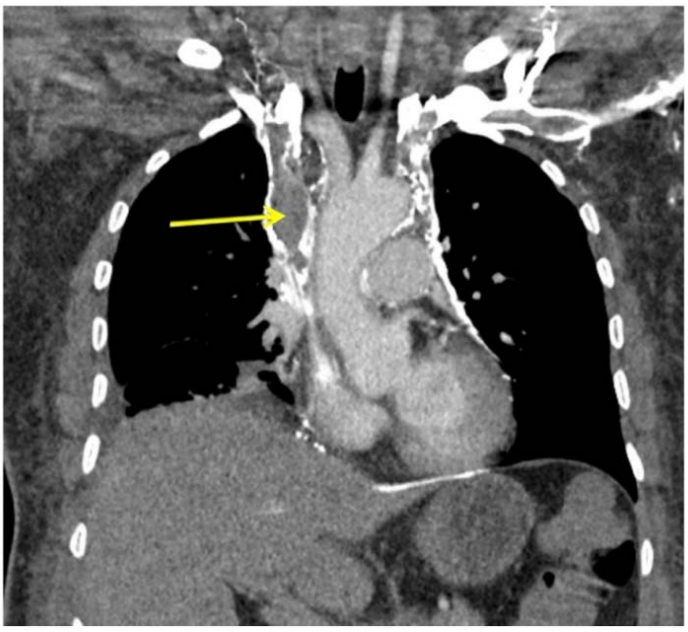
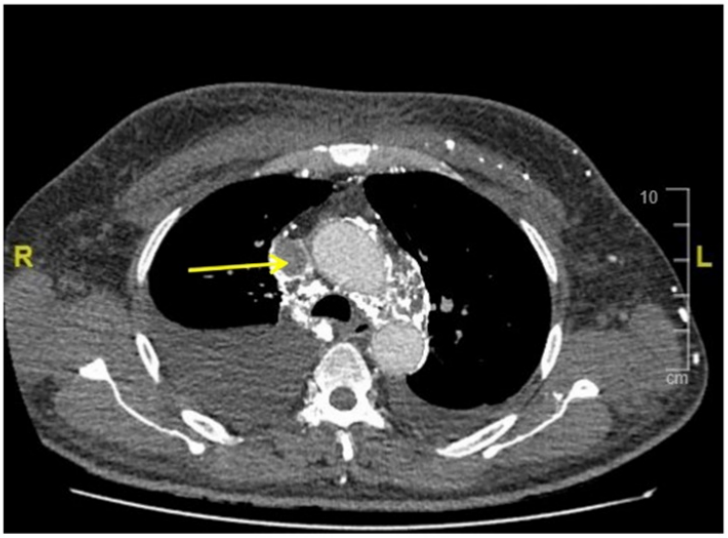


Fig 2. CT thorax axial view: yellow arrow showing the thrombus in the superior vena cava.



Results and discussion

The patient's platelet count was persistently normal with a moderately raised D-dimer. Generally, patients with VITT present within 5–30 days post vaccination and thrombocytopenia (platelet count <150,000 x 109 L), D-dimer >4 ug/mlFEU, positive anti-PF4 antibodies on ELISA and presence of thrombosis.[2] In VITT IgG antibodies that recognise PF4 bound to platelets leading to widespread platelet activation.[3] Besides thrombosis and positive anti-PF4, our patient did not have any other features of VITT (although about 5% of patients with VITT typically have normal platelet count).[4] Moreover, in VITT, the cerebral vein, deep veins of the legs, pulmonary arteries and portal circulation are commonly affected by thrombosis,[5] which did not occur in our patient; rather, jugular, subclavian, axillary vein and superior vena cava were involved, causing SCVS.

Conclusion

Although exceedingly rare, VITT can be life-threatening, with a mortality rate of 22%,[2] thus highlighting the importance of not missing a diagnosis. This case report highlights the fact that all not cases of VITT have all the diagnostic features. Moreover, we think this is the first case report of VITT where the patient presented with SCVC. Therefore, clinicians should be vigilant when patient presents with thrombosis in atypical site and has had a history of recent COVID-19 vaccination to avoid missing this life-threatening complication.

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The Macklin effect in COVID-19

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Introduction

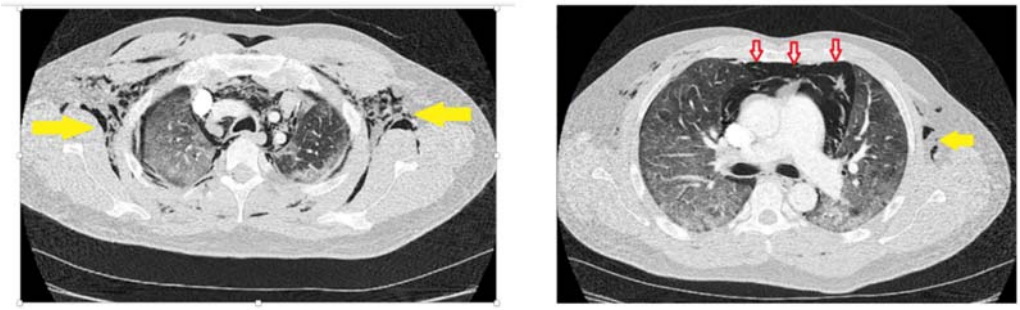
Coronavirus mainly targets the respiratory system; however, various systemic complications are reported. In patients with moderate to severe COVID-19 infection, CT chest can show a wide range of parenchymal changes, and, occasionally, extra-parenchymal findings such as pneumomediastinum. The authors present a case of COVID-19 infection complicated by spontaneous pneumomediastinum (SP) to highlight this rare complication.

Case presentation

A previously healthy 42-year-old Asian man presented to the emergency department with a 10-day history of fatigue and dry cough and two days of high-grade fever along with shortness of breath. On presentation, oxygen saturation was 60% on air, heart rate was 118 beats/minute, blood pressure 130/80 mmHg, and respiratory rate 28 breaths/minute. Chest examination revealed bilateral basal fine crepitation, central trachea, and crepitus on palpation. The rest of the systemic examination was unremarkable. He denied chest pain, recent long-distance travel, leg swelling or rash. He was admitted and started on appropriate treatment. His PCR for SARS-CoV-2 was positive and remarkable bloods were a C-reactive protein 624 mg/L (0–6 mg/L) and D-dimers 2041 ng/ml (0–230 ng/ml). In view of the high D-dimer value, computed tomography pulmonary angiogram (CTPA) was carried out which was negative for pulmonary embolism, but revealed bilateral consolidation, extensive pneumomediastinum, surgical emphysema throughout the chest wall, and bilateral small pneumothoraces (Fig 1).

A multidisciplinary team's opinion was to manage conservatively, to which he responded well with gradual reduction in oxygen requirement. He was eventually weaned off and was discharged on day 12. He was advised to follow up after 6 weeks.

Fig 1. Chest CT axial sections of pulmonary parenchymal window showing extensive ground glass opacities in both lung fields, showing extensive ground glass opacities in both lung fields, along with subcutaneous emphysema (yellow arrows) and pneumomediastinum.



Discussion

Macklin effect has been proposed as a possible aetiology for SP in non-ventilated patients.[1,2] It starts with alveolar rupture secondary to direct alveolar injury, leading to air leaking and dissection along the bronchovascular sheaths and eventually spreading of air within the mediastinum.[3] This can also lead to subcutaneous emphysema, as seen in our patient. The most common symptom of pneumomediastinum is

acute retrosternal chest pain, which warrants early alert to rule out this dreaded complication in patients with suspected or confirmed COVID-19.[2] However, our patient did not complain of retrosternal chest pain.

Although the treatment for SP is usually symptomatic and conservative, oxygen therapy could possibly lead to faster recovery.[4] Loffi and colleagues consecutively studied 102 patients and found the incidence of SP to be 6%, and reported a mortality of one in six patients.[1] Although isolated pneumomediastinum might be a self-limiting condition, patients with concurrent pneumopericardium, tend to have a less favourable outcomes.[5-8] This could likely be due to a more severe hemodynamic risk associated with the presence of pneumopericardium. Pneumopericardium can be thought of as an extended complication of the Macklin effect.

Conclusions

Although no set guidelines have been devised, the management of SP in COVID-19 patients is largely conservative. Increased mortality is reported in patients with concurrent SP and pneumopericardium.

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Effects of COVID-19 on primary percutaneous coronary intervention admissions: is there hidden morbidity?

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Background

The COVID-19 pandemic has had significant consequences on the cardiovascular health of millions worldwide. There have, however, been limited data comparing patients admitted for primary percutaneous coronary intervention (PPCI) during the COVID era to those admitted in the pre-COVID era, which would be crucial in identifying hidden morbidity. This study considers all PPCI patients admitted to a large cardiothoracic hospital in 2019–2021.

Methods

The electronic health records of 530 patients (72.6% male, mean age 65.2, 14 COVID-positive) admitted to Royal Papworth Hospital (Cambridge, UK) via the PPCI pathway were interrogated for information on demographics, admission COVID status, admission blood test results, 30-day mortality and 6-month mortality. This group represented every patient admitted via this pathway during the following time frames: April 2019 to May 2019 and December 2019 to January 2020 (pre-COVID controls), April 2020 to May 2020 (‘wave 1’), and December 2020 to January 2021 (‘wave 2’). The pre-COVID time frames were chosen to be exactly one year earlier than wave 1 and 2 to control for seasonal variations. Unpaired two-tailed t-tests were performed using R to compare the characteristics of patients when grouped by wave or COVID status.

Results

Compared to the spring 2019 patients, the group admitted during spring 2020 (wave 1) had a lower proportion of males (64.5% vs 76.6%, p=0.045), a higher proportion of White patients (100% vs 86.3%, p=0.00002), higher admission D-dimer levels (mean 2,595 vs 135, p=0.013), and lower troponin levels on admission (mean 4,205 vs 6,868, p=0.04) and 12 hours post-admission (mean 17,948 vs 21,995, p=0.038). When compared to winter 2019/20 patients, those admitted during winter 2020/21 (wave 2) had a lower proportion of males (68.9% vs 80.3%, p=0.023) and higher lymphocyte counts (1.81 vs 1.42, p=0.043).

COVID-positive patients admitted in waves 1 and 2, compared to COVID-negative patients admitted during the same timeframes, were younger (mean 56 vs 66, p=0.027), had a lower lymphocyte count (mean 1.22 vs 1.75, p=0.025), and had a lower BNP (mean 638 vs 4,923, p=0.025). They also showed a higher rate of 30-day mortality (21.4% vs 6.6%) and 6-month mortality (21.4% vs 8.9%), but neither result was statistically significant, likely owing to the small number of COVID-positive patients in the sample.

COVID-positive patients admitted during wave 1 were not statistically different on any recorded metric to COVID-positive patients admitted during wave 2, though again this may be in part due to the low sample size. Considering all patients in these waves shows that wave 1 patients were more likely to be White (100% vs 93.9%, p=0.001), and had a higher BNP (mean 3696 vs 658, p = 0.03).

Conclusions

It is evident that during the COVID-19 pandemic, there was an increase in females undergoing PPCI in both waves, whereas the first wave particularly saw an increase in white patients. Biomarkers such as increased D-dimer, troponin and BNP were found to be significant in different waves. No major differences were found between the two variants of COVID infection.

The burden of hospital-acquired COVID-19: the Welsh and international experience

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Introduction

During the first wave of the SARS-CoV-2 pandemic, the rate of hospital-acquired (nosocomial) COVID-19 across hospitals in the UK peaked at 15.8% of patients admitted with COVID-19.[1] However, little is known about the outcome of these individuals. To address this, we determined inpatient mortality associated with nosocomial COVID-19 in Wales during the first wave[2] and systematically reviewed the international literature.[3] Together, these studies expose the burden of nosocomial COVID-19 and support enhanced infection control and targeted public health measures.

Materials and methods

We first conducted a national service evaluation to determine the outcomes of 2,508 adults with molecularly confirmed SARS-CoV-2 admitted across 18 major hospitals in Wales, representing over 60% of those hospitalised between 1 March and 1 July 2020.

To understand the global burden of mortality associated with hospital-acquired (nosocomial) COVID-19 infection, we systematically reviewed the international pre-print and peer-reviewed literature from 1 January 2020 to 9 February 2021, without language restriction, for studies reporting outcomes of nosocomial and community-acquired COVID-19 (PROSPERO registration: CRD42021249023). We applied a random-effects meta-analysis to estimate the 1) relative risk of death and 2) intensive care admission, classifying studies by patient cohort characteristics and nosocomial case definition.

Results and discussion

Within our national service evaluation, inpatient mortality for nosocomial infection ranged from 38% to 42%, consistently greater than in participants with community-acquired infection (31%–35%) across a range of case definitions. Those with hospital-acquired infections were older and frailer than those infected within the community. Nosocomial COVID-19 diagnosis was made a median of 30 days following admission (IQR 21–63 days), suggesting a window for prophylactic or postexposure interventions, alongside enhanced infection control measures. These findings directly contributed to changes in clinical practice such as the recommendation to offer vaccinations for inpatients in Wales admitted during the second wave.[4]

21 studies were included in the primary meta-analysis, describing 1,513 probable or definite nosocomial COVID-19, and 6,738 community-acquired cases based on 8,251 admissions across eight countries during the first wave. The risk of mortality was 1.3 times greater in patients with nosocomial infection, compared to community-acquired (95% CI: 1.005–1.683). Rates of intensive care admission were similar between groups (RR 0.74, 95% CI: 0.50–1.08). Immunosuppressed individuals with nosocomial COVID-19 were twice as likely to die in hospital as those admitted with community-acquired infection (RR 2.14, 95% CI: 1.76–2.61).

Conclusion

Adults who acquire SARS-CoV-2 while already hospitalised are at greater risk of mortality compared to patients admitted following community-acquired infection. We highlight a window of opportunity for primary or booster vaccination is likely to exist following admission. Our meta-analysis exposes individuals with malignancy or who had undergone transplantation to be particularly vulnerable to mortality

associated with nosocomial COVID-19. Importantly, immunosuppressed individuals commonly fail to respond to vaccination,[5–7] indicating the threat of nosocomial COVID-19 remains is likely to remain in these groups. With the continued widespread circulation of highly infectious novel variants increasingly capable of evading existing therapeutics, these findings inform public health and infection control policy.

Funding statement

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Are there ethnic inequalities in patients referred to regional long COVID services in Cheshire and Merseyside?

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Introduction

Ethnic minority groups in the UK have been disproportionately affected by acute COVID-19 infections.[1] Public Health England (PHE) data show patients from ethnic minority groups were four times more likely to die following infection with SARS-CoV-2.[2,3] Long COVID syndrome is a new phenomenon comprising various physical and psychological symptoms which continue or develop following an acute COVID-19 infection.[3] It is estimated that 1 in 7 patients are experiencing long COVID symptoms.[4] As a result, NHS England commissioned a network of national clinics to offer a holistic assessment of this patient population. There is some evidence that long-term adverse health effects of COVID-19 may impact people from ethnic minority groups significantly more.[4-6] We evaluated whether our data were consistent with the national trend of disproportionate levels of ethnic minority patients suffering from long COVID being referred into our service.

Method

Retrospective case notes review of all patients assessed by the Cheshire and Merseyside long COVID service between March 2021 and September 2021. Patients underwent a structured telephone consultation as part of their assessment process. Data were collected, including date of birth, gender, ethnicity, postcode and occupation status. Ethnicity was broken down into Office for National Statistics (ONS) broad ethnic categories for the purposes of data analysis.[7]

Results

A total of 1,285 cases were reviewed over a 6-month period.

- 67.2% (863) were females.
- 32.8% (422) were males.
- 70% (902) patients were between the ages of 40 and 64 (see Table 1).

Ethnicity data were recorded in 96% (1,238) cases. Table 2 demonstrates to the broad ethnic demographics of the patient cohort.

- 96% (1193) ‘White’.
- 3.7% (45) other ‘Ethnic minority’

Asian/Asian British category contributed to 1.3% of the patient group, while Black/African/Caribbean/Black British only made up 0.6% of the cohort. 19.7% (253) and 10.3% (132) patients reported long-term sick leave and unemployment respectively, with the greater majority remaining in employment with adjustments.

Table 1. Patient age demographics of those referred to the service between March 2021 and September 2021.

Age group	Number of patients	Percentage (%)
18–24	24	1.87
25–29	60	4.67
30–34	78	6.07
35–39	94	7.32
40–44	133	10.35
45–49	186	14.47
50–54	205	15.95
55–59	232	18.05
60–64	146	11.36
65–69	83	6.46
70–74	22	1.71
75–79	14	1.09
80–84	8	0.62
85+	0	0

Table 2. Patient ethnic demographic of those referred to the service between March 2021 and September 2021.

Broad ethnic group	Number of patients	Percentage (%)
Other	24	0.16
Asian/Asian British	17	1.37
Black/African/Caribbean/Black British	8	0.64
White	1193	96.37
Mixed/Multiple ethnic groups	18	1.45

Conclusion

Our data are consistent with published national data, which show that the most common patient demographic for long COVID services is white middle-aged females.[8] Surprisingly, a considerably lower percentage of ethnic minority groups were referred into the service than would be expected. Given that 8.5% of the population in Cheshire and Merseyside are categorised as belonging to an ethnic minority group, we would have expected the patient composition to be higher.[8] This raises the question whether there are barriers to entry for this patient cohort being referred into long COVID services. Further work is required to evaluate whether such barriers exist and to further explore possible inequalities in access to services to both regionally and the wider population nationally.

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