The association between admission hyperglycemia and the No-reflow phenomenon in STEMI patients undergoing PPCI

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Introduction

No-reflow phenomenon is not uncommon in acute myocardial infarction patients treated by primary PCI (PPCI). It is associated with poorer left ventricular systolic dysfunction and higher mortality in such patients. Diabetes was linked to an increased incidence of no-reflow in PPCI. We hypothesised that acute admission hyperglycemia, rather than diabetes, is responsible for this complication.

Materials and Methods

We prospectively studied 120 consecutive STEMI presenting to 2 PPCI centres over a period of 6 months. We included all the patients eligible for PPCI according to the European Society of Cardiology (ESC) guidelines. We excluded patients with previous PCI and stent thrombosis and patients with previous coronary artery bypass grafting (CABG). The local research ethics committee has approved the study protocol. We did all the procedures following the Helsinki declaration of research ethics in human beings including informed consents. The patients were divided into two groups based on the coronary flow post-PPCI (normal flow and no-reflow). No reflow is defined as the absence of coronary TIMI 3 flow post PCI without mechanical obstruction. A professional statistician did the analysis using IBM SPSS 21.0 software.

Results

The incidence of no-reflow was 17.5% (n=21). There was no significant between the two groups regarding the different cardiovascular risk factors including diabetes (table 1).

Table 1: The clinical characteristics of the studied groups.

Parameter	Normal flow group	No-reflow group	P value
Number of patients	99	21	
Non-diabetics (n;%)	62 (62.6%)	9 (42.9%)	0.094
Diabetics of insulin (n;%)	9 (9.1%)	2 (9.5%)	1.00
Diabetics of oral diabetic medications (n;%)	28 (28.3%)	10 (47.6%)	0.084
Hypertension (n;%)	48 (48.5%)	7 (33.3%)	0.206
Smoker (n;%)	52 (52.5%)	9 (42.9%)	0.421
Ex-smoker (n;%)	4 (4%)	1 (4.8%)	1.00
Dyslipidaemia (n;%)	54 (54.5%)	15 (71.4%)	0.155
Family history of ischaemic heart disease (n;%)	17 (17.2%)	2 (9.5%)	0.521
Previous ACS (n;%)	19 (19.2%)	3 (14.3%)	0.762
Absence of pre-infarction angina (n;%)	56 (56.6%)	15 (71.4%)	0.208

The median of admission random plasma glucose (RPG) level was significantly higher in the no-reflow group (15.5 vs 8.3 mmol/l, p=0.001) (figure 1).

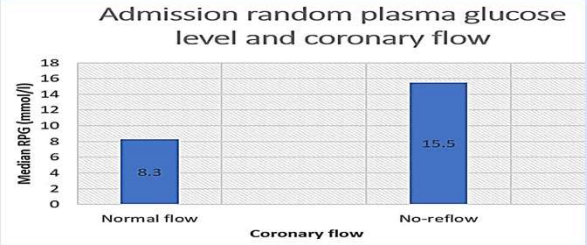

Figure 1: The admission plasma glucose in the two groups.

Discussion

Our study shows that No-reflow is linked with admission hyperglycaemia rather than the diabetic state. A possible explanation is that hyperglycemia increases leucocytes' adhesion molecules, causing microvascular obstruction and Elastase-induced endothelial damage. This augments thrombus formation and impairs ischaemic preconditioning. The study was limited by the small study population size and the narrow geographical area of recruitment.

Conclusion

Admission hyperglycemia, rather than diabetes, is associated with a higher incidence of no-reflow post-PPCI. The control of admission hyperglycaemia can help to reduce the peri-procedural complications of PPCI.

Disclaimer

This abstract has been previously presented at the RCP trainees conference in December 2020.