Norfolk and Norwich University Hospitals NHS
NHS Foundation Trust

Improving Assessment of Blood Glucose Levels in Acute Coronary Syndrome Patients – a Single University Centre Study

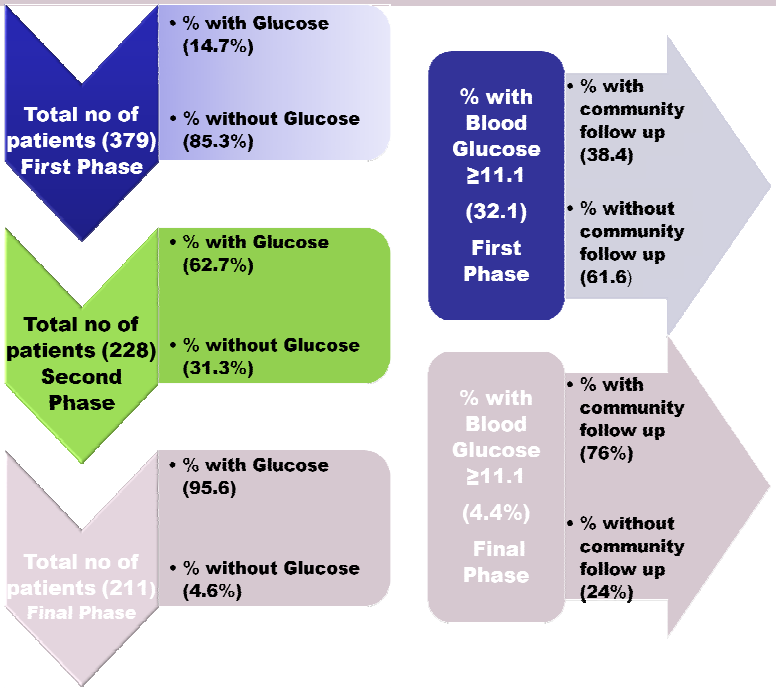
A Brahma, S Raja, K Dhatariya
Elsie Bertram Diabetes Centre, Norfolk and Norwich University Hospital NHS Foundation Trust, Norwich UK

Background: Hyperglycaemia remains an underappreciated factor in management of Acute Coronary Syndrome (ACS). The prevalence of impaired glucose regulation is increasing and hyperglycaemia in ACS is associated with higher mortality rates compared with euglycaemia[1]. Previous work has shown that mortality in ACS is higher because of poor glycaemic management[1]. This is, in part, due to the gaps in understanding the relationship between hyperglycaemia in ACS and the poor outcome. However recent studies have shown that even moderate improvements in blood glucose level are linked with better outcomes in ACS patients.

Aim: To assess the standard of care our institution. In particular, measuring plasma glucose levels for patients admitted with ACS. This was done with a view to improve awareness and practice in this area.

Method: This was a retrospective study on all patients admitted to a single, tertiary care centre with ACS over a period of one year. ACS was defined on clinical presentation, ECG findings with a ≥12 hour Troponin I of more than 0.05 ug/L (ref range < 0.04ug/l) in the absence of renal impairment, pulmonary embolism or sepsis. Plasma glucose levels requested within 24 hours of admission were looked at from the electronic hospital pathology records.
The biochemistry of patients who had a random plasma glucose levels ≥11.1 mmol/L during the first 24 hours of admission without a previous diagnosis of diabetes was assessed further to see whether they had screening for diabetes with an oral glucose tolerance test in the community six weeks after discharge as per American Diabetes Association recommendations [2].
After the first set of data was collected, our results were disseminated and discussed at various levels of management within our institution. In an attempt to provide evidence that practice needed improving, the audit cycle was then completed four months after the implementation of our suggested improved practice and the results assessed. Further changes were then made to the process.

Results: Age, gender and ethnicity did not differ between the study groups.
During the first phase of study, 379 patients were found to have been admitted with established diagnosis of ACS. Of these, 49 (12.9%), had a prior diagnosis of diabetes. Only 56 patients (14.7%) had a blood glucose measurement within 24 hours of admission. Of these 56 patients, 38 already had an established diagnosis of diabetes. Thus, more than 87% of admissions did not have a plasma glucose requested at admission. Only 7 patients (12.5% of those who had a blood glucose measured, 1.8% of total cohort) who had a random plasma glucose ≥11.1 mmol/L on admission went on to have formal screening for diabetes in the community 6 weeks after discharge.
During the second phase of the audit cycle we found that only 145 out of 228 patients admitted with ACS (62.7%) had their plasma glucose measured at the time of admission. However follow up in community with appropriate screening still remained poor. Out of the total patients who had no plasma glucose measured on admission 16 (19%) had known diabetes. Of the patients who had plasma glucose levels measured, 20 (14%) had previously been diagnosed with diabetes.
Although the education provided after the first set of data had enhanced practice, there was still room for improvement. This led us to linking plasma glucose measurement to Troponin I requests.



Every time a request was made on the system for a Troponin I it would automatically request samples to be collected in a fluoride vial for plasma glucose measurement. 4 months after this change, we found that 202 out of 211 patients (95.6%) had plasma glucose measured at the time of presentation. In addition, follow up in community improved, with 76% having appropriate screening after discharge.

Discussion: Our results highlight and confirm the difficulties our cardiac care centre experiences due to uncertainties about the optimal management of hyperglycaemia during acute coronary syndrome [3].
Meta analysis and observations have made clear that modest control of glycaemic status during ACS leads to improved outcome irrespective of type of interventions. Our work has shown that awareness among medical teams needs to be improved, through a simple change in pathology ordering led to a significant improvement in the management of hyperglycaemia in our patients with ACS.

1.Deedwania P et al. Circulation 2008;117(12):1610-1619 2..ADA Diabetes Care 2011;33(Suppl 1):S11-S61 3.Kosiborod M et al. Circulation 2010;122(25):2736-