Frequency of stress Hyperglycemia for in-hospital mortality in Acute Coronary Syndrome

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ABSTRACT

Aim: To find out the frequency of stress hyperglycemia in patients of acute coronary syndrome and its association with in-hospital mortality.

Methods: This study was conducted at Department of Cardiology Nishter Hospital Multan from March 2015 to August 2015. Total 100 patient of acute coronary syndrome either male or female with age from 40-70 years were selected. Serum glucose level at the time of admission and in-hospital mortality rate was recorded in pre-designed proforma.

Results: Mean age of the patients was 59±8 years. Total 39(39%) patients were found with stress hyperglycemia at the time of admission and in-hospital mortality rate was 12(12%). Statistically significant (P = 0.056) association of in-hospital mortality with stress hyperglycemia was found.

Conclusion: Findings of this study revealed that marked number of patients of ACS found with stress hyperglycemia and in-hospital mortality was significantly associated with stress hyperglycemia.

Keywords: Stress hyperglycemia, acute coronary syndrome, Coronary heart disease

INTRODUCTION

Acute coronary syndrome (ACS) refers to acute myocardial ischaemia caused by atherosclerotic coronary disease and includes ST-elevation myocardial infarction (STEMI), non ST-elevation MI (NSTEMI), and unstable angina (UA)¹.

Globally, Coronary heart disease (CHD) is the most common cause of mortality². In America, it is the most common cause of mortality among the both male and female³. In the year 2012, 7.4 million deaths was occurred due ischemic heart disease (IHD)⁴. ACS is one of the major causes of death and burden on health system⁵,⁶. CAD is the second most common cause of death in Pakistan and contributing to about 11% of all deaths⁶. Hyperglycemia at the time of admission in patients of ACS. In diabetics and non-diabetics, ACS is a very powerful predictor of survival of patients and increased risk of in-hospital complications⁷,⁸.

In literature, many studies have established that hyperglycemia at the time of admission is very common in patients of ACS and is a risk factor for in-hospital complications and mortality⁹,¹⁰. In patients of ACS, the prevalence of hyperglycemia at the time of admission ranges from 25%-50%¹⁰.

A study is planned to find out the frequency of stress hyperglycemia in patient of acute coronary syndrome and its association with in-hospital mortality. Results of this study may guide us for the better management of cases of ACS and to reduce the rate of mortality and morbidity related to it.

RESEARCH METHODOLOGY

This study was conducted at Department of Cardiology Nishter Hospital Multan. Before commencing the study, an approval was taken from the review committee of institution and written informed consent was also taken from every patient. Total 100 patient of acute coronary syndrome either male or female with age from 40-70 years were selected. Demographic profile of all the selected patients was noted on pre-designed proforma.

Patient having glucose level ≥ 140mg/dl at the time of admission was labelled as patient of stress hyperglycemia. At the time of admission of patients with ACS, blood sample was taken and send to laboratory for blood glucose levels. Findings of laboratory results were noted in term of stress hyperglycemia (Yes/No) and during the hospital stay, fate of the patients was also noted.

All the collected data was analyzed by using SPSS version 18. Mean and SD was calculated for age and frequencies were calculated for stress hyperglycemia (Yes/No), in-hospital mortality (Yes/No) and gender. Stratification was done in relation to in-hospital mortality. Chi-square test was used as test of association. P. value ≤5% was considered as statistically significant.

RESULTS

Total 100 patients ACS were selected for the study. Mean age of the patients was 59±8 years. Total 39(39%) patients were found with stress hyperglycemia at the time of admission (Fig. 1). Among the 100 patients of ACS, mortality rate as 12(12%) (Fig. 2). Stratification of the patients was done for in-hospital mortality. During the study period, 12(12%) patients were expired, of which 8(66.67%)
patients had stress hyperglycemia at the time of admission. Out of 88(88%) alive pts, stress hyperglycemia was found in 31(35.23%) patients. Statistically significant (P=0.056) association of inhospital mortality with stress hyperglycemia was found (Table 1).

Fig. 1: Frequency of stress hyperglycemia (n = 100)

![Frequency of stress hyperglycemia](image)

Fig. 2: Rate of mortality (n = 100)

![Rate of mortality](image)

Table 1: Association of in-hospital mortality with stress hyperglycemia (n = 100)

<table>
<thead>
<tr>
<th>In hospital mortality</th>
<th>Stress Hyperglycemia</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Yes</td>
<td>8(66.67%)</td>
<td>4(33.33%)</td>
</tr>
<tr>
<td>No</td>
<td>31(35.23%)</td>
<td>57(63.64%)</td>
</tr>
</tbody>
</table>

P value: 0.056

DISCUSSION

Several studies have suggested that blood glucose levels between 110mg/dL and ≥200mg/dL are associated with adverse outcomes. In the American Heart Association Scientific Statement on Hyperglycemia and Acute Coronary Syndrome, hyperglycemia was defined as a blood glucose level >140mg/dL at any time during hospitalization. However, the relationship between glycemic status and the outcome may vary depending on the diabetic status of the patient. In non-diabetic patients, the mortality rate increases when blood glucose >120mg/dL, while in diabetic patients, a blood glucose>200mg/dL is associated with a poor outcome.

In present study, mean age of the patients ACS was 59±8 years. Bhalli et al and Mansour et al also reported comparable mean age to our study. Numerous studies have indicated that stress hyperglycemia (SH) should be a common marker in patients with ACS and is an important risk factor for intrahospital complications. Although the exact cutoff point for SH has not been defined to date, its prevalence in epidemiological studies varies from 25-50% in cases of ACS at the time of admission. In our study stress hyperglycemia was found in 39% patients. In one study by Modenesi et al stress hyperglycemia was noted in 26.4% patients which is lower than our findings. In a study by Marfella et al stress hyperglycemia was observed in 29% patients. Nordin et al in a retrospective analysis of patients admitted with ACS, observed 38% prevalence of SH.

Several studies demonstrate an association between hyperglycemia and death in populations with ACS. In the study by Mehta et al, patients with AMI with ST-segment elevation had a mortality rate of 6.6% within the first 30 days in the control group, whereas in the group with SH, the mortality rate was 14%. In the study by Cheung et al, mortality was significantly higher in the group with average blood glucose levels greater than or equal to 144 mg/dL.

Suleiman et al reported correlation between higher rate of mortality and serum glucose level at the time of admission in patients with AMI. Svensson et al., also reported that patients with serum glucose level >120mg/dl had 46% higher rate of death as compared to those patients who had serum glucose level from 56-119mg/dl.

The differential impact of SH on the outcome of patients with ACS has been assessed by several researchers. Specifically, SH appears to be a strong indicator of adverse effects. Although the pathophysiological mechanisms are not yet fully understood, there are several possible explanations. It is possible that a greater degree of stress is necessary to produce a similar degree of hyperglycemia in patients without DM than in those with DM.
The benefits of strict control of blood sugar levels in critical patients have been demonstrated and include reduced rates of organ dysfunction and mortality with the maintenance of blood glucose levels between 80 and 110mg/dL instead of the old target, which was between 180 and 200mg/dL. The benefits seem to be related not only to lower blood glucose levels but also to the anti-inflammatory effects of insulin, which reduce the production of substances related to oxidative stress and lower glucoxicity.

CONCLUSION

Findings of this study revealed that marked number of patients of ACS found with stress hyperglycemia and in-hospital mortality was significantly associated with stress hyperglycemia.

REFERENCES
