Research Article

A cross sectional study on stress hyperglycemia in cases of Acute Coronary Syndrome

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ABSTRACT

Objectives: To assess the stress hyperglycemia in cases of Acute Coronary Syndrome.

Methods: Total 100 patients of acute coronary syndrome either male or female having age 40-70 years were selected from Department of Cardiology D.G Khan Hospital D.G Khan from January 2017 to June 2017. Stress hyperglycemia was assessed in selected patients.

Results: Mean age of the patients was 59 ± 8 years. Total 39 (39%) patients was 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: Results of this study showed that marked number of patients with ACS found with stress hyperglycemia. In-hospital mortality was significantly associated with stress hyperglycemia.

Key words: Acute coronary syndrome, Coronary heart disease, stress hyperglycemia

INTRODUCTION

Numerous prior studies have established that hyperglycemia on admission is common in patients with ACS and is a risk factor for death and in-hospital complications.[1-2] Although the exact definition of hyperglycemia has not been established, the prevalence of admission hyperglycemia in prior epidemiological studies ranges from 25% to >50% of patients admitted with ACS.[3-4] In a meta-analysis of 15 relatively small and mostly older studies that evaluated the association between admission glucose level and death, Capes et al[5] demonstrated that the relative risk of in-hospital death in nondiabetic patients with acute myocardial infarction (AMI) with admission glucose $\geq$110 mg/dL was 3.9 compared with nondiabetic AMI patients who were normoglycemic. Among AMI patients with diabetes, those with admission glucose $\geq$180 mg/dL had a 70% relative increase in the risk of in-hospital death compared with diabetic patients with normal admission glucose values. Similarly, Foo et al3 demonstrated a near-linear relationship between higher admission glucose levels and higher rates of left ventricular failure and cardiac death among 2127 patients with ACS. Meier et al6 showed higher long-term mortality rates and larger infarct size (measured by creatine kinase and MB-fraction levels) among hyperglycemic AMI patients both with and without diabetes. Studies by Wahabet al4 and Stranders et al7 have also suggested that the admission hyperglycemia-associated risk is the highest in AMI patients without previously known diabetes.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.

MATERIAL AND METHODS

Total 100 patients of acute coronary syndrome either male or female having age 40-70 years were selected from Department of Cardiology D.G Khan Hospital D.G Khan from January 2017 to June 2017. An approval was taken from institutional review committee and written informed consent was taken from every patient.

Clinical examination of all the selected patients was done. Blood sample of all the patients was taken and sent to laboratory for glucose analysis. Findings were noted in pre-designed proforma along with demographic profile of the patients. Patient having glucose level $\geq$ 140mg/dl at the time of admission was labelled as patient of stress hyperglycemia.

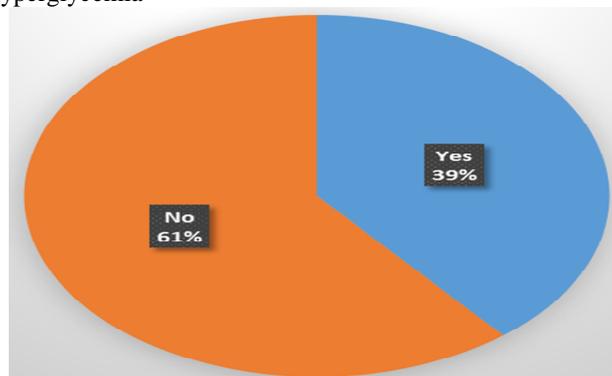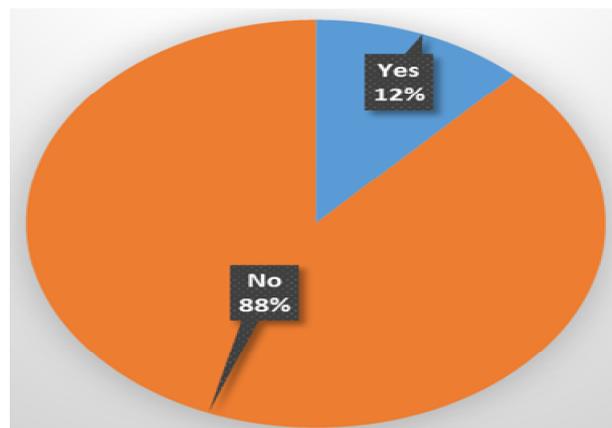All the collected data was entered in SPSS version 17 and analyzed. Mean and SD was calculated for age and frequencies were calculated for stress hyperglycemia (Yes/No), in-hospital mortality (Yes/No) and gender. Stratification was done in relation to in-hospital mortality. Chi-square test was used to see the association between stress hyperglycemia and in-hospital mortality. P. value $\leq$ 0.05 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 was 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 patients, stress hyperglycemia was found in 31 (35.23%) patients. Statistically significant (P = 0.056) association of in-hospital mortality with stress hyperglycemia was found. (Table 1)

Fig. 1: Prevalence of stress hyperglycemia

Fig. 2: Mortality rate

Table 1: Relation of stress hyperglycemia with in-hospital mortality

In-hospital Mortality	Stress Hyperglycemia		Total	P. value
	Yes (%)	No (%)		
Yes	8 (66.67)	4 (33.33)	12 (12%)	0.056
No	31 (35.23)	57 (63.64%)	88 (88%)	
Total	39 (39%)	61 (61%)	100	

DISCUSSION

In present study, mean age of the patients ACS was 59 ± 8 years. Similar mean age of the patients with ACS was noted by Bhalli et al8 and Mansour et al.9 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.10 Although the exact cutoff point for SH has not been defined to date, its prevalence in epidemiological studies varies from 25% to 50% of patients admitted with ACS.11In our study stress hyperglycemia was found in 39% patients. In one study by Modenesi et al,12 stress hyperglycemia was noted in 26.4% patients which is lower than our findings. In a study by Marfella et al., 13 stress hyperglycemai was observed in 29% patients. Nordin et al.,14 in a retrospective analysis of patients admitted with ACS, observed a 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%.15 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.16 Suleiman et al. observed in a cohort of 735 non-diabetic patients with AMI that the blood glucose levels on admission were correlated with higher mortality.17 Svensson et al., demonstrated that patients with blood glucose levels greater than or equal to 120 mg/dL had 46% higher mortality compared with patients whose blood glucose levels were between 56 and 119 mg/dL.18

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.19

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 110 mg/dL instead of the old target, which was between 180 and 200 mg/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 glucotoxicity.20

CONCLUSION

Results of this study showed that marked number of patients with ACS found with stress hyperglycemia. In-hospital mortality was significantly associated with stress hyperglycemia.

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