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Prevalence of Stress Hyperglycemia in Acute Stroke Patients in Central India

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Abstract
Aim of study was to study prevelance of stress hyperglycemia in acute stroke patients.
Methods: *This was a observational cross-sectional study, consisting of consecutive 117 patients admitted in emergency medical ward.*
Results: *Total 117 patients are enrolled in our study. 47 (40.17%) patients were found stress hyperglycemic and it is significant (p-value is 0.0249, result is significant if p value < 0.05). Age group of the stress hyperglycemic patients ranged from 17years to 82 years with maximum (53.19%) patients in the age group of 41years to 60 years. Mean age of patient was 40.27 ± 1.44 years (95% CI 38.83 – 41.71 year, SD – 15.06, SE – 1.44). There were 35 (74.47%) stress hyperglycemic male and 12 (25.53%) stress hyperglycemic female patients.*
Conclusions: *Expected proportion of stress hyperglycemia was observed among stroke patients.*
Keywords: *Stress Hyperglycemia, Acute Stroke*

INTRODUCTION

Stress hyperglycemia is very common among critically ill patients[1]. The American Diabetes Association and American Association of Clinical Endocrinologists[2] consensus on inpatient hyperglycemia defined stress hyperglycemia or hospital-related hyperglycemiaas any blood glucose concentration > 7.8 mmol/l (140 mg/dl) without evidence of previous diabetes. it is important to identify and track patients as 60% of patients admitted with new hyperglycemia had confirmed diabetes at 1 year.[3] Cross-sectional studies of patients with stress hyperglycemia revealed that 30%–60% of patients with stress hyperglycemia have impaired carbohydrate intolerance or diabetes during follow-up.[3] the use of HbA1C has been recommended over OGTT as the preferred diagnostic testing in hospitalized patients with hyperglycemia.[4] Stress [5,6] or injury alter normal glucose metabolism because of changes in neuro-endocrine secretions and peripheral insulin resistance, resulting in transient increase in blood glucose. Stress hyperglycemia is thought to be the body's adaptive response to stress or injury[7] . In the past, this response to injury was believed to be beneficial during critical illness[8]. It has recently recognized to be associated with increased mortality and morbidity.

AIMS AND OBJECTIVES

- Aim of the study was to study prevelance of stress hyperglycemia in acute stroke patients.

MATERIAL AND METHODS

This was a observational cross-sectional study, consisting of consecutive 117 patients admitted in emergency medical ward at Gandhi Medical College and allied Hamidia Hospital in Bhopal from may 2014 to July 2014.The study unit was all patients who meet the eligibility and selection criteria to diagnose stress **hyperglycemia:**

Inclusion criteria – all acute stroke patients with random blood glucose value   >140 mg/dl.

Exclusion criteria

1) Referred Patients following first aid.
2) Known diabetes mellitus patient.
3) HbA1C >6.4%

The sugar level was measured using an Acu-check Active Glucometer by allowing a drop of blood spot on the glucose stick which is preloaded on the reader .Selected patients with random blood sugar greater than 140mg/dl (7.77mmol/l) had their another blood samples taken for HBa1C (high performance liquid chromatography) and confirmation of random blood sugar value by glucose oxidase - peroxidase method in pathology laboratory.

OBSERVATION

TABLE NO 1 PROPORTION OF HYPERGLYCEMIA

S.No.	STROKE	DIABETES	Stress Hyperglycemia (n=47)		NORMO-GLYCEMIA	TOTAL (117)
			HbA1C <5.7	HbA1C 5.7-6.4		
1.	ISCHEMIC	27 (87.87%)	28 (82.35%)	9 (69.23%)	31 (79.49%)	95 (81.20%)
2.	HAEMORRHAGIC	4 (12.90%)	6(17.65%)	4(30.33%)	8 (20.51%)	22 (18.80%)
3.	TOTAL(117)	31 (26.50%)	34(29.06%)	13(11.11%)	39 (33.33%)	117 (100%)

The p-value is 0.024938, the result is significant if p value < 0.05 .

RESULTS

Total 117 patients are enrolled in our study. 47 (40.17%) patients were found stress hyperglycemic. out of 47 patients, 34 (29.06%) patients had HbA1C<5.7% and 13 (11.11%) patients had HbA1C 5.7 – 6.4%. and 39 (33.33%) and 31(26.50%) were normoglycemic and diabetic respectively. and it is significant (p-value is 0.0249, result is significant if p value < 0.05).

Age group of the stress hyperglycemic patients ranged from 17years to 82 years with maximum (53.19%) patients in the age group of 41years to 60 years 47. Mean age of the patients in our study was 40.27 ± 1.44 years, (95% CI 38.83 – 41.71 year, SD – 15.06, SE – 1.44).

In our study there were 35 (74.47%) stress hyperglycemic male and 12 (25.53%) stress hyperglycemic female patients.

DISCUSSION

The results of this study show that stress hyperglycemia incidence for stroke 40.47%. Compared with other studies, the stress hyperglycemia incidence of sroke patients was slightly lower than acute stroke and acute myocardial infarction (42.3% and 50%, respectively)[11,12] Podell et al [13] also reported that a positive correlation between the blood sugar level and disease severity. In this study, stroke patients were not severe and stress hyperglycemia incidence was relatively low.

Age group of the patients ranged from 17years to 82 years with maximum patients in the age group of 41years to 60 years 25 (53.19%) patients and mean age of the patients in our study was 40.27 ± 1.44 years, (95% CI 38.83 – 41.71 year ,SD – 15.06 , SE – 1.44).This finding was in sharp contrast to study by NICE- SUGAR study [14] and LEUVEN trial [8] in which the mean age was

around 60 ± 12 years and 59 ± 3.7 years .This implies that patient in developing countries are much younger than developed nations.

In our study there were male 35 (74.47%) and 12 (25.53%) female patients. Finding was higher to study by Krinsley[9] et al , Egi at al[15] ,and LEUVEN trial [8] in whom there were 61% , 59% , and 63% male patients respectively. It may be due to higher proportion of male hospitalization.

RECOMMENDATIONS

- Clinicians should have high index of suspicion of stress hyperglycemia in critically ill stroke patients. specially when considering administration of intravenous or oral glucose in sick patients. This would lead to avoidance of unnecessary glucose infusions in these patients.
- Further studies should evaluate the pattern of subsequent blood sugar measurements in sick patients with stress hyperglycemia and its effects on the prognosis of sick patients.
- How should we manage stress hyperglycemia? And correlate with prognosis of disease.
- Correlate stress hyperglycemia with severity of illness by established scoring systems for critically ill patients.
- Stress hyperglycemic patient may prone to develop diabetes in future life so they should advised for RBS and HbA1C monitoring.
- How should we manage stress hyperglycemia? And correlate with prognosis of disease.

C0NCLUSIONS

Expected proportion of stress hyperglycemia was observed among stroke patients. Thus it is now known that patients with stress hyperglycemia suffer from various diseases. Blood glucose value offers a simple, sensitive, non-invasive, easily available, bedside, consistent means of assessing the status of patients and identify the high risk

patients even among those who have similar disease. Hence all critically ill patients should be subjected to blood glucose monitoring and given appropriate management at the earliest.

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