

Frequency of Hyperglycemia in Acute Subarachnoid Hemorrhage

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ABSTRACT

Objectives: To determine the frequency of hyperglycemia in patients with subarachnoid hemorrhage.

Study Design: Descriptive/Cross-Sectional

Place and Duration: Study was conducted at department of Neurology Ayub Teaching Hospital, Abbottabad for duration of two year from October 2018 to September 2020.

Material and methods: A total of 100 patients of both genders with ages 20 to 70 years presented with subarachnoid hemorrhage were included. Patients detailed demographics including age, sex, body mass index and Hunt Hess grade were recorded after taking informed consent. Serum glucose level was examined. Hyperglycemia was defined as serum glucose level >140mg/dl. Data was analyzed by SPSS 24.0.

Results: There were 70 (70%) males 30 (30%) females patients. 28 (28%) patients were ages <40 years, 55 (55%) were ages 41 to 60 years and 17 (17%) were ages above 60 years. Hyperglycemia was found in 59 (59%) patients while 41 (41%) patients were non hyperglycemic.

Conclusion: It is concluded that the frequency of hyperglycemia in patients with subarachnoid hemorrhage was too high.

INTRODUCTION

Incidence of subarachnoid hemorrhage is 9 per 100,000 person-years, making it an urgent, life-threatening medical emergency. Aneurysm rupture is responsible for 85 percent of subarachnoid hemorrhage instances. [1] The mortality rate for aneurysms in the posterior circulation is greater (10-15 percent for all aneurysms) than for those in the anterior circulation [1]. It is characterized by severe and widespread headaches, vomiting, neck stiffness, loss of consciousness and decerebrate posture as well as jerking of limbs or deficits in the extremities [2] [3, 4]. Rebleed, hydrocephalus, and reactive vasospasm are common consequences [3]. CT brain may be used to make a diagnosis, and MRA has a 96.7 percent sensitivity rate for detecting intracranial aneurysms [4]. To avoid subsequent hydrocephalus, external ventricle drains prohibit aneurysm obliteration through endovascular treatments or surgical clipping [5].

In patients with hyperglycemia, the risk of a bad outcome is about three times higher, and this seems to be independent to the various cutoff values used to define hyperglycemia [6]. Persistent hyperglycemia is associated with a worse clinical result than initial hyperglycemia [7-9]. Patients with chronic hyperglycemia are seven times more likely to have a bad result than those with normoglycemia, according to a recent research [10]. The effect of hyperglycemia on the prognosis of patients with subarachnoid hemorrhage has been studied throughout the world, but relatively few local research have been conducted to determine the prevalence of this disease.

Patients with subarachnoid hemorrhage were studied to determine the frequency of hyperglycemia.

MATERIAL AND METHODS

This cross-sectional/observational study was conducted at department of Neurology Ayub Teaching Hospital,

Abbottabad for duration of two year from October 2018 to September 2020. A total of 105 patients of both genders with ages 20 to 70 years presented with subarachnoid hemorrhage were enrolled. Patients detailed demographics including age, sex, body mass index (BMI) and Hunt Hess grade of subarachnoid hemorrhage at admission were recorded after taking informed written consent. Patients with history of diabetes mellitus, patients with surgical intervention of stroke, patients who had lobar (frontal/parietal/temporal/occipital regions of brain) or central (brainstem/basal ganglia/thalamus) bleed on CT brain were excluded.

The diagnostic criteria for SAH are defined on the basis of the CT scan brain, where one is in the CT brain: hyperdensity (blood) in the interhemispheric crack, sylvian fissure, or ventricular / parenchymal-extended perimesencephalic cistern. Serum glucose level was examined by glucometer at admission. Hyperglycemia was defined as serum glucose level >140mg/dl. All the data was analyzed by SPSS 24.0. Frequencies and percentages were recorded in tabulation form. Chi-square test was applied to examine the stratification hyperglycemia between male and female. P-value <0.05 was taken as significant.

RESULTS

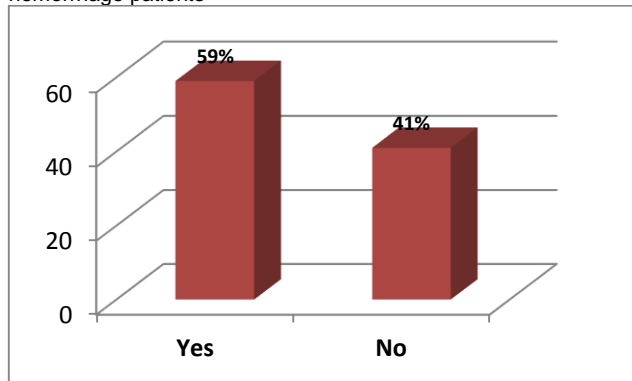
There were 70 (70%) males 30 (30%) females patients. 28 (28%) patients were ages <40 years, 55 (55%) were ages 41 to 60 years and 17 (17%) were ages above 60 years. Mean BMI was 23.62±1.84 kg/m². 25 (25%) patients were Hunt Hess grade 1-2, 32 (32%) had grade 3, 33 (33%) had grade 4 and 10 (10%) had grade 5. (Table 1)

According to the random glucose level, hyperglycemia was found in 59 (59%) patients while 41 (41%) patients were non hyperglycemic. (Figure 1)

Table No 1: Baseline details of all the patients

Variables	Frequency No.	%age
Gender		
Male	70	70%
Female	30	30%
Age		
<40 years	28	28%
41 to 60 yrs	55	55%
Above 60 yrs	17	17%
H-H score		
1-2	25	25%
3	32	32%
4	33	33%
5	10	10%
Mean BMI (kg/m)	23.62±1.84	-

Figure No 1: Frequency of hyperglycemia in subarachnoid hemorrhage patients



When we stratified with gender, we found that frequency of hyperglycemia was high in females 24/30 (80%) as compared to males 35/70 (50%). A significant association was found between hyperglycemia and female gender with p-value 0.001. (table 2)

Table No 2: Stratification with gender

Variable	Male (n=70)	Female (n=30)	P-value
Hyperglycemia			0.001
Yes	35 (50%)	24 (80%)	
No	35 (50%)	6 (20%)	

DISCUSSION

One of the most frequent complications of severe neurological diseases is hyperglycemia, which is linked with increased morbidity and death [11-12]. The purpose of this research was to determine the incidence of hyperglycemia in patients with acute subarachnoid hemorrhage who were diagnosed. A total of 100 participants were recruited in this study. Patients in this research were mostly male (70%) Only 28 patients were aged 40, 55 were aged 41-60, and 17 (17%) were aged beyond 60. 23.621.84 kg/m² was the average BMI. These findings were similar to those of many earlier studies in which male patients accounted for 60 to 75 percent of patients, and 70 percent of patients were older than 50 years [13-14]. There were 25 (25%) Hunt Hess grade 1-2 patients, 32 (32%) grade 3, 33 (33%) grade 4, and 10 (10%) grade 5 patients in our study. Hunt Hess grade 3 to 5 was seen in the majority of individuals with subarachnoid

hemorrhage in a research performed by Frontera JA et al. [15].

Patients with hyperglycemia accounted up 59% of the study's participants; those without hyperglycemia made up the remaining 41%. 78.67 percent of subarachnoid hemorrhage patients had hyperglycemia, whereas only 21.33 percent were non-hyperglycemic, according to a research by Bano M et al [16]. Regarding metabolic complications in individuals with subarachnoid hemorrhage, KazempoorAzar A et al [17] found that hyperglycemia occurred in 23 percent of the 483 patients.

Those with hyperglycemia are approximately three times more vulnerable, with no correlation to the different hyperglycemia cutoff levels[18]. There is a danger of a negative result in this situation. [19] The connection between high blood glucose levels and bad clinical outcomes is greater than the relationship between hyperglycemia upon admission and poor clinical result

Glucose levels in the study population ranged from 3.2 to 40.5 mmol / L, and median glucose levels of more than 5.8 mmol/L were reported as being as low as 1.8 mmol / L (range of 0.1 to 12.9), according to Frontera JA et al [15]. As a result of hyperglycemia, patients have reported worse clinical outcomes than those who do not have hyperglycemia.

In addition, hyperglycemia exacerbates the effects of SAH by increasing mitochondrial imbalance, apoptosis, and inflammation [20]. As the initial bleeding progresses, so does the glucose level. In previous research, hyperglycemia was shown to be an independent predictor of prolonged cerebral ischemia and poor outcomes in SAH patients. Patients with SAH were recommended to have their plasma glucose levels monitored because of their predictive value. [21-22].

CONCLUSION

Increased morbidity and death in individuals with subarachnoid hemorrhage are strongly linked to hyperglycemia After analyzing the results of this research, we found that patients with subarachnoid hemorrhage were more likely to have hyperglycemia. Patients with subarachnoid hemorrhage should have their blood glucose levels checked at the time of admission because hyperglycemia must be managed.

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