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CLINICAL OUTCOME IN ACUTE ISCHEMIC STROKE PATIENTS WITH HYPERGLYCEMIA IN A TERTIARY CARE HOSPITAL: A CROSS-SECTIONAL STUDY

General Medicine

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ABSTRACT

Background: Stroke is one of the leading cause of death and long term disability in India and it's also an important cause of premature death and disability. Diabetes mellitus by virtue of its association with micro and macro vascular disease is an important risk factor for genesis of stroke. **Aim:** To measure the random blood glucose level in the early phase of ischemic stroke (within 24 hours of onset) in both diabetics and in non-diabetics and to evaluate the severity and prognosis in both diabetics and non-diabetics in relation to hyperglycemia. **Materials And Methods:** Total of 50 cases of acute ischemic stroke patients admitted in the medical wards, santhiram medical college & general hospital, nandyal between December 2023 to May 2024 were studied. The Patients were selected on the following basis. **Results:** The total of 50 patients of acute ischemic stroke were studied out of which 60% were male and 40% females. **Conclusion:** There is a linear correlation between admission day hyperglycemia and ischemic stroke in its severity, size and outcome. The combined diabetes and stress hyperglycemics are found to have larger sized severe stroke and poor functional outcome in the form of increased mortality.

KEYWORDS

INTRODUCTION:

Stroke is one of the leading causes of death and long term disability in India. Among all the neurological diseases of adult life, cerebrovascular accidents clearly ranks first in frequency of importance. Almost fifty percent of neurological diseases in general hospital are due to stroke. Cerebrovascular accident includes ischemic stroke, hemorrhagic stroke, and cerebrovascular anomalies such as intracranial aneurysm, AV malformation and cortical venous thrombosis. Stroke after heart disease, is the second most common cause of death among non-communicable diseases. Most of the diabetic patients with stroke have raised glycosylated hemoglobin indicating that most of them have uncontrolled diabetes. Diabetics and stress hyperglycemics have severe strokes resulting in poor outcome. Stroke is Twice more common in diabetics than in non-diabetics.

AIMS AND OBJECTIVES: To measure the random blood glucose level in the early phase of ischemic stroke (within 24 hours of onset) in both diabetics and in non-diabetics and to evaluate the severity and prognosis in both diabetics and non-diabetics in relation to hyperglycemia

MATERIALS AND METHODS:

A Hospital-based cross-sectional study was conducted in the Department of General Medicine Santhiram Medical College, and General Hospital for six months after approval from the Hospital Ethics and Research Committee.

DURATION OF STUDY: From December 2023 to May 2024
SAMPLE SIZE: 50
METHODS OF DATA COLLECTION:

- Information is collected through a pre structured proforma for each study subject.
- Random blood glucose level in the early phase of ischemic stroke (within 24 hours of onset) in both diabetics and in non-diabetics is done
- Qualifying study subjects will be undergoing detailed history, clinical examination and laboratory investigations.
- **SAMPLING TECHNIQUE:** Simple Random Sampling

INCLUSION CRITERIA:

1. Patients should be above the age of forty
2. Patients should have been admitted within twenty four hours of onset of symptoms
3. This should be the first cerebrovascular accident for the patient
4. Blood sugar recorded with in twenty four hours of the onset of stroke
5. Patients who are willing to participate and give informed consent

EXCLUSION CRITERIA:

1. Patients admitted after twenty four hours of stroke
2. Those patients who received intravenous glucose before or during study period
3. Patients with reliable information about diabetes could not be obtained
4. Patients who died before it be established whether or not they had diabetes.
5. Illness presented with stroke like symptoms
6. Patient who are not willing to participate and not willing to give informed consent.

DATA ANALYSIS:

1. Data was collected using a pretested proforma meeting the study's objectives. Detailed history, physical examination, and necessary investigations were undertaken.
2. The chi-square and Fisher's exact test were used in statistical analysis to compare proportions. At a P-value of 0.05, statistical results were considered significant <0.01.

RESULT:

SEX DISTRIBUTION

SEX	Frequency	Percent
MALE	30	60.0
FEMALE	20	40.0
Total	50	100.0

AGE WISE DISTRIBUTION

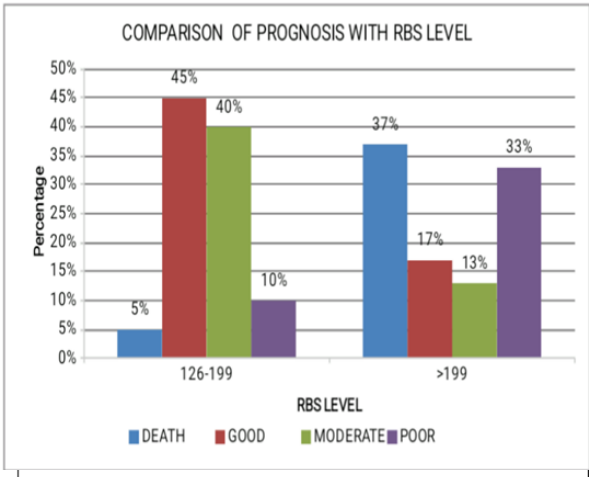
Age	Frequency	Percent
40-50 YEARS	9	18.0
51-60 YEARS	15	30.0
61-70 YEARS	14	28.0
71-80 YEARS	12	24.0
Total	50	100.0

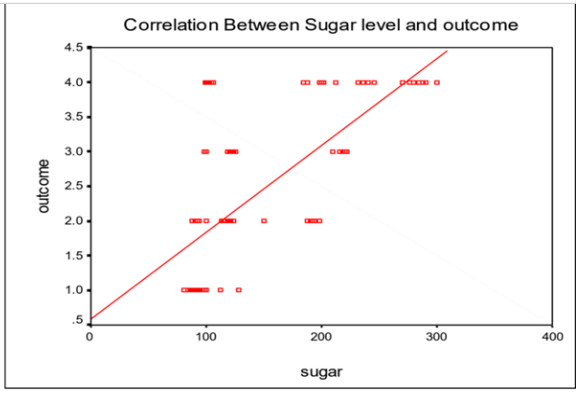
STATISTICALANALYSIS:
NIHSS is equated to stroke severity and clinical outcome of patient after stroke onset assessed in varying intervals.

NIHSS VS RANDOM BLOOD SUGAR LEVELS

			RBS_GROUP		Total
			126-199	>199	
NIHSS	MINOR	Count	0	2	2
		% within RBS_GROUP	0.0%	6.7%	4.0%
	MODERATE	Count	18	8	26
		% within RBS_GROUP	90.0%	26.7%	52.0%
	MODERATE TO SEVERE	Count	1	9	10
		% within RBS_GROUP	5.0%	30.0%	20.0%
	SEVERE	Count	1	11	12
		% within RBS_GROUP	5.0%	36.7%	24.0%
	Total	Count	20	30	50
		% within RBS_GROUP	100.0%	100.0%	100.0%

Pearson Chi-Square=21.819** P<0.0001 significant





DISCUSSION:

AGE, SEX AND RISK FACTORS:
In our study of fifty patients majority of them belonged to male sex showing a male preponderance which is commonly seen in most studies. Majority of the patients, fifteen were between the age group of 51 to 60. Among the fifty patients 32 had hypertension, 34 had diabetes, 29 had hypercholesterolemia, 3 had previous history of myocardial infarction, and one female patient had atrial fibrillation. More than two third of the male patients were smokers and one half had history of alcohol intake. 36 patients had right sided weakness and 24 patients had left sided weakness.

GLYCEMIC STATUS:
Among the fifty patients in our study group, 30 patients had elevated admission day blood glucose level and 20 patients had normal blood glucose values. Diabetes was noticed in 32 patients and stress hyperglycemia in another 9 patients. Stress hyperglycemia amounted to more than one third of the patients.

SEVERITY OF STROKE:
Severity of stroke was assessed with NIH Stroke scaling system. Admission day hyperglycemic patients had a higher score when compared to Euglycemic patients, which was statistically significant with $p = 0.0001$.

SIZE OF STROKE:
The size of the lesion were analyzed with the help of CT scan brain. Most of the euglycemic patients had small sized infarcts whereas hyperglycemic patients had large sized lesion with edema and midline shift. These data's were statistically significant with $p = 0.001$.

OUTCOME OF STROKE:
In this study of fifty acute stroke patients, euglycemic patients had a better outcome when compared to admission day hyperglycemic patients. Seventy two percent of euglycemic (patients including treated) had a good functional recovery. On the contrary only three percent of admission day hyperglycemic patients had good functional recovery at the end of thirty day follow up. Fifty percent of the admission day hyperglycemic patients died with in the first thirty days. In the euglycemic patients the early case fatality rate was only fifteen percent. Hence there was a threefold increased risk of early mortality in admission day hyperglycemic patients when compared to euglycemics. Poor outcome was noticed in thirty eight percent of admission day hyperglycemic patients and in three percent of euglycemic patients. These data's were statistically significant with $\chi 2=21.819$ and $p=0.0001$. In the ischemic stroke group early mortality rate was 2.07 % in euglycemic patients and 14.8 % in hyperglycemic patients. Poor outcome was noticed in 3.18 % in euglycemics and 38.3 % in hyperglycemics. Our study clearly shows a positive correlation ($r = 0.71$, $p = 0.01$) between admission day sugar value and the outcome of stroke. According to Perttu J. Lindsberg and Risto o Roine [39] study hyperglycemia was noted in two third (66%) of all ischemic stroke patients. In our study hyperglycemia was noticed in 60% of patients with ischemic stroke. In their study known diabetes and newly diagnosed diabetes contributed one third of cases (33%). In our study the same group contributed to 62 %.

CONCLUSION:
There is a good correlation between admission day glucose level and the outcome in ischemic stroke. Admission day elevated glucose level was a significant predictor of mortality and poor functional outcome after acute stroke. Hence, restoration of normoglycemia as soon as possible should be encouraged. In the interim, we should fare well with adhering to good general stroke management, normalization of body temperature, blood glucose levels, fluid balance and hemodynamics or we may otherwise risk the favorable outcome even in the patients with normoglycemia.