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A Study of Clinical Correlation Between Serum Fibrinogen Level In Patients of Cerebrovascular Stroke(CVA), at RIMS, Ranchi, Jharkhand , India.

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Abstract
Introduction: *Cerebrovascular stroke is one of the leading causes of death and disability throughout the World. There are many risk factors which precede stroke by several years. Hypertension is considered the main risk factor for cerebral thrombosis as well as cerebral hemorrhage. In most cases stroke is merely an incident in the slowly progressive course of a generalized vascular disease. . In urban India stroke accounts for 1% mortality of all hospital admissions, 4% in all medical cases and about 20% in all disorders of central nervous system.*
Objective: *To determine the association of serum fibrinogen level with other clinical findings associated with patients of stroke.*
Method: *Data for the study was collected from patients with CVA admitted in Department of Medicine at R.I.M.S RANCHI. Total of 100 patients were included in this study and their detailed clinical and etiological analysis was done.*
Conclusion: *High prevalence of elevated fibrinogen in patients with stroke.*
Keywords: *Cerebrovacsular stroke, Hypertension, Fibrinogen.*

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I. Introduction

Cerebrovascular stroke is one of the leading causes of death and disability throughout the World[1]. There are many risk factors which precede stroke by several years. Hypertension is considered the main risk factor for cerebral thrombosis as well as cerebral hemorrhage. Demographic changes, urbanization, and increased exposure to major stroke risk factors will fuel the stroke burden in the future. By 2025, four out of five stroke events will occur in people living in low and middle income countries. Important Risk factor for stroke includes Diabetes, Hypertension, smoking and dyslipidemia.

"Stroke" is defined as an acute neuronal injury that occurs as a result of diseases of cerebral vasculature and its contents[2]. "RIND" (Reversible ischemic neurological deficit) refers to the resolution of symptoms within a period of seven days.

Fibrinogen is a soluble plasma glycoprotein that consists of three non-identical pairs of polypeptide chains Aα, Bβ and γ chains[3]. Fibrinogen plays a key role in blood clotting. It's association with increased incidence of stroke is related to its ability to promote thrombosis or clot formation by causing platelets to clump inside blood vessels.

Normal serum Fibrinogen level is 200 to 400 mg/dl. Fibrinogen bridges adjacent platelets together to form platelet aggregates and results in arterial thrombosis leading to ischemic stroke[4].

It is an independent type of risk factor for recurrences of stroke apart from age, smoking, hypertension, diabetes and other risk factors. It is also a predictor of future recurrences of stroke and adverse cardiovascular events[5].

Hence, fibrinogen levels are to be measured in patients with stroke at the earliest and to be treated. Measurement of plasma fibrinogen levels could be more useful than other acute phase reactants such as C-reactive protein, as fibrinogen is more specific to vascular disease. The study identifies the association of fibrinogen with other multiple variables like age, sex, bodyweight, smoking, cholesterol, hypertension and diabetes[6].

II. Materials and Methods

Source of Data: Patient admitted to,Department of medicine, Rajendra Institute of Medical Sciences, Ranchi, in the study period between August 2017 to August 2018.

Inclusion Criteria:

- Those with neurological deficit lasting for more than 24 hours and CT showing Cerebral Hemorrhage or Infarction.
- Those presenting within 7 days of onset of stroke .

Exclusion Criteria:

- Trauma related stroke
- Patients with subarachnoid hemorrhage
- CT scan not done due to any reason
- Thrombocytopenia
- Known case of Hereditary disorders of coagulation
- Known case of Hemophilia, any bleeding disorders, vasculitis or any connective tissue diseases.

Study requiring investigations to be conducted:

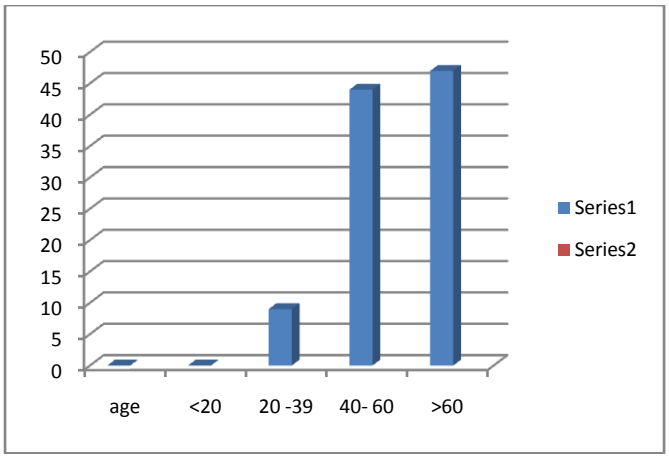
RBS
Complete blood count
Lipid profile

III. Results

AGE DISTRIBUTION

Out of 100 patients participated in study 9 are aged between 20 to 39 years, 44 were between 40 to 60 year of age and 47 were more than 60 year of age.

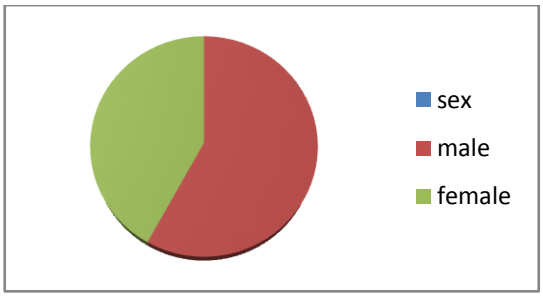
AGE IN YEARS	NO. OF PATIENTS	PERCENTAGE
<20 YRS	0	0
20 -39 YRS	9	9%
40-60 YRS	44	44%
>60 YRS	47	47%



SEX DISTRIBUTION

Out of 100 patients, 58 were male and 42 were female.

SEX	NO. OF PATIENTS	PERCENTAGE
MALE	58	58%
FEMALE	42	42%



FIBRINOGEN

Plasma fibrinogen was measured for all the patients in our study as soon as they got admitted. It is noted that lowest value seen in our patients is 179 and highest value is 530. The mean value is 403.84 and standard deviation 85.73 and standard error of mean is 8.6.

LEVEL OF CORRELATION WITH PLASMA FIBRINOGEN

FACTORS	CORRELATION COEFFICIENT
SBP	0.0708
DBP	0.022
RBS	0.341
SSS	0.43
MRS- AD	0.86
MRS- DIS	0.26

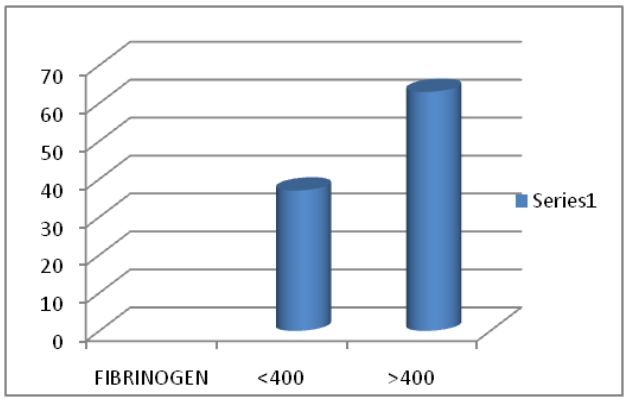
All the data were analyzed , and correlation coefficient was deduced using Pearson method. We compared fibrinogen value with SBP, DBP, RBS, Scandinavian stroke scale, modified Rankin scale at admission and discharge.The correlation coefficient is more in MRD- AD and SSS.
Then using correlation coefficient and other data p value was calculated for each one.
P value for SBP, RBS, SSS, MRS-AD, MRS-DIS was <0.01 and hence statistically significant.

FIBRINOGEN STATISTICS FROM GROUPED DATA	
N	100
MEAN	403.84
MEDIAN	420
MODE	400
STANDARD DEVIATION	85.73
STANDARD ERROR OF MEAN	8.6
VARIANCE	7350.66
MINIMUM	179
MAXIMUM	530
RANGE	351

FIBRINOGEN IN THIS STUDY

In the study of all 100 patients, 63% of the patients were having fibrinogen level of >400, and 37% were having fibrinogen level <400, depicted in the bar diagram**.**

FIBRINOGEN	N	PERCENTAGE
<400	37	37%
>400	63	63%

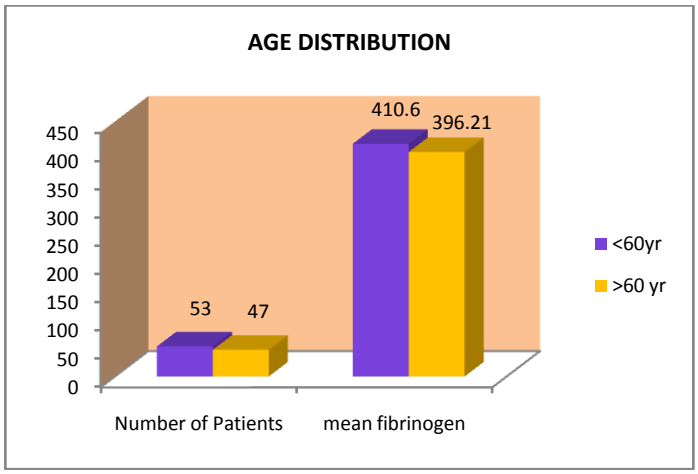


AGE DISTRIBUTION:

FIBRINOGEN

	<60 yr	>60 yr
N	53	47
MEAN	410.6	396.21

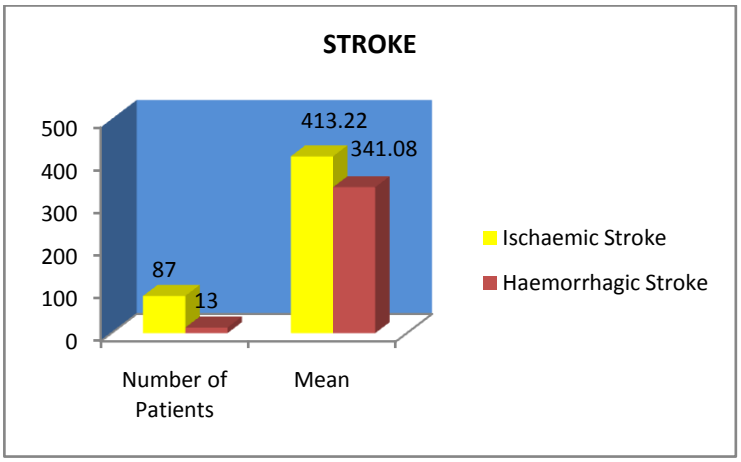
P value <0.01 statistically significant.



STROKE

FIBRINOGEN

	ISCHEMIC	HEMORRHAGIC
N	87	13
MEAN	413.22	342.08



IV. Discussion And Conclusion

This study was conducted among the Indian population involving 100 patients who got admitted in our hospital with clinical features and investigations suggestive of cerebrovascular accident. All the cases were divided into two groups as per CT scan finding , namely hemorrhage and infarction.

We evaluated the fibrinogen value with Scandinavian stroke scale(ranges from 0-58) and found that the fibrinogen value was inversely related with stroke severity and it was found to be statistically significant ($p<0.01$). The mean SSS scoring was 29.89.Hence patients having high fibrinogen value associated with increased severity of stroke.

In our study , of all the stroke patients mean fibrinogen level was raised and it was 403.84 with a standard deviation of 85.73 and standard error of mean was 8.6, with a statistically significant p value(0.03).

The minimum value observed was 179 among the patients and the maximum was 530. 63% of the patients were having fibrinogen level >400 and 37% were having <400.

del Zoppo et al(2009)[7] report new data on the association between hyperfibrinogenemia and functional prognosis after ischemic stroke using the placebo data from 2 well-known clinical interventional trials on the use of defibrinogenating agent ancrod in acute ischemic stroke.

Swarowska, Marta,(2014) et al[8]. "The sustained increase of plasma fibrinogen during ischemic stroke predicts worse outcome independently of baseline fibrinogen level. The sustained fibrinogen's increase was defined as the persistent elevation of fibrinogen's concentration on days 7 and 14 by at least 20 % compared to the level on day 1.

Lee, Seong-Joon,(2017) et al[9]. "Association of fibrinogen level with early neurological deterioration among acute ischemic stroke patients with diabetes. Elevated fibrinogen is dose-dependently associated with END in patients with diabetes following acute ischemic stroke**.**

In the study by **Amit kumar et al** and **Mistry P et al** on the stroke patients showed raised mean fibrinogen level i.e. 602±197 and 534±74 respectively, the p value were statistically significant (< 0.05).

Plasma fibrinogen level at the time of admission correlated with the severity of stroke. This is suggested by the fact that the plasma fibrinogen value increases, the Scandinavian stroke scale decreases.

Plasma fibrinogen acts as a prognostic marker to predict functional outcome of stroke. This is evidenced by higher plasma fibrinogen values correlated with modified Rankin scale at the time of admission and discharge.

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