SERUM URIC ACID LEVEL IN ACUTE ISCHAEMIC STROKE

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ABSTRACT: INTRODUCTION: Stroke entails a high socioeconomic burden due to increased mortality and morbidity. Early identification of individual at risk could be of helpful in designing primary prevention strategies¹. The role of serum uric acid (SUA) level as an independent risk factor for stroke has been questioned for many years². Evidence from epidemiological studies suggest that elevated SUA levels may predict an increased risk for stroke and cardiovascular events^{2,3}. **AIMS AND OBJECTIVES:** 1. study the clinical profile of stroke patient with normal and elevated uric acid. 2. To study the incidence of stroke with normal and elevated uric acid and its correlation with other risk factors (i.e. hypertension, diabetes, alcohol, hyperlipidemia). **MATERIAL AND METHODS:** The present study was carried out on 100 patients of acute ischaemic stroke. In each case, the diagnosis of recent ischaemic stroke was confirmed by CT scan of brain. Patients having disease known to increase serum uric acid or taking drugs which can cause hyperuricemia were excluded from study. Detailed clinical and physical examination with relevant investigation was done in all cases and statistical analysis with Chi square and student 't' test were applied wherever appropriate and p value < 0.05 was considered significant. **RESULTS:** In present study total 100 cases out of them 54% Patients were male and 46% patients were female, majority of patients (62%) were in the age group of 50 to 80 years. Mean age ($\pm$ SD) of stroke patients was 58.73 ± 13.97 years, Mean serum uric acid ($\pm$ SD) of hyperuricemic patients 9.52 ± 2.56 mg/dl, in patient below 60 years 6.01 ± 2.93 mg/dl, in patient above 60 years 6.59 ± 2.40 mg/dl, amongst hypertensive 6.30 ± 2.64 mg/dl, amongst diabetic 6.90 ± 3.02 mg/dl, Mean SSS Score in patient with elevated serum uric acid was 38.31 ± 11.31 vs. 31.35 ± 12.64 in patient with normal serum uric acid p value equals 0.0116. **CONCLUSION:** The prevalence of hyperuricemia in acute ischaemic stroke patients in present study was 29%. Alcoholism amongst male showed statistically significant positive correlation with hyperuricemia in patient with acute ischaemic stroke. Patient with hyperuricemia were having poor neurological status as compared to patients without hyperuricemia when assessed at the time of admission showing statistically significant relation. Outcome was also poor with rising level of serum uric acid but no statistically significant relationship was found in between outcome of patient and hyperuricemia in patient with acute ischaemic stroke.

KEY WORDS: serum uric acid, acute ischaemic stroke, hyperuricemia

INTRODUCTION: Stroke entails a high socioeconomic burden due to increased mortality and morbidity. Early identification of individual at risk could be of help in designing primary prevention strategies¹. The role of serum uric acid (SUA) level as an independent risk factor for stroke has been questioned for many years². Evidence from epidemiological studies suggest that elevated SUA levels may predict an increased risk for stroke and cardiovascular events^{2,3}. In some studies serum uric acid has been linked to prognosis of patient with acute ischaemic stroke. Evidence suggests that increased level of uric acid is bad prognostic factor in patients with acute ischaemic stroke while some studies suggest increased level of serum uric acid as protective in patient with acute

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ischaemic stroke^{4,5}. In this respect SUA level could be as an 'easy to measure' serum marker in selecting and appropriately treating subjects at risks as well as it could be marker of value in prognosis of patient with acute ischaemic stroke. The present study is designed to study the association between serum uric acid and stroke. The study is also intended to study the association between traditional risk factor for stroke and serum uric acid level in patients of acute ischaemic stroke as well as prognostic significance.

AIMS AND OBJECTIVES:

1. To study the incidence of stroke with normal and elevated uric acid and its correlation with other risk factors (i.e. hypertension, diabetes, alcohol, hyperlipidemia).
2. To study the clinical profile of stroke patient with normal and elevated uric acid.

MATERIAL & METHODS: The present study was carried out on 100 patients of acute ischaemic stroke. Detailed clinical and physical examination with relevant investigation was done in all cases and statistical analysis with Chi square and student 't' test were applied wherever appropriate and p value < 0.05 was considered significant. In each case, the diagnosis of recent ischaemic stroke was confirmed by CT scan of brain.

Inclusion criteria: Cases of acute ischemic stroke, of both sexes defined as rapidly developing clinical symptoms and signs of focal or global loss of cerebral function with symptoms lasting more than 24 hours or leading to death with no apparent cause other than that of vascular origin [WHO 1980]⁶. In each case, the diagnosis of recent ischaemic stroke was confirmed by CT scan of brain.

Exclusion criteria: Patients having disease known to increase serum uric acid or taking drugs which can cause hyperuricemia were excluded from study. Haemorrhagic stroke, embolic stroke & old cases of Stroke were excluded from study

METHODOLOGY: On admission in hospital detailed history was taken and thorough physical examination was performed. The serum uric acid was estimated by the Uricase / PAP method in the Central Laboratory of Rajendra Institute of Medical Sciences, Ranchi. A one milliliter sample of blood was collected in the fasting state in a clean glass vial and was then taken to the Central Lab where it was centrifuged and the serum collected. Ten microliter of the serum was then mixed with thousand microliter of reagent and incubated for ten minutes. The reading was then taken by spectrophotometric method in a semi-automatic analyser, Chi square and student't' test were applied wherever appropriate. p value < 0.05 was considered significant.

OBSERVATIONS AND RESULTS:

Sl. No.	Age groups (in years)	Sex		Total (n=100)
		Male	Female	
1	<40	06 (11%)	06 (13%)	12
2	41-50	15 (28%)	09 (20%)	24
3	51-60	12 (22%)	10 (22%)	22
4	61-70	09 (17%)	13 (28%)	22
5	71-80	10 (19%)	08 (17%)	18

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6	>81	02 (04%)	00 (00%)	02
7	TOTAL	54	46	100

TABLE- 1: Distribution of Cases According to Age & Sex in Patient with Acute Ischaemic Stroke

54% Patients were male and 46% patients were female, majority of patients (62%) were in the age group of 50 to 80 years.

Sl. No.	Age groups (in years)	No. of cases based on SUA level		Total (n=100)
		SUA ≤7 mg% (n=71)	SUA >7 mg% (n=29)	
1	<40	11 (15.5%)	01 (3%)	12
2	41-50	21 (30%)	03 (10%)	24
3	51-60	13 (18%)	09 (31%)	22
4	61-70	13 (18%)	09 (31%)	22
5	71-80	11 (15.5%)	07 (24%)	18
6	>81	02 (3%)	00 (00%)	02
7	TOTAL	71	29	100

TABLE – 2: Distribution of cases according to Age & its Relation with Uric Acid in Acute Ischaemic Stroke

Mean age (±SD) of stroke patients = 58.73±13.97 years

Mean serum uric acid (±SD) of hyperuricemic patients = 9.52± 2.56 mg/dl

Mean serum uric acid (±SD) in patient below 60 years = 6.01±2.93 mg/dl

Mean serum uric acid (±SD) in patient above 60 years = 6.59±2.40 mg/dl

(≤60 years vs. >60 years; chi square = 16.870; p =0.0002; Significant)

Out of 29 hyperuricemic patient 16(55%) were above the age of 60 years as compared to patient with normal serum uric acid in whom out of 71 only 26 (37%) patients were above 60 years}

Sl. No.	Sex	No. of cases based on SUA level		Total (n=100)
		SUA ≤7 mg% (n=71)	SUA >7 mg% (n=29)	
1	Male	37 (52%)	17 (59%)	54
2	Female	34 (48%)	12 (41%)	46
3	Total	71	29	100

TABLE – 3: Distribution of cases according to Sex & its Relation with Uric Acid in Acute Ischaemic Stroke

Mean serum uric acid (±SD) hyperuricemic male = 9.97±3.02 mg/dl

Mean serum uric acid (±SD) hyperuricemic female = 8.89±1.62 mg/dl

(Male vs. female; 't' value = 1.126; p = 0.2702; non significant)

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{This study includes 54 males and 46 females, males were having higher Incidence (59%) of hyperuricemia as compared to females (41%).}

Sl. No.	Blood pressure	No. of cases based on SUA level		Total (n=100)
		SUA ≤ 7 mg% (n=71)	SUA > 7 mg% (n=29)	
1	Normal BP	16 (23%)	Nil	16
2	Pre hypertension SBP-120 to 139 DBP-80 to 89	17 (24%)	11 (38%)	28
3	Stage 1 Hypertension SBP 140-159 DBP-90-99	16 (23%)	6 (21%)	22
4	Stage 2 Hypertension SBP >160 , DBP >100	22 (31%)	12 (41%)	34
5	Total	71	29	100

TABLE – 4: Correlation of Hypertension and Serum Uric Acid in Acute Ischaemic Stroke

Mean serum uric acid ($\pm$ SD) amongst hypertensive = 6.30 ± 2.64 mg/dl

Mean serum uric acid ($\pm$ SD) amongst non-hypertensive = 6.19 ± 2.85 mg/dl

(Hypertensive vs. Non-hypertensive; chi square = 2.715; p = 0.043; Significant)

None of the hyperuricemic patient was Normotensive. In 29 patient with hyperuricemia 11 (38%) were having pre-hypertension and 18(62%) were hypertensive as compared to patient with normal serum uric acid where 38 (54%) were hypertensive.}

Sl. No.	Status	No. of cases based on SUA level		Total (n=100)
		SUA ≤ 7 mg% (n=71)	SUA > 7 mg% (n=29)	
1	Diabetic	14 (20%)	10 (34%)	24
2	Non-diabetic	57 (80%)	19 (66%)	76
3	Total	71	29	100

TABLE – 5: Correlation of Diabetes and Serum Uric Acid in Acute Ischaemic Stroke

Mean serum uric acid ($\pm$ SD) amongst diabetic = 6.90 ± 3.02 mg/dl

Mean serum uric acid ($\pm$ SD) amongst non-diabetic= 6.05 ± 2.61 mg/dl

(Diabetics Vs Non-diabetics; Chi square = 1.718; p = 0.190: non significant)

{34% of patients with hyperuricemia were diabetic as compared to patient with normal serum uric acid in which only 20% patients were diabetic}.

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Sl. No.	Lipid profile (mg %)	No. of cases based on SUA level		Total (n=100)
		SUA ≤ 7 mg% (n=71)	SUA > 7 mg% (n=29)	
1	No dyslipidemia (S. Cholesterol < 200 mg%) (S. Triglyceride < 160 mg%)	32 (45%)	07 (24%)	39
2	Hypercholesterolemia (S. Cholesterol > 200 mg%)	10 (14%)	05 (17%)	15
3	Hypertriglyceridemia (S. triglyceride > 160 mg%)	19 (27%)	10 (35%)	29
4	Combined dyslipidemia	10 (14%)	07 (24%)	17
5	TOTAL	71	29	100

TABLE – 6: Correlation of Lipid Profile and Serum Uric Acid in Acute Ischaemic Stroke

(No dyslipidemia Vs dyslipidemia; chi square = 0.273; p = 0.872, non significant)

(The incidence of dyslipidemia was almost equal amongst patient with hyperuricemia and without hyperuricemia)

Sl. No.	Status	No. of cases based on SUA level		Total (n=100)
		SUA ≤ 7 mg% (n=71)	SUA > 7 mg% (n=29)	
1	Alcoholic	20 (28%)	12 (41%)	32
2	Non-Alcoholic	51 (72%)	17 (59%)	68
3	Total	71	29	100

TABLE – 7: Correlation of Serum Uric Acid and Alcoholism in Acute Ischaemic Stroke

Mean serum uric acid ($\pm$ SD) among alcoholic = 6.75 ± 3.58 mg/dl

Mean serum uric acid ($\pm$ SD) among non-alcoholic = 6.02 ± 2.20 mg/dl

(Alcoholic Vs Nonalcoholic; Chi square = 1.886; p = 0.1697; non significant)

{Prevalence of alcoholism in our study was 32%.out of which 12 (41%) patients was hyperuricemic. All alcoholics were male. Although overall there was no significant correlation in between serum uric acid and alcoholism. Significant positive correlation $p < 0.05$ was present amongst male alcoholics.}

Sl. No.	Arterial territory involved	No. of cases based on SUA level		Total
		SUA ≤ 7 mg% (n=71)	SUA > 7 mg% (n=29)	
1	MCA	60 (85%)	23 (79%)	83

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2	MCA, ACA	06 (8%)	01 (3%)	07
3	PCA	05 (7%)	05 (18%)	10
4	Total	71	29	100

TABLE – 8: CT Scan Arterial Territory Involved

Majority (83%) of patients were having infarct in MCA artery territory. In 07% of patients MCA and ACA both were involved. In 10% of patients PCA artery was involved

Sl. No.	SSS	No. of cases based on SUA level		Total (n=100)
		SUA ≤7 mg% (n=71)	SUA >7 mg% (n=29)	
1	<20	18(25%)	03(10%)	21
2	21-30	18(25%)	06(21%)	21
3	31-40	19(27%)	07(24%)	27
4	41-50	14(20%)	09(31%)	26
5	>51	02(3%)	04(14%)	05

TABLE – 9: Correlation of Serum Uric Acid and SSS in Acute Ischaemic Stroke

Mean SSS Score in hyperuricemic patients = 38.31±11.31

Mean SSS Score in normal patients = 31.35±12.64

(SSS ≤30 Vs >30; 't' value = 2.573 ; p = 0.0116; significant)

Mean SSS Score in patient with elevated serum uric acid was 38.31±11.31 vs. 31.35±12.64 in patient with normal serum uric acid p value equals 0.0116, which is statistically significant.

{Majority of patients 20 (69%) with elevated serum uric acid) were having SSS score >30 as compared to patients with normal serum uric acid who in whom only 35 (49%) were having SSS score >30}.

SUA Level	No. of cases	SUA (Mean±SD)	mRS (Mean±SD)
1.0– 6.0	57	4.47±1.01	3.86±1.31
6.1 – 11.0	40	8.05±1.39	3.87±1.24
11.1 – 16.0	2	14.5±2.12	4.5±0.70
16.1 – 21.0	1	18.0±0.00	5.0±0.00
Total	100		

Table – 10: Correlation of Mean Serum Uric Acid and Mean Modified Rankin's Scale (Outcome) in Acute Ischaemic Stroke

Above table shows that as mean mRS is increased, mean serum uric acid level is also increased.

Sl. No.	mRS	No. of cases based on SUA level		Total (n=100)
		SUA ≤7 mg% (n=71)	SUA >7 mg% (n=29)	
1	1	04 (06%)	00 (00%)	04
2	2	08 (11%)	09 (31%)	17
3	3	16 (23%)	08 (28%)	24
4	4	20 (28%)	06 (21%)	26
5	5	15 (21%)	03 (10%)	19
6	6	08 (11%)	03 (10%)	10
7	Total	71	29	100

Table – 11: Correlation of Serum Uric Acid and Outcome by Modified Rankin's Scale in Acute Ischaemic Stroke

Mean modified Rankin's scale in hyperuricemic patient = 4.13 ± 1.02

Mean modified Rankin's scale in normal patient = 3.81 ± 1.35

[mRS <3 vs. mRS ≥3; 't' value = 1.148; p = 0.253, non-significant]

{Mean mRS score in patients with normal serum uric acid 3.81 ± 1.35 vs. 4.13 ± 1.02 in patient with hyperuricemia; student 't' test $p > 0.05$ statistically non-significant}

DISCUSSION:

Table 1: Distribution of cases according to Age & sex in patient with acute ischaemic stroke:

The present study included total 100 patients with new onset of acute ischaemic stroke. Out of 100 patients 54% patients were male and 46% patients were female. Majority of patients (62%) were in the age group of 50 to 80 years. 12 patients were below the age of 40 years and 2 patients were above the age of 80 years.

Table 2: Distribution of cases according to age & its relation with uric acid in acute ischaemic stroke:

In present study old age appears to be a big risk factor for both stroke and hyperuricemia. We found prevalence of hyperuricemia in stroke patient was 29%. Mean serum uric acid was 9.52 ± 2.56 mg/dl. Out of 29 hyperuricemic patient 16 (55%) were above the age of 60 as compared to patient with normal serum uric acid in whom 26 (37%) patients were above sixty (P value <0.05, Significant). Overall 44% patients were above the age of 60 years. Mean age of stroke in our study was 58.73 ± 13.97 years. Average serum uric acid in patient above 60 years was 6.59 ± 2.40 mg/dl as compared to patient under the age of 60 years in whom mean serum uric acid level was 6.01 ± 2.93 mg/dl.

Bansal et al ²⁴ reported the prevalence of hyperuricemia of 30% in patient with acute ischaemic stroke, with mean serum uric acid of 8.94 ± 2.37 mg/dl. Incidence was more in the age group of 60 to 80 years with mean age of acute ischaemic stroke was 59.40 ± 12.15 years. Our finding is consistent with finding of Bansal et al.

Table 3: Distribution of cases according to sex & its relation with uric acid in acute ischaemic stroke:

The prevalence of hyperuricemia was higher in male. As 17 (59%) out of 29 were male. In

present study mean serum uric acid amongst male was 9.97 ± 3.02 mg/dl and in female mean serum uric acid level was 8.89 ± 1.62 mg/dl. However this difference in serum uric acid and gender is not statically significant (student't test, $p > 0.05$) Males usually have higher prevalence of hyperuricemia as compared to female. This difference is maintained till menopause, after that this difference normalized. The difference is due to uricosuric effect of oestrogen in premenopausal woman.

Chamorro et al 2002⁴ showed a significant relationship between serum uric acid and male gender of patient with acute ischaemic stroke ($p = 0.0001$).

H. J. Millionis et al 2005²² also showed significant relation between serum uric acid level and male gender in patient with acute ischaemic stroke ($p = 0.01$).

In our study incidence of acute ischaemic stroke was more in male with hyperuricemia, which was consistent with above studies.

Possible reason why we are getting insignificant relationship in between sex and serum uric acid level may be due to the fact that majority of woman in present study were postmenopausal, as after menopause uric acid difference tends to equalize in between male and female.

Table 4: Correlation of hypertension and serum uric acid in acute ischaemic stroke: In present study overall 56% patients were hypertensive and 28% patients were prehypertensive. Out of 29 hyperuricemic patients 18 (62%) patients were hypertensive, whereas in patients with normal level of serum uric acid 38(54%) out of 71 were hypertensive. Mean serum uric acid amongst hypertensive was 6.30 ± 2.64 mg/dl and in non-hypertensive it was 6.19 ± 2.85 mg/dl. There was significant positive relationship was found in between hypertension and hyperuricemia ($P < 0.05$)

Chamorro et al 2002⁴ showed a positive relationship in between Hypertension and serum uric acid in patient with acute ischaemic stroke ($p < 0.05$) with the mean serum uric acid of 5.35 ± 1.88 mg/dl amongst hypertensive stroke patients and 4.83 ± 1.56 mg/dl amongst non-hypertensive stroke patients.

Jiunn-Horng Chen et al 2009²⁵ done a prospective cohort study of 41,879 men and 48,514 women ages > 35 years using data from the MJ Health Screening Centre in Taiwan and reported incidence of hypertension in approximately 32% of patients and shown a significant relationship in between hyperuricemia and hypertension in stroke patients ($p < 0.05$).

So our finding is consistent with the finding of above mentioned studies although we found higher incidence of hypertension 56% as compared to study done by Jiunn-Horng Chen et al 2009²⁵ possible reason is lack of awareness regarding hypertension among the patient in our study in whom hypertension present with its complication viz. stroke.

Table 5: Correlation of Diabetes and serum uric acid in acute ischaemic stroke: In present study out of 29 hyperuricemic patient 10 (34%) patients were diabetic as compared to patient with normal serum uric acid in whom only 14 (20%) patients were diabetic. Mean serum uric acid amongst diabetic was 6.90 ± 3.02 mg/dl as compared to non-diabetics in whom it was 6.05 ± 2.61 mg/dl. We didn't found any significant relation in diabetic Vs non-diabetics with serum normal and elevated serum uric acid level ($p > 0.05$).

Chien Kl et al 2008⁹¹ conducted a community-based prospective cohort study of 2690 participants (35-97 years) in the Chin-Shan Community Cardiovascular Cohort Study, and they

reported modest positive association between plasma uric acid concentration and the incidence of diabetes in Chinese individuals ($p < 0.05$).

Chamorro et al 2002⁴ showed lower uric acid level in diabetics 4.98 ± 1.76 mg/dl vs. 5.20 ± 1.78 mg/dl in non-diabetics with a significant association in between hyperuricemia and diabetes in patient with acute ischaemic stroke.

Our finding is consistent with the findings that diabetics were having higher level of serum uric acid but contrary to the findings of Chamorro et al 2002 as we are not getting significant relationship between diabetes and hyperuricemia, possibly due to small sample size.

Table 6: Correlation of lipid profile and serum uric acid in acute ischaemic stroke: In our study we found that there was no significant difference in prevalence of dyslipidemia in patient with hyperuricemia and normal uric acid level. Among hyperuricemic group 22(76%) of patient were dyslipidemic as compared to patient with normal serum acid in which only 39(55%) of patient were dyslipidemic. Overall 61% patient were dyslipidemic in which 15% patients were having elevated cholesterol, 29% were having elevated triglycerides and 17% were having combined dyslipidemia. There was also no statistically significant relationship was found in between hyperuricemia and cholesterol & triglycerides (chi square test, $p > 0.05$).

K Sridhar et al 2010²⁶ studied Total of 100 patients of which 80 were cases of completed stroke and the remaining 20 were controls. They reported that 32 patients had elevated serum total cholesterol levels, of which 81.3% had ischaemic stroke and the rest haemorrhagic stroke. 10 patients had elevated serum triglyceride levels, of which 80% had ischaemic stroke and the rest haemorrhagic stroke.

Chamorro et al 2002⁴ showed insignificant relationship between dyslipidemia and serum uric acid in patient with acute ischaemic stroke. They reported mean serum uric acid value of 5.21 ± 1.70 mg/dl amongst dyslipidemic patient as compared to 5.11 ± 1.81 mg/dl in non dyslipidemic.

Our finding is similar to finding of Chamorro et al 2002, but in comparison to study by K Sridhar et al 2010²⁶ we found higher incidence of Hypertriglyceridemia and lower incidence of hypercholesterolemia.

Table 7: Correlation of serum uric acid and Alcoholism in acute ischaemic stroke: We found overall Prevalence of alcoholism in present study was 32%.out of which 12 (47%) patient were hyperuricemic. All alcoholics were male. Although there was no significant correlation between hyperuricemia and alcoholism in acute ischaemic stroke significant positive correlation was present amongst male alcoholics ($p < 0.05$).

Mean serum uric acid among alcoholic were 6.75 ± 3.58 mg/dl as compared to non-alcoholic in which it was 6.02 ± 2.20 mg/dl.

Chamorro et al 2002⁴ reported mean serum uric acid in alcoholic 5.46 ± 1.67 mg/dl vs. 5.10 ± 1.79 mg/dl in non-alcoholics. They had shown a weak positive correlation in between alcohol and hyperuricemia in acute ischaemic stroke patient.

Our finding is consistent with the fact that mean uric acid levels are higher in alcoholic but we are not getting statistically significant result may be due to the fact that in our study woman were exclusively non-alcoholic.

Table 8: CT scan arterial territory involved: Majority (83%) of patients were having infarct in MCA artery territory. In 07% of patients MCA and ACA both were involved .in 10 % of patients PCA artery was involved. So our finding is consistent with fact MCA is most common territory to be involved in ischaemic stroke.

Table 9: Correlation of serum uric acid and SSS in acute ischaemic stroke: Mean SSS Score in hyperuricemic patients was 38.31 ± 11.31 vs. 31.35 ± 12.64 in patient with normal serum uric acid (t value = 2.573; P value < 0.05; statically significant). Majority of hyperuricemic patients (20 patient; 69%) were having SSS score >30 as compared to patients with normal serum uric acid who in whom only (35; 49%) were having SSS score >30.

Chamorro et al 2002⁴ showed higher Mathew score on admission ($P \pm 0.001$) in patients with acute ischaemic stroke with higher uric acid level at the time of admission higher Mathew score depict a better clinical condition.

Our finding is consistent with the finding of above study.

Table 10: Correlation of mean serum uric acid and mean modified Rankin Scale (outcome) in acute ischaemic stroke: At present study as mean serum uric acid level increased, mean modified Rankin Scale (mRS) also increased that indicating poor outcome with rise in serum uric acid.

Table 11: Correlation of serum uric acid and outcome by modified Rankin's scale in acute ischaemic stroke: In present study at the time of outcome mean modified Rankin's scale in hyperuricemic patient was 4.13 ± 1.02 vs. 3.81 ± 1.35 in patient with normal level of serum uric acid. There was no significant difference between these two groups. (t value = 1.148; p > 0.05).

Poor outcome was defined as modified Rankin's scale 3 or more than 3. There was also no significant difference was found amongst hyperuricemic patient and patient with normal level of serum uric acid in terms of good outcome or bad outcome (p > 0.05).

Weir et al 2003 who studied 3731 patients and measured serum urate in 2498 reported that elevated urate level predict a lower chance of good 90-day outcome independent of stroke severity and other prognostic factors.

Chamorro et al 2002⁴ reported in 881 patients with acute ischaemic stroke, there is a 12% increase in the odds of good clinical outcome for each milligram per deciliter increase of serum uric acid. This finding reinforces the relevance of oxidative damage in ischaemic stroke. In our study, there is relation between increasing serum uric acid and poor outcome but statistically it is not significant.

Possible reasons are small sample size and follow up only during the hospital stay. Large trials are required to provide definite answers in clinical practice.

CONCLUSION: The prevalence of hyperuricemia in acute ischaemic stroke patients in present study was 29%. Out of all the traditional risk factors for stroke analysed, age, hypertension and alcoholism amongst male showed statistically significant positive correlation with hyperuricemia in patient with acute ischaemic stroke. Patient with hyperuricemia were having poor neurological status as compared to patients without hyperuricemia when assessed at the time of admission showing statistically significant relation. Outcome was also poor with rising level of serum uric acid but no

statistically significant relationship was found in between outcome of patient and hyperuricemia in patient with acute ischaemic stroke.

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