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Research Paper

Medical Science

KEYWORDS :

To Study the Correlation Between Serum Uric Acid Levels and Acute Ischemic Stroke.

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ABSTRACT

AIM AND OBJECTIVES: TO STUDY THE RELATION OF SERUM URIC ACID LEVELS AS A RISK FACTOR IN ACUTE ISCHEMIC STROKE.

MATERIALS AND METHODS: This Cross-Section Study Was Performed From 2011 To 2014 on 50 Patients attending To Gandhi Hospital Medicine Department SECUNDERABAD With Ischemic Stroke With Focal Neurological Deficit.

RESULTS: Out of 80 patients studied, 56 were males and 24 were females. Male: female ratio was 2.3:1. . Mean SUA level in cases was 6.48 ± 1.92 mg / dl whereas it was 5.09 ± 1.07 mg/dl for controls. Mean SUA level was significantly higher in cases as compared to controls (P< 0.001). Hypertension, Diabetes and serum Uric Acid were independently associated with stroke according to our study. But the mean SUA in hypertensive subjects (6.42 ± 1.85 mg/dl) was higher than that in normotensive subjects (5.49 ± 1.55 mg/dl) and was statistically significant (P= 0.00). There was a statistically significant difference between SUA levels in diabetic (6.85 ± 1.86 mg/dl, Range 3.1 – 12 mg/dl) and non-diabetic patients (5.56 ± 1.58 mg/dl, Range 2.1 - 11 mg/dl)) (P = 0.00)

CONCLUSIONS: SUA is highly sensitive and an independent risk factor for Ischemic stroke in patients even without other traditional risk factors for atherosclerosis.

INTRODUCTION: Stroke entails a high socio-economic burden due to increased morbidity and mortality. The elderly (continuously increasing proportion of the population in the developed countries) are more frequently affected. Ischemic stroke accounts for more than 80% of total stroke events. Stroke entails a high socio-economic burden due to increased morbidity and mortality. The elderly (continuously increasing proportion of the population in the developed countries) are more frequently affected. Ischemic stroke accounts for more than 80% of total stroke eventsStroke is the third most common cause of death, morbidity and long term disability in the world after coronary heart disease and cancer especially in the elderly. Mortality rate of stroke in the acute phase is as high as 20%. Stroke is the second cause of disability and dementia in adults aged ≥ 65 years worldwide. Close to 25% of stroke survivors develop dementia. Up to 40% of survivors are not expected to recover their independence with self-care and 25% become unable to walk independently.

Stroke constitutes 15-20% of all admissions in GANDHI HOSPTIAL. Furthermore, traditional atherogenic risk factors such as hypertension, smoking, diabetes don't fully account for the clinical occurrence of CHD and stroke in different population. Many studies including the NHANES study concluded that uric acid is an independent risk factor for development of cardiovascular and cerebrovascular diseases. In contrast the Framingham Heart Study concluded that an association between hyperuricemia and cardiovascular diseases merely reflects the link between serum uric acid and other risk factors, including hypertension, renal disease, elevated lipoprotein levels and the use of diuretics

Therefore it is unclear whether SUA promotes or protects against the development of cerebrovascular disease or simply acts as a passive marker of increased risk. Amidst this controversy and lack of Indian data, it was decided to carry out the present study with the aim of studying "CORRELATION BETWEEN SERUM URIC ACID LEVELS AND ACUTE ISCHEMIC STROKE" at GANDHI HOSPTIAL, SECUNDERABAD. We evaluated potentially modifiable risk factors for acute ischemic stroke, including SUA.

Limited work has been done on Uric Acid changes in stroke despite high incidence of CVAs in INDIA.

Methods: The study was initiated with the approval of institutional ethics committee. This cross-section study was performed from 2011 to 2014. 50 patients attending to Gandhi hospital medicine department. Serum uric acid levels were measured by uricase method

INCLUSION CRITERIA

- PATIENTS WITH ISCHEMIC STROKE WITH FOCAL NEUROLOGICAL DEFICIT GANDHI HOSPITAL MEDICINE DEPARTMENT.

EXCLUSION CRITERIA

- TIA
- GOUT
- ARF/CKD
- NEPHROLITHIASIS
- RECURRENT CVA
- The study groups comprised of 40 patients with ACTUE ISCHEMIC STROKE belongs to age group above 40years. among these 27 were males and 13 were females.

RESULTS: Out of 80 patients studied, 56 were males and 24 were females. Male: female ratio was 2.3:1. The controls were appropriately age and sex matched. The mean age of cases was 60.05 ± 9.98 and the range was 36 to 86, whereas the mean age of controls was 60.32 ± 10.11 (with the range from 40 to 80 years). The difference between the two groups was not statistically significant (P = 0.8).

The mean SUA was 5.94 ± 1.72 (Range 2.1 - 12) mg/ dl for males and 5.51 ± 1.64 (Range 2.1 - 10) mg/dl for females [1,2]. SUA values were higher among males as compared to females, but this difference was not statistically significant

In our study, correlaton between obesity and ischemic stroke was found to be independent on multiple logistic regression analysis. (OR=0.116,Z=-3.636,95% C.I=-3.321 TO -0.995,P<0.05) [3,4].

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In this study the mean SUA level in smokers was higher in smokers (6.36 ± 1.78 vs. 5.69 ± 1.67 mg/dl, P = 0.05) [5].

In our study, we found a significant inverse correlation between SUA levels and HDL cholesterol, and a positive correlation between SUA and serum triglyceride levels (r = -0.334, P = 0.001 for HDL and r = 0.294, P = 0.001 for triglycerides)[6].

Comparison of conventional risk factors for ischemic stroke (confounding variables) between cases and controls. Mean SUA level in cases was 6.48 ± 1.92 mg / dl whereas it was 5.09 ± 1.07 mg/dl for control. Mean SUA level was significantly higher in cases as compared to controls (P< 0.001)[7,8].The association of various risk factors with ischemic stroke done in the multiple logistic regression analysis. This analysis shows that hypertension and diabetes were found to be independently associated with ischemic stroke.

It was also found that serum uric acid was also independently associated with ischemic stroke. In the present study there was a significant correlation between SUA level and NIHSS score on admission (r = 0.407, P < 0.001). NIHSS scores on discharge also correlated significantly with SUA levels (r = 0.398, P < 0.001.

The mean SUA in hypertensive subjects (6.42 ± 1.85 mg/dl) was higher than that in normotensive subjects (5.49 ± 1.55 mg/dl). This difference was statistically significant (P= 0.00)[9].

There was a statistically significant difference between SUA levels in diabetic (6.85 ± 1.86 mg/dl, Range 3.1 – 12 mg/dl) and non-diabetic patients (5.56 ± 1.58 mg/dl, Range 2.1 - 11 mg/dl)) (P = 0.00)[10].

Table 1: PATIENTS AGE & SEX DISTRIBUTION

AGE GROUP	NO.OF PATIENTS	
	Male	Female
50-55	4	6
56-60	7	1
61-65	6	0
66-70	4	1
>70	6	5

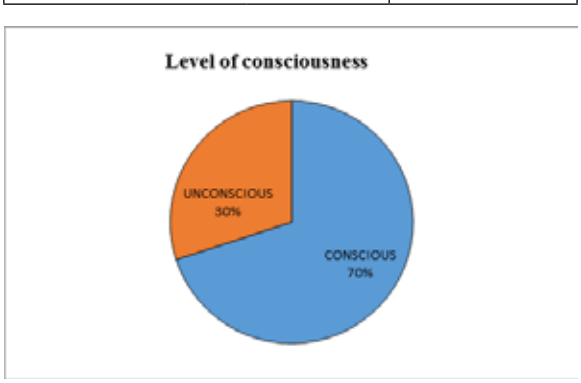

Table 2: SERUM URIC ACID LEVELS IN PATIENTS

RANGE	NO.OF PAITENTS	
	Male	Female
5.0-5.5	5	1
5.6-6.0	8	4
6.1-6.5	7	1
6.6-7.0	5	5
7.1-7.5	0	2
7.6-8	2	0

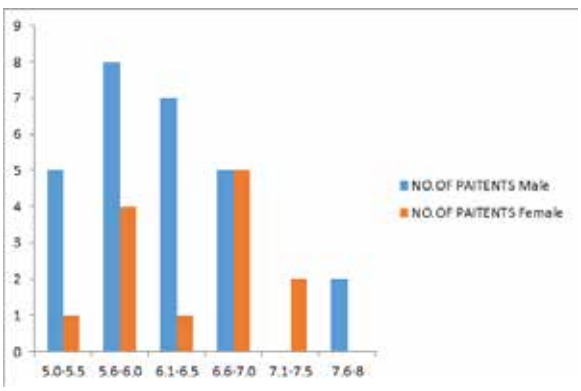

Figure 2: Serum Uric Acid Levels in Patients

Table 3: CONTROLS AGE & SEX DISTRIBUTION

RANGE	NO.OF CONTROLS	
	Male	Female
4.0-4.5	6	0
4.6-5.0	4	5
5.1-5.5	4	1
5.6-6.0	8	7
>6.1	4	1

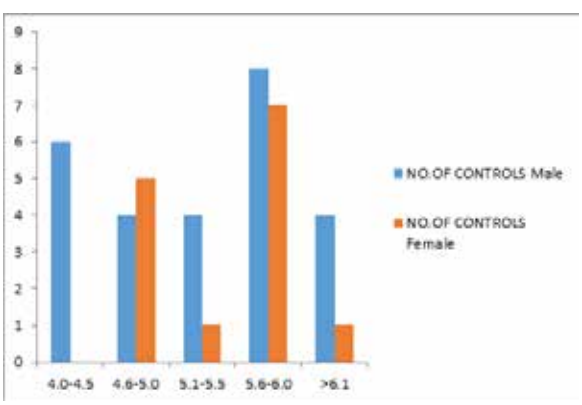

Figure3: Serum Uric Acid Levels in Controls

RANGE	NO.OF CONTROLS	
	Male	Female
4.0-4.5	6	0
4.6-5.0	4	5
5.1-5.5	4	1
5.6-6.0	8	7
>6.1	4	1

Table 4: SERUM URIC ACID LEVELS IN CONTROLS

RANGE	NO.OF CONTROLS	
	Male	Female
4.0-4.5	6	0
4.6-5.0	4	5
5.1-5.5	4	1
5.6-6.0	8	7
>6.1	4	1

Table 5: Comparison of Serum Uric Acid Levels in Cases and Controls:

	Cases	Controls	P value
Mean SUA	6.24 +/- 0.66	5.4 + /- 0.65	<0.001
Range	5.2 - 7.8	4.0 -6.5	
Median	6.15	5.6	

DISCUSSION:

- The well recognized risk factors for stroke like age, diabetes, and hypertension explain only a part of the cases. Hence a search for other risk factors is the need of the hour. This study was conducted to study the role of serum uric acid in acute ischemic stroke and its effect on stroke outcome.
- The male to female ratio was 2.3:1. The mean age of the cases was 60.05 ± 9.98 years with the range of 40 to 80 years. These findings are consistent with the data published by Pandiyan et al[11] who observed a male: female ratio of 1.9:1 and mean age of stroke patients as 61.7 ± 13.4 years.
- In this study, SUA levels represent an independent risk marker for acute ischemic nonembolic stroke in elderly individuals. This association was not attenuated after adjustment for the presence of established CV and cerebrovascular risk factors such as hypertension (defined according to history and/or relevant treatment), diabetes mellitus as well as for variables that could affect SUA levels.

The selection criteria for cases and controls were strict in the present study, excluding patients with any history of vascular disease and/or potential source of emboli. This was decided in order to attenuate the heterogeneity of the sample studied and to increase the chances of correctly identifying any associations present.

In our study high base line SUA value (>5mg/L) was present in 80% of Ischemic patients (p value<0.001).

CONCLUSIONS:

1. The Serum Uric Acid was significantly elevated in patients with Ischemic stroke and can be used as a marker for increased risk of stroke. Furthermore, SUA can also be used for risk stratification after stroke.
2. This was highly sensitive independent risk factor for stroke without other traditional risk factors for atherosclerosis. Thus elevated serum uric acid may provide scope for developing new strategies to prevent future strokes.

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