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PREVALENCE OF INCREASED SERUM URIC ACID IN ACUTE HAEMORRAGHIC STROKE

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Introduction:

In clinical practice, uric acid has been used as a marker of severe metabolic disturbances. Its antioxidant property has not been considered important for a longtime. The plasma attention of uric acid is nearly10-fold advanced than other antioxidants similar as Vitamin C and VitaminE. It's considered that uric acid has much advanced antioxidant capacity1. Uric acid which is formed by catabolism of purine is proposed to neutralize the free radical injury that occurs in ischemic stroke. Epidemiological studies have suggested a direct relationship between the situations of the natural antioxidant uric acid and the threat of cerebrovascular and coronary ischemic events2. still it isn't fully clear whether this association indicates that uric acid is an independent ischemic threat factor or it represents a marker of atherosclerotic complaint. Whether the attention of uric acid at the onset of ischemic symptoms influences the inflexibility of stroke also remains to be illustrated.2

AIM

1. To estimate the level of serum uric acid in patients with acute haemorraghic stroke
2. To identify whether uric acid level among the stroke cases has any association with diabetes and hypertension.
3. To study its significance in the outcome of these patients

MATERIALS AND METHODS

Setting - The work was carried out in the medical wards of a tertiary care hospital, Chennai.
Study design - Cross Sectional, analytical hospital based study.
Period of study
Ethical Approval was obtained
Sample size - Study group (Stroke cases) : 100
Control group : 50

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METHODOLOGY

The stroke patients admitted within the above period and who satisfied the set criteria were included. The number of patients in the present study group was 100

INCLUSION CRITERIA

1. Patients with stroke as defined by WHO criteria
Rapidly developing clinical signs of focal or global (coma) neurological deficit lasting more than 24 hrs or leading to death with no apparent cause other than vascular origin.
2. All patients who presented within 48 hours of onset of stroke and who gave informed consent to participate in the study were included.

EXCLUSION CRITERIA

1. Patients with previous history of TIA/RIND.
2. Patients with gout.
3. Patients who were alcoholics.
4. Patients taking drugs causing hyperuricaemia.
5. Patients with previous history of coronary vascular events
6. Kidney disease
7. Patient on medication to reduce oxidant levels
8. Hypothyroidism
9. Inflammatory diseases
10. Steroid therapy

Control group

People without stroke who satisfied the above exclusion criteria and matched for age, gender, diabetes, hypertension were taken as control. The number of controls in the present study was 50.

Data Collection

The socio demographic, clinical, laboratory parameters and outcome data were collected.
Socio demographic data included age of the patients, sex, area of residence, income, diet and time of hospitalisation after stroke.
Clinical data included recording of vital parameters, fundus examination, the type of stroke, conscious level of the patients assessed by the glasscow coma scale and complete neurological examination.
Laboratory parameters included complete blood count, renal function tests, fasting blood sugar and CT Scan brain.

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The serum uric acid level was measured in the stroke patients and control by the uricase method.
The test was done in the Biochemistry Lab at Government General Hospital, Chennai.

Outcome assessment
These patients were followed up for a period of 2 weeks in the hospital and the outcome in them assessed by Glassgow outcome scale[28] at the end of 2 weeks.
GLASGOW OUTCOME SCALE
1. Indicates death
2. Vegetative state (patient is unable to interact with environment)
3. Severe disability (patients is unable to live independently but can follow commands)
4. Moderate disability (patients is capable of living independently but unable to return to work or school).
5. Mild or No disability Patient can return to work or school.
Scale 4 & 5 - Favourable outcome (good outcome)
Scale 1,2 & 3 - Unfavourable outcome (poor outcome)
The data were entered in microsoft excel software and analysed using SPSS v.17 statistically.

RESULTS

Table 1: Baseline characteristics of study participants

Parameter	**Patients (n=100)**		**Controls (n=50)**	**P value**
Age	56.72±1.89 (mean±SD)		50.78±1.39 (mean±SD)	0.546
Gender				
Male	66		30	0.632
Female	34		20	0.61
Serum uric acid level	5.66mg/dL±1.65 (mean±SD)		4.08mg/dL±1.15 (mean±SD)	< 0.001
Risk factors				
Diabetes Mellitus	34		12	0.009
Hypertension	55		13	0.001
Smoking				
Yes	45	p=0.879	-	-
No	55		-	-

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Table 2: Outcome of stroke

Outcome	Patients (n=100)	P value
Good	60	0.001
Poor	40	

DISCUSSION

Uric acid which is an end product of purine metabolism has long been considered only in the pathogenesis of gout and uric acid stones. Its anti-oxidant functions and its various role in the pathogenesis of hypertension, cardiovascular and cerebrovascular events are been considered oflate. Various studies conducted during recent years on serum uric acid levels in vascular events have proven its prognostic significance. Uric acid is also been considered as a marker for atherosclerosis. But the exact pathogenesis and whether it is the cause or effect of atherosclerosis remains to be elucidated. Uric Acid and Gender The serum uric acid level was compared between male and female stroke patients. Though it was increased in males, statistical association between gender and uric acid was not present. But in a study by Chamorro et al.5 serum uric acid levels were found to be higher in males.

In the present study diabetic patients who developed stroke had higher uric acid level than the diabetics in the control group with significant association. Among the stroke patients no significant difference in uric acid levels was found between diabetics and non diabetics. Lehto et al.5 studied uric acid levels in diabetics patients prospectively and showed that it was more elevated in the diabetics who developed stroke.

Hypertensive patients who developed stroke had increased uric acid level than the hypertensive in the control group with statistical significant association ($P < 0.001$). Among the stroke patients, no significant difference in uric acid level was found between the hypertensive and non hypertensives. In a study by Verdecchia P and Schillaci et al.,8 it was proven that there is a definite relation between serum uric acid and essential hypertension. Theodore R Fields et al.,8 in his study on uric acid and cardiovascular disease discussed pathogenic role of uric acid in hypertension - 'Chicken and Egg' theory ie., whether uric acid is the cause or effect of hypertension. In his study, he included coronary artery diseases also and found that uric acid has no etiological role in hypertension. His conclusion was that elevated uric acid is secondary to the systemic hypertension. Elevated serum uric acid in hypertensives can be associated with ischemic stroke. This has been showed in a study by Franeesea Viazzi et al.,9 who found that cerebrovascular events was higher in hypertensives with increased uric acid level.

Smoking was not found to be associated with elevated uric acid levels among patients with stroke in this study. Angel Chamorro et al.4 in his study has proven that uric acid levels are independent of smoking. However, associated atherosclerosis can elevate the uric acid levels

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falsely giving an impression that smokers have elevated uric acid levels. Uric Acid and outcome in stroke patients Elevated uric acid was found to be significantly associated with poor outcome among the stroke patients in the present study. To eliminate the potential bias created by risk factors (diabetes, hypertension, smoking), the uric acid level was analysed among stroke patients without these selected risk factors and compared with outcome. It was found that uric acid was still an independent indicator of poor outcome. According to Weir et al.10 serum uric acid can be

independent predictor of poor outcome and future vascular events after acute stroke. In his study serum uric acid concentrations was measured in an unselected cohort study of stroke survivors and was followed up. Uric acid was associated with a statistically significant three fold increase in relative risk of death, even after adjustment for other conventional risk factors.

Uric acid being an anti oxidant, it is increased as a compensatory mechanism to protect the ischemic tissues of the brain from free radical injury1. Present observation concurs with the above statement. Recent evidence suggests that acute ischemic stroke results in generation of local oxidants that augment local injury and increase infarct size. Acute stroke is associated with a rapid decrease in serum antioxidants that recover slowly over subsequent weeks2. Though uric acid is considered an antioxidant, it being an aqueous antioxidant, it can become a pro-oxidant under certain circumstances, particularly if other antioxidants such as ascorbate are low3. Thus fall in ascorbrate (Vitamin C) levels with acute stroke could predispose the serum uric acid to take on pro-oxidant properties. Acute stroke cases with high uric acid and low acerbate levels had worst outcome in a study carried by Cherubini et al4. However, it has been evident by experiments that uric acid is synthesised locally from infarcted tissues, particularly during reperfusion and its level in serum rises often in proportion to the size of the infarcted tissue, reperfusion status and the extent of the free radical injury.

CONCLUSION

Serum uric acid level was increased in stroke patients and was independent of age and gender. Uric acid level among stroke cases was independent of their diabetic and hypertensive status. All the stroke cases who had poor outcome were found to have elevated uric acid level which may be a response to oxidative stress and hence it can be considered as biochemical marker in stroke patients..

REFERENCES

1. Milionis HJ, Kalantzi KJ, Goudevenos JA. Serum uric acid levels and risk for acute ischemic non embolic stroke in elderly subjects. J. Intern. Med., 2005, 258(5); 435-41.
2. Hozawa, A. Folson AR. Uric acid is an indpendent predictor of ischemic stroke among subjects not using diuretics. Atherosclerosis, 2006, 187(2) : 401-7.

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3. Longo Mbenza B, Luila EL, Mbete P, Vita EK. Is hyperuricemia a risk factor of stroke and coronary heart disease among Africans. Int. J. Cardiol., 1999, 71(1) : 17-22.
4. Iribarren C, Folsom AR, Eckfeldt JH, MC Govern PG, Nieho FJ. Correlates of uric acid and its association with asymptomatic carotid atherosclerosis; the ARIC study; Atherosclerosis Risk in communities. Stroke, 1999; 29 : 635-639.
5. Seppo Lehto, Leo Nishkanen and Ronnemaa et al. Serum uric acid is a strong predictor of stroke in patients with NIDDM. Stroke, 1998; 29 : 635-639.
6. Wang Y, Lim JL, Levic, Hella RF, Fishen J. Influence of hyperglycemia on stroke mortality. J. Stroke Cerebrovasc. Dise., 2001, 10(1) : 108-110.
7. Yoon SS, Zheng ZJ. Elevated total WBC count with high blood sugar is in indicator of poor outcome after ischemic stroke. J. Stroke Cerebrovasc. Dis., 2005, 14(2) : 88-93.
8. Verdecchia, Schillaci, Reboldi G, Santensanio F, Posullati. C Brunelti. P. Relation between serum uric acid and risk of cardiovascular disease in essential hypertension. The PIUMA study, Hypertension, Dec., 2000; 36(6) : 1072-8.
9. Franeesea Viazzi, Denise Parodi and Giovanna Leoneini, Elena Ratto. SErum uric acid and target organ damage in essential hypertension. Hypertension, 2005; 45 : 991-996.
10. Christopher J, Weir, Scotter, Muir, Mathew R. Walkers, Kennedy R. Lees. Serum Urate as an independent predictor of poor outcome and future vascular events after Acute Stroke. Stroke, 2003, 34 : 1951-1957.