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Original Research

Assessment of serum uric acid in patients with acute stroke

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ABSTRACT:
Background: Stroke is third common cause for mortality and fourth leading cause for disease burden. The present study was conducted to assess serum uric acid in patients with acute stroke. **Materials & Methods:** 64 patients of acutestrokeof both genders were enrolled. Serum uric acid and lipid profile were performed. The NIH Stroke Scale (NIHSS) was used for assessing the severity of a stroke experienced by a patient asno stroke symptoms: 0 score minor stroke: 1-4 score moderate stroke: 5-15 score moderate to severe stroke: 16-20 score severe stroke: 21-42 score. **Results:** Out of 64 patients, males were 40 and females were 24.NIHSS scale revealed minor stroke in 42%, moderate stroke in 48%, moderate to severe stroke in 6% and severe stroke in 4%. The mean serum uric acid level in patients with minor stroke was 3.2, moderate stroke was 5.9, moderate to severe stroke was 7.3 and severe stroke was 8.1. **Conclusion:** The severity of acute ischaemic stroke was proved to be directly proportional to the mean serum uric acid levels.
Key words: Acute ischaemic stroke, Serum uric acid, lipid

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INTRODUCTION

Stroke is third common cause for mortality and fourth leading cause for disease burden.[1] Stroke is defined by (WHO) World Health Organization as 'a clinical syndrome consisting of rapidly developing clinical signs of focal (or global in case of coma) disturbance of cerebral function lasting more than 24 hour or leading to death with no apparent cause other than a vascular origin.'[2] A transient ischaemic attack (TIA) is defined as stroke symptoms and signs that resolve within 24 hours. There are limitations to these definitions. 'Brain Attack' is sometimes used to describe any neurovascular event (NICE Clinical Guidelines).[3]

Stroke is the second cause of disability and dementia in adults aged ≥ 65 years worldwide: close to 25% of stroke survivors develop dementia.[4] Stroke is also an important cause of morbidity and long-termdisability: up to 40% of survivors are not expected to recover their independence with self-care and 25% become unable to walk independently. Uric acid is the ultimate catabolite of purine metabolism in human and higher primates.[5] It exists in the extracellular compartment as sodium urate, and it is cleared from the plasma through the kidney. Uric acid levels are influenced by age and sex. Prior to puberty, the average serum uric acid is 3.6 mg/dl for males and females. Following puberty, value rises to adult levels with women typically 1 mg/dl less than men. This lower level in women apparently reflects estrogen related enhancement of renal urate clearance.[6]The present study was conducted to assess serum uric acid in patients with acutestroke.

MATERIALS & METHODS

The present study comprised of 64 patients of acutestrokeof both genders. The consent was obtained from all enrolled patients.

Data such as name, age, gender etc. was recorded. Clinical presentations, general examination findings, systemic examination findings were carried out. Investigations like complete hemogram, renal profile, serum uric acid and lipid profile were performed. The NIH Stroke Scale (NIHSS) was used for assessing the severity of a stroke experienced by a patient asno stroke symptoms: 0 score minor stroke: 1-4 score

moderate stroke: 5-15 score moderate to severe stroke: 16-20 score severe stroke: 21-42 score. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 64		
Gender	**Males**	**Females**
Number	40	24

Table I shows that out of 64 patients, males were 40 and females were 24.

Table II Distribution of patients according to NIHSS scale severity

NIHSS scale	Percentage	P value
Minor stroke	42%	0.01
Moderates stroke	48%	
Moderate to severe stroke	6%	
Severe stroke	4%	

Table II, graph I shows that NIHSS scale revealed minor stroke in 42%, moderate stroke in 48%, moderate to severe stroke in 6% and severe stroke in 4%. The difference was significant (P< 0.05).

Graph I Distribution of patients according to NIHSS scale severity

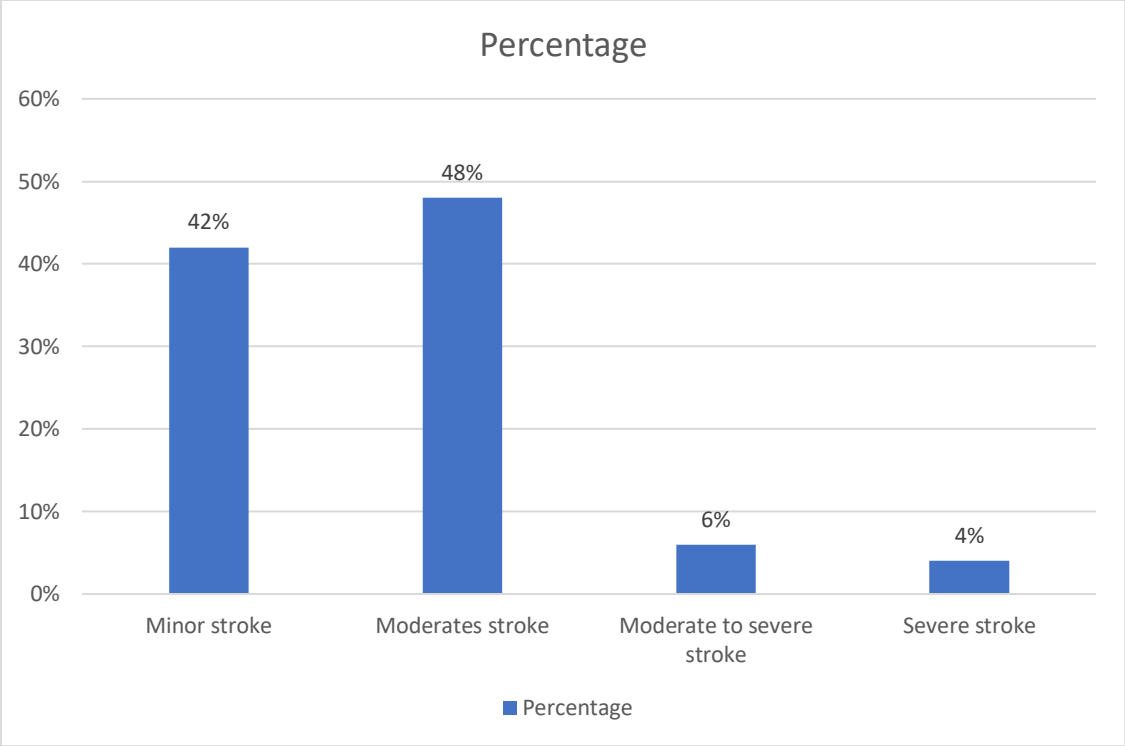
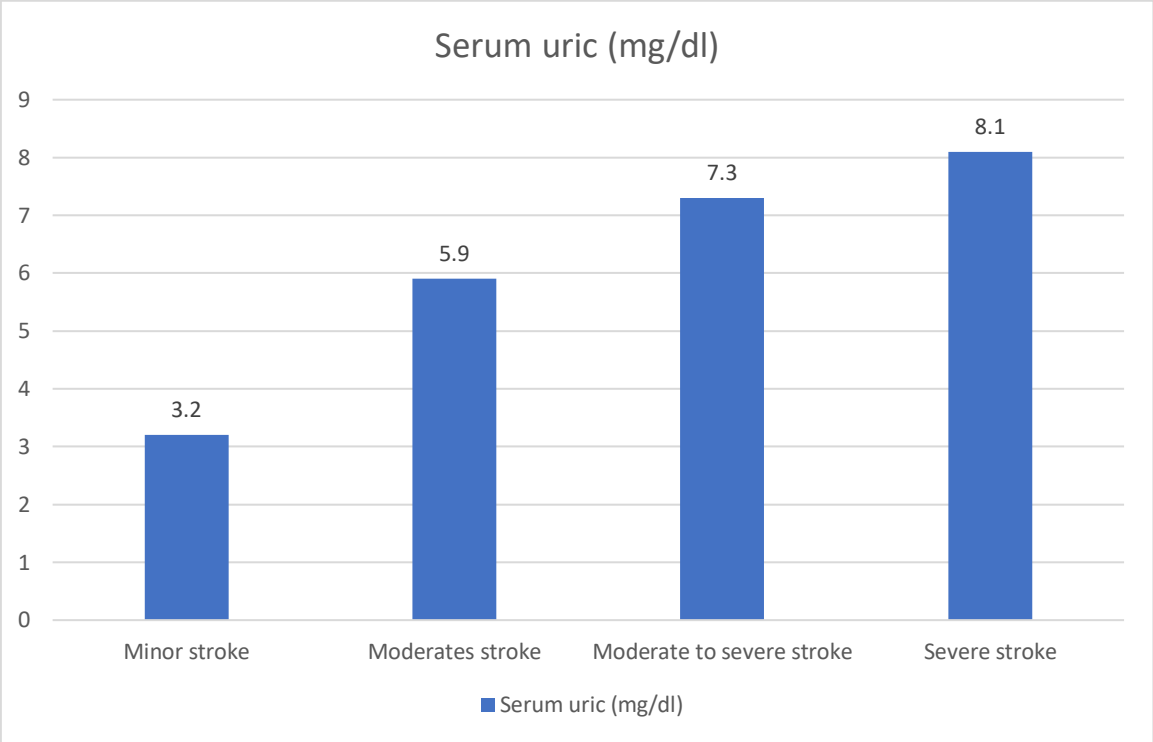


Table III Serum uric acid level based on NIHSS scale severity

NIHSS scale	Serum uric (mg/dl)	P value
Minor stroke	3.2	0.01
Moderates stroke	5.9	
Moderate to severe stroke	7.3	
Severe stroke	8.1	

Table III, graph II shows that mean serum uric acid level in patients with minor stroke was 3.2, moderate stroke was 5.9, moderate to severe stroke was 7.3 and severe stroke was 8.1. The difference was significant (P< 0.05).

Graph II Serum uric acid level based on NIHSS scale severity



DISCUSSION

Stroke is a growing disease; according to a recent report. About 780000 Americans experience a new or recurrent stroke each year, on average, one stroke every 40 seconds.[7] Stroke is the third common cause of death in the world after coronary heart disease and cancer especially in the elderly. The mortality rate of stroke in the acute phase is as high as 20% and it remains higher for several years after the acute event in stroke patients than in the general population.[8]It has been reported that increased levels of uric acid are associated with established cardiovascular risk factor such as elevated serum triglyceride and cholesterol concentration, hypertension, obesity, insulin resistance and metabolic syndrome.[9]On the other hand uric acid has been known to exert neuroprotective effects by acting as a free radical scavenger.In humans, approximately one half the antioxidant capacity of plasma comes from uric acid.[10]The present study was conducted to assess serum uric acid in patients with acutestroke.

We found that out of 64 patients, males were 40 and females were 24. Shah Harsh et al[11]evaluated role of uric acid in assessing severity of acute ischemic stroke among 100 cases of acute ischaemic stroke. In the study, serum uric acid levels and its distribution was carried out. Mean levels of Serum Uric acid was 4.92 ± 1.89 mg/dl. Maximum value being 8.4 mg/dl and minimum value was 1.2 mg/dl.

We observed that NIHSS scale revealed minor stroke in 42%, moderate stroke in 48%, moderate to severe stroke in 6% and severe stroke in 4%. Mehrpour et al[12]determined serum uric acid levels in patients with acute stroke and assessed its relationship with cerebrovascular risk factors. They assessed patients with acute stroke. Fifty- five patients with acute stroke were evaluated who 25 of these patients (45.5%) were female and 30 of them (54.5%) were male. The mean age of patients was 67±14 years. Mean serum uric acid levels in the patients studied 5.94±1.70 mg/dl, and about half of the patients (47.3%) were hyperuricemic. There was a significant negative correlation between age of patients and their serum uric acid level (p=0.04, R =-0.27). Uric acid level was significantly higher in men than women (p=0.03). Hyperuricemia was associated with increased amounts of triglycerides and Low-density lipoprotein (LDL) cholesterol (p=0.03, p=0.02). In patients with acute stroke, there was no significant association between serum uric acid level and diabetes mellitus, hypertension, history of ischemic heart disease, smoking, prescription rTPA, and type of stroke.

We observed that mean serum uric acid level in patients with minor stroke was 3.2, moderate stroke was 5.9, moderate to severe strokewas 7.3 and severe stroke was 8.1.Tushar Patil et al[13] cited that out of 100 patient, 63 were males and 37 were females. Male: female ratio was 1.7: 1. The controls were appropriately matched for age and sex. The mean age of cases was 60.05 ± 9.98. Mean SUA level in cases was 6.48 ± 1.92 mg. 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. SUA values were higher among males as compared to females, but this difference was not statistically significant. Khalil MI et al cited association between serum uric acid and ischemic stroke. Mean serum uric acid level was

4.94±1.76. Among them 76.7% had normal and 23.3% had abnormal serum uric acid levels. An increase in serum uric acid for 1mg/dl has a 47.0% increase in odds ratio of having ischemic stroke.

CONCLUSION

Authors found that the severity of acute ischaemic stroke was proved to be directly proportional to the mean serum uric acid levels.

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