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Original Research Paper

General Medicine

CORRELATION BETWEEN SERUM URIC ACID LEVELS AND ACUTE ISCHEMIC STROKE

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ABSTRACT

BACKGROUND– In this study, we determined serum uric acid levels in patients with acute stroke and assessed its relationship with disease severity.

METHOD- This is an observational, case control study on patients diagnosed with acute ischemic stroke in Geetanjali Medical College and Hospital, Udaipur.50 cases and 50 controls were included in the study.Serum uric acid levels along with other blood routine tests were done.

RESULTS- The mean age group in cases was 60.56±13.53 years and in control was 57.56±13.06 years. Male preponderance was seen in both cases and control.Mean blood uric acid level in cases was 4.98±1.45 and in control was 4.36±1.45 mg/dl, this difference was statistically significant at p value of 0.035. The correlation between serum uric acid levels and severity of stroke on basis of GCS score was not statistically significant.(p value-0.6154).

CONCLUSION- This study concludes that Serum uric acid can be used as pathological biomarker in patients of acute ischemic stroke but of severity of disease cannot be predicted by its levels.

KEYWORDS : Uric Acid, Stroke

BACKGROUND

Stroke is a growing disease. Stroke is defined as per the WHO (World Health Organization) definition, 'a syndrome of rapidly developing clinical signs of focal or global neurological disturbance lasting for more than 24 hours with no apparent cause other than a vascular origin'. Stroke is the third common cause of death in the world after coronary heart disease and cancer especially in the elderly [1,2] .Stroke is the second cause of disability and dementia in adults aged ≥ 65 years worldwide: close to 25% of stroke survivors develop dementia [3].Uric acid is the ultimate catabolite of purine metabolism in human and higher primates [4] . It exists in the extracellular compartment as sodium urate, and it is cleared from the plasma through the kidney [5] . 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 [4] . Cerebral ischemia initiates a complex cascade of metabolic events, generating nitric oxide and free oxygen radicals. [6] These radicals and reactive oxygen species (ROS) mediate a great part of injuries appearing after a transitory ischemic attack or during permanent ischemia, modifying macromolecules especially DNA , initiating apoptosis and necrosis.Uric acid has been known to exert neuroprotective effects by acting as a free radical scavenger [14] .

AIM AND OBJECTIVES :

1. To estimate serum uric acid levels in patients of acute ischemic stroke and find correlation.
2. To study the relationship between serum uric acid levels and clinical severity of Acute Ischemic Stroke.
3. To study the variation related to gender and age.

MATERIALS AND METHOD :

This is an observational , case control study which was conducted on 50 patients diagnosed with acute ischemic stroke admitted in ICU, Neurology and Medicine ward in Geetanjali Medical College and Hospital, Udaipur. 50 controls will also be included in the study with unrelated ailments.The study was conducted from June 2018 to December 2018.Data of patients were collected by detailed history, clinical examination, investigations and diagnosis confirmed by MRI or CT Brain. Apart from routine investigations, serum uric acid estimation was done. The severity of stroke was assessed as per Glasgow Coma Scale (GCS).

SELECTION OF CASES:

Inclusion criteria: Patients with Acute Ischemic Stroke >18 years of age

EXCLUSION CRITERIA:

Patients with evidence of space occupying lesions,patients with hemorraghic stroke patients with ischemic conditions other than Stroke, patients with a known or possible cardiac source of emboli, history of intake of drugs known to alter uric acid levels, history of Gouty arthritis or clinical evidence of gout, patients with venous infarct, history of renal insufficiency, patients with Acidosis including DKA, lactic acidosis and starvation acidosis, history of thyroid dysfunction, malignancy, recent excessive alcohol consumption, patients with Down's Syndrome.

SELECTION OF CONTROLS:

Patients with unrelated illess >18 years of age were selected and exclusion criteria included acute ischemic stroke patients and rest same as for cases.

RESULTS :

With equal number of cases and controls, i.e. 50 in each group. Mean age of 100 patients was 59.06±13.32 years.The mean age group in cases was 60.56±13.53 years and in control was 57.56±13.06 years.Mean blood uric acid level in cases was 4.98±1.45 and in control was 4.36±1.45 mg/dl, this difference was statistically significant at p value of 0.035.The correlation between serum uric acid levels and severity of stroke was not statistically significant.(p value-0.6154). For cases Pearson's correlation between serum uric acid level and age was 0.348 which is statistically significant.(P value =0.012)

Table 1. BLOOD URIC ACID LEVEL DISTRIBUTION

Uric Acid Levels	Cases	Controls	Total
0-6	36	41	77
6.01-6.50	5	6	11
6.51-7	4	2	6
7.01-7.50	3	0	3
7.51-8	2	1	3

Table 2. SEVERITY OF GCS AND S.URIC ACID LEVEL IN CASES

GCS	SUA <6	SUA >6	P value
<12	3	2	0.6154
>12	33	12	

Table 3. DIFFERENCE BETWEEN CASES AND CONTROLS

	cases(n=50)	controls(n=50)	P value
Age	60.56±13.53	57.56±13.06	0.262
Sex			
Male	32	27	0.4162
Female	18	23	
Uric acid level	4.98±1.45	4.36±1.45	0.035

DISCUSSION :

A stroke can be defined as an abrupt onset of a neurologic deficit that is due to a focal vascular cause. Stroke is an important cause of morbidity and long term disability.Serum uric acid is one of the major aqueous antioxidant in human beings. Thus it should have a protective role in stroke. However there are only few studies that have concluded higher levels of serum uric acid being neuroprotective in patients with stroke.[19-22]In our study,mean blood uric acid level in cases was 4.98±1.45 and in control was 4.36±1.45 mg/dl, this difference was statistically significant at p value of 0.035.Kaur I et al, 2017 reported higher serum uric acid level i.e. 6.15±1.91 in cases and 5.1±1.4 in controls, and this difference was statistically significant. SriKrishna R et al found that serum uric acid levels were significantly higher in cases as compared to controls (6.56±0.73 versus 4.66±0.47, P < 0.05)[23].In, the Rotterdam study, high serum uric acid levels were associated with the risk of stroke[24].Mbenza LB et al found significantly higher serum uric acid level in males (6.6±7 versus 5.8±6 mg/dl, P < 0.01) which is contrasting to present study where we found no significant difference[25].The correlation between severity of stroke based on GCS score and uric acid levels was not statistically significant in our study (p value being 0.6154).This finding is in contrast to Kaur I et al, 2017 where they reported statistically significant difference in serum uric acid level finding when the GCS score is severe[26].

CONCLUSION :

Serum uric acid can be used as pathological biomarker in patients of acute ischemic stroke.However the levels do not correlate with severity of the disease.

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