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To Study the Serum Uric Acid Levels in Hemorrhagic Stroke Patients

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Abstract
Background: *Cerebrovascular diseases include some of the most common and devastating disorders.*
Methods: *This study is conducted among 50 patients of acute stroke with CT scan evidence of hemorrhage (ICH and SAH) and CT scan showing no evidence of ischemia. A total of 50 subjects age and sex matched controls (who do not have acute stroke) were also selected*
Results: *The Mean serum uric acid level in cases was 6.022 ± 1.199 mg/dl whereas it was 5.112 ± 1.301 mg/dl for controls. The difference between the two groups was statistically significant (P<0.05).*
Conclusion: *The study concludes that serum uric acid level was significantly elevated in patients of acute stroke.*
Keywords: *Stroke, Uric acid, Cerebrovascular diseases.*

Introduction

Cerebrovascular diseases include some of the most common and devastating disorders[1]. Stroke is the main cause of disability and mortality among the ageing population, and about 87% of all cases are ischemic stroke while 15% are hemorrhagic stroke[2,3]. Stroke is a major public health problem. According to the Global Burden of Diseases (GBD) study in 1990, reported 4.66 million stroke deaths globally, and nearly 5.87 million deaths in 2010, which indicated 26 per cent increase in global stroke deaths during the past two decades. With the rising proportion of mortality, stroke still remains the second leading cause of death worldwide[4-,6]. The Global Burden of Disease 2010 Study showed a 47% increase in the absolute number of hemorrhagic stroke (including ICH and subarachnoid hemorrhage) worldwide between 1990 and 2010.

Uric acid is the most abundant aqueous antioxidant in humans, and contributes as much as two-thirds of all free radical scavenging capacity in plasma. It is particularly effective in quenching hydroxyl, superoxide and peroxynitrite radicals, and may serve a protective physiological role by preventing lipid peroxidation[7] It is the final catabolite of purine metabolism in humans and other higher primates[8]. It exists in extra cellular compartment as sodium ureate. It is cleared from the plasma though 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 ureate clearance.[9]

Materials and Methods

Study Protocol

1) 50 patients of hemorrhagic stroke and 50 age and sex matched controls.
2) Blood samples will be taken from each of the study groups and serum uric acid level will be assessed and compared between case and control group.
3) Serum uric acid levels will be compared with various risk factors like age, sex, hypertension, diabetes mellitus, smoking, family h/o stroke, and h/o previous stroke in hemorrhagic stroke patients.

Study Population

This study is conducted among 50 patients of acute stroke with CT scan evidence of hemorrhage (ICH and SAH) and CT scan showing no evidence of ischemia. A total of 50 subjects age and sex matched controls (who do not have acute stroke) were also selected

Design of Study: single center (hospital based) observational case control study

Inclusion Criteria

1) Patients presented within 48 hours of onset of stroke with CT-scan evidence of hemorrhage (intra cerebral hemorrhage and subarachnoid hemorrhage) and without ischemia admitted in J.L.N. Hospital, Ajmer were selected.
2) Both sex (male and female) greater than 18 years of age, who has given informed consent to participate in the study.

Exclusion Criteria

1) Patients who NCCT-scan show ischemic-infarct or other space occupying lesions other then hemorrhage.
2) Patients with history of TIA.
3) Patients with EDH/SDH/ RTA.
4) Patients who were known cases of gout or show clinical evidences of gout.
5) Patients who were alcoholics.
6) Patients taking drugs causing hyperuricemia (Eg. loop diuretics/ thiazides/anti cancer drug eg. cisplatin, cyclophosphamide, cyclosporine, ATT eg. pyazinamide and ethambutol, l-dopa, isotretinoin and clofibrate, aspirin, pentamidine, theophylline, ketaconazole)
7) Patients with previous history of coronary vascular event and known cardiac disease
8) Patient with Chronic renal failure (CRF).
9) Patients with known hematological malignancy (leukemia or lymphoma) or myeloproliferative disorder (eg polycythemia).

Statistical Analysis

Statistical analysis was performed with the help of Quick graph pad scientific software. Qualitative data (Categorical data) was presented as number of subjects (proportions) and to assess any significant association difference by Chi Square ($\chi 2$) test .Quantitative data was expressed as mean and SD. Relationship between variables in the patient group was assessed by Pearson's correlation co-efficient. P-value less than 0.05 was considered statistically Significant.

A total of 50 patients (25 male and 25 female) admitted due to hemorrhagic stroke and 50 age sex matched control (25 male and 25 female) were included. The association between SUA level and various risk factor of hemorrhagic stroke was observe.

Results

Table-1 Distribution of the Age groups According to the Sex

Age group	Sex		Total
	Male	Female	
>18to 40 yrs	9	5	14
41 to 60	15	14	29
>60 yrs	26	31	57
Total	50	50	100

Chi- Square=1.6159 with 2 degree of freedom P=0.44537(NS)

In the study population the mean age of the male was 57.42 ± 15.20 years, whereas the mean age of the female was 62.72 ± 14.19 years. The difference between the two group was not statistically significant [p=0.44537(NS)].

Table-2 Comparison of Serum Uric Acid Level in Cases and Controls:

Groups	Serum Uric Acid Level (mg/dl)		Total
	≤6.8	>6.8	
Cases	36	14	50
Controls	46	4	50
Total	82	18	100

Chi- square = 6.775 with one degree of freedom;
P= 0.009244 (S)

The Mean serum uric acid level in cases was 6.022 ± 1.199 mg/dl whereas it was 5.112 ± 1.301 mg/dl for controls. The difference between the two groups was statistically significant (P<0.05).

Discussion

Stroke can occur to any one at any time, regardless of age, sex or race. It is a major cause of mortality and morbidity in among worldwide. The well recognized risk factors like age, sex, hypertension, diabetes, dyslipidemia, smoking, family history of stroke and previous history of stroke explain only a part of the cases. Hence a search for other risk factors is the need of the hour.

Many studies have found conflicting role of uric acid in patients with stroke and cardiovascular disorders, this study was conducted to study the role of serum uric acid in hemorrhagic stroke.

The mean serum uric acid level in cases was 6.022 ± 1.199 mg/dl whereas it was 5.112 ± 1.301 mg/dl for controls. The difference between the two groups was statistically significant (P<0.05) in our study.

Prasad CP et al[10] was found that mean SUA level was 6.69±2.34 mg/dl and half of them were hyperuricemic. The prevalence of hyperuricemia among the patients, attending Nobel Medical College was 28.33% (male 30.06%, female 26.61%).[11] Another large study in Bangkok population showed that prevalence of hyperuricemia is 24.4%.[12] According to these studies prevalence of hyperuricemia is significantly higher in patients with acute stroke than normal population.

Conclusion

The study concludes that serum uric acid level was significantly elevated in patients of acute stroke. However further evaluation is needed with larger study for this fact to establish.

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