ORIGINAL RESEARCH PAPER

Neurology

CORRELATION BETWEEN SERUM URIC ACID AND CAROTID DISEASE IN ACUTE ISCHEMIC STROKE

KEY WORDS:

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INTRODUCTION

Acute ischemic stroke (AIS) is a major cause of morbidity and mortality worldwide, primarily due to atherosclerotic vascular disease. Carotid artery disease is a well-recognized risk factor for AIS, with carotid intima-media thickness (CIMT) and stenosis serving as reliable indicators of carotid atherosclerosis.

Serum uric acid (SUA), the end product of purine metabolism, has historically been viewed as a benign antioxidant. However, increasing evidence suggests it also plays a pro-inflammatory role, potentially contributing to endothelial dysfunction and vascular damage. The current study investigates the correlation between SUA and carotid artery disease in patients presenting with AIS.

Objectives

- To assess serum uric acid levels in patients with acute ischemic stroke.
- To evaluate the relationship between SUA levels and carotid intima-media thickness (CIMT).
- To determine the association between SUA levels and carotid artery stenosis.

MATERIALS AND METHODS

This was a prospective cross-sectional study conducted at the Pacific Institute of Medical Sciences, Udaipur, from April 2023 to February 2025. A total of 80 patients diagnosed with AIS were included. Serum uric acid levels were measured within 24 hours of admission. All patients underwent carotid Doppler ultrasonography to assess CIMT and detect the presence of carotid artery stenosis.

Inclusion Criteria

- Age ≥ 18 years.
- Diagnosed acute ischemic stroke confirmed by CT or MRI.
- Presentation within 72 hours of symptom onset.

Exclusion Criteria

- Hemorrhagic or vasculitic stroke.
- Chronic kidney disease or systemic inflammatory disorders.
- Patients who did not give informed consent.

Statistical Analysis

Data were analyzed using SPSS version 25. Quantitative data were presented as mean ± standard deviation (SD), and categorical variables as percentages. Unpaired t-tests were used for comparison of means, and chi-square tests were used for proportions. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Table 1: Association Between SUA And Carotid Intima-media Thickness (CIMT)

CIMT Category	Mean SUA (mg/dL)	p-value
≤ 1 mm	5.4 ± 1.1	—
> 1 mm	6.9 ± 1.4	0.001

Table 2: Association Between SUA And Carotid Artery Stenosis

Stenosis Presence	Mean SUA (mg/dL)	p-value
Absent	5.5 ± 1.2	—
Present	6.8 ± 1.3	0.004

These results indicate a statistically significant association between higher SUA levels and both increased CIMT and the presence of carotid stenosis.

DISCUSSION

Our findings suggest that elevated SUA levels are significantly associated with increased carotid intima-media thickness and carotid artery stenosis in patients with acute ischemic stroke. These results align with existing studies, such as those by Arévalo-Lorido et al. and Kumrai et al., which indicate a contributory role of SUA in vascular inflammation and atherosclerosis.

The dual nature of uric acid, acting both as an antioxidant and pro-oxidant, may underlie its complex role in atherogenesis. Intracellular uric acid has been shown to induce endothelial dysfunction, inflammation, and smooth muscle proliferation - mechanisms crucial in the development of carotid artery disease.

CONCLUSION

Elevated serum uric acid is significantly associated with increased carotid intima-media thickness and carotid stenosis in acute ischemic stroke patients. SUA could serve as a cost-effective and easily measurable biomarker for predicting vascular involvement in stroke and may aid in early risk stratification and management.

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