

## Evaluation of Serum Uric Levels in Nasopharyngeal Carcinoma: An Institutional Based Study

Poonam Omer<sup>1</sup>, Mohammad Frayez<sup>2\*</sup>, Prerna Tewari<sup>3</sup>

<sup>1</sup>Assistant Professor, Department of ENT, Autonomous State Medical College, Shahjahanpur, Uttar Pradesh, India

<sup>2</sup>Assistant Professor, Department of Pathology, Autonomous State Medical College, Shahjahanpur, Uttar Pradesh, India

<sup>3</sup>Senior Resident, Department of Pathology, All India Institute of Medical Sciences (AIIMS), Patna, Bihar, India

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### Abstract

**Background:** Nasopharyngeal carcinoma (NPC) is one of the Epstein-Barr virus (EBV)-associated malignancies. The present study was conducted to assess serum uric acid levels in nasopharyngeal carcinoma. **Materials and Methods:** In the present study 80 pathologically diagnosed NPC patients free of distant metastasis were enrolled in this retrospective study. The study included a total of 160 subjects, 80 patients with NPC in the experimental group and 80 patients in control group. Two milliliters of intravenous blood were taken from all participants after an overnight fast. The blood was centrifuged at 3000 rpm for 5 min and separated serum was aspirated into tubes and analyzed for uric acid using the reagent kit and BTS 350 Semi-Auto analyzer. Tabulation of the results was carried out for both groups. For all tests,  $P$  values  $\leq 0.05$  were utilized for statistical significance. **Results:** The study included a total of 160 subjects, 80 patients with NPC in the experimental group and 80 patients in control group. The mean age among study group was 54.8 years and that of the control group was 53.65 years. In study group 56.25% were males and in control group 52.5% were males. Males were in predominance. In the study group, out of 80 patients, 37.5% patients had low serum uric acid levels ( $<3$  mg/dl), 56.25% patients had normal serum uric acid levels (3–6 mg/dl) and 6.25% patients had high serum uric acid levels ( $>6$  mg/dl). Among 80 subjects in control group, 10% subjects had low serum uric acid levels ( $<3$  mg/dl), 30.0% subjects had normal serum uric acid levels (3–6 mg/dl), and 60% subjects had high serum uric acid levels ( $>6$  mg/dl). The distribution of serum uric acid levels among the study group and the control group showed statistically very high significance ( $P < 0.001$ ). **Conclusion:** The present study concluded that serum uric acid was lower in nasopharyngeal carcinoma patients compared with healthy volunteers and low serum uric acid was associated with increased risk of nasopharyngeal carcinoma development.

**Keywords:** Serum Uric Acid, Nasopharyngeal Carcinoma, Malignancies.

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### Introduction

Nasopharyngeal carcinoma (NPC) is one of the Epstein-Barr virus (EBV)-associated malignancies and has a characterized geographical distribution[1]. Nasopharyngeal carcinoma (NPC) is a distinct malignant tumor. It is diverse from other types of head and neck squamous cell carcinoma in regard to epidemiology, biological characteristics, and clinical treatment[2]. Nasopharyngeal carcinoma (NPC) is one of the most prevalent malignancies in Southeast Asia, with an annual incidence of 30 to 80 per 10,000 people[3,4]. Cases of locally advanced diseases constitute approximately 70% of all patients with NPC, as a result of the tumor's deep-seated location and nonspecific symptoms[5]. Epidemiological studies have revealed that low levels of essential antioxidants in circulation are associated with an increased risk of cancer[6]. The possible protective action of many of the natural antioxidants that are found in biological fluids and tissues has been the subject of intense investigation. Recent findings suggest that examination of specific cancers in relation to serum uric acid levels may be worthwhile[7]. According to some previous studies, a reduction in serum uric acid level has been associated with an increase in the risk of lung cancer, oral cancer, and laryngeal cancer[8-11]. The present study was conducted to assess serum uric acid levels in nasopharyngeal carcinoma.

\*Correspondence

**Dr. Mohammad Frayez**

Assistant Professor, Department of Pathology, Autonomous State Medical College, Shahjahanpur, Uttar Pradesh, India.

E-mail: [dfrayezgsvm@gmail.com](mailto:dfrayezgsvm@gmail.com)

### Materials and Methods

In the present study 80 pathologically diagnosed NPC patients free of distant metastasis were enrolled in this retrospective study. Before the commencement of the study ethical approval was taken from the ethical committee of the institute and informed consent was taken from the patient. Patients who had complete clinical data; eliminate hyperuricemia or gout before treatment were included in the study. The subjects were from the patients attending the outpatient Department of Oral Medicine and Radiology. The study included a total of 160 subjects, 80 patients with NPC in the experimental group and 80 patients in control group. In all groups, individuals suffering from known systemic diseases such as gout, renal diseases, cardiovascular disease, and diabetes Patients who are on medications that might affect serum uric acid levels, Patients with other malignancies except NPCs, Patients undergoing treatment for NPC were excluded from the study. Two milliliters of intravenous blood was taken from all participants after an overnight fast. The blood was centrifuged at 3000 rpm for 5 min and separated serum was aspirated into tubes and analyzed for uric acid using the reagent kit and BTS 350 Semi-Auto analyzer. Tabulation of the results was carried out for both group. All the variables from the study were statistically analyzed for the mean values, standard deviation, and " $P$ " value. Multiple group comparisons were done by ANOVA. Evaluation of results and statistical analysis were carried out using Student's  $t$ -test and Chi-square test. For all tests,  $P$  values  $\leq 0.05$  were utilized for statistical significance.

## Results

The study included a total of 160 subjects, 80 patients with NPC in the experimental group and 80 patients in control group. The mean age among study group was 54.8 years and that of the control group was 53.65 years. In study group 56.25% were males and in control group 52.5% were males. Males were in predominance. In the study group, out of 80 patients, 37.5% patients had low serum uric acid levels (<3 mg/dl), 56.25% patients had normal serum uric acid levels (3–

6 mg/dl) and 6.25% patients had high serum uric acid levels (>6 mg/dl). Among 80 subjects in control group, 10% subjects had low serum uric acid levels (<3 mg/dl), 30.0% subjects had normal serum uric acid levels (3–6 mg/dl), and 60% subjects had high serum uric acid levels (>6 mg/dl). The distribution of serum uric acid levels among the study group and the control group showed statistically very high significance ( $P < 0.001$ )

**Table 1: Mean age-wise comparison of study and control group**

| Groups        | Mean±SD     |
|---------------|-------------|
| Study group   | 54.8±14.04  |
| Control group | 53.65±12.38 |

**Table 2: Gender-wise distribution of cases**

| Gender | Study group n(%) | Control group n(%) | Total n(%) |
|--------|------------------|--------------------|------------|
| Male   | 45(56.25%)       | 42(52.5%)          | 87(54.37%) |
| Female | 35(43.75%)       | 38(47.5%)          | 73(45.62%) |
| Total  | 80(100%)         | 80(100%)           | 160(100%)  |

**Table 3: Serum uric acid levels in study group and control group**

| Uric acid levels | Study group n(%) | Control group n(%) | Total n(%) |
|------------------|------------------|--------------------|------------|
| Low (<3mg/dl)    | 30(37.5%)        | 8(10%)             | 38(23.75%) |
| Normal(3-6mg/dl) | 45(56.25%)       | 24(30%)            | 69(43.12%) |
| High (>6mg/dl)   | 5(6.25%)         | 48(60%)            | 53(33.12%) |
| Total            | 80(100%)         | 80(100%)           | 160(100%)  |

## Discussion

Because the cancer is located in a silent anatomic site, and NPC exhibits a higher metastatic rate[12], NPC tends to present at advanced stages (clinical stages III and IV) when diagnosed. It has been shown that >70% of patients were at advanced stage when diagnosed in clinics[13].

Uric acid is considered as an antioxidant, which has the effects of eliminating reactive oxygen free radicals, protecting DNA damage, reducing the cell migration ability, and regulating tumor cell death[14,15].

The study included a total of 160 subjects, 80 patients with NPC in the experimental group and 80 patients in control group. The mean age among study group was 54.8 years and that of the control group was 53.65 years. In study group 56.25% were males and in control group 52.5% were males. Males were in predominance. In the study group, out of 80 patients, 37.5% patients had low serum uric acid levels (<3 mg/dl), 56.25 patients had normal serum uric acid levels (3–6 mg/dl) and 6.25% patients had high serum uric acid levels (>6 mg/dl). Among 80 subjects in control group, 10% subjects had low serum uric acid levels (<3 mg/dl), 30.0% subjects had normal serum uric acid levels (3–6 mg/dl), and 60% subjects had high serum uric acid levels (>6 mg/dl). The distribution of serum uric acid levels among the study group and the control group showed statistically very high significance ( $P < 0.001$ )

Toxicity by oxygen radicals has been suggested as a major cause of cancer, heart disease, and aging. Aerobic organisms have an array of protective mechanisms now being recognized as anti-carcinogenic and in some cases, even as life-span extending. Ames *et al.* proposed that the uric acid may act to prevent the formation of oxygen radicals and thereby protect against carcinogenesis[16].

Yiu *et al*[17] evaluated the serum uric acid level and subsequent development of cancer in cancer-free individuals. They found that altered uric acid levels were associated with the overall and specific risk of some cancer types, including the colorectal, hepatobiliary, kidney, and nonmelanoma skin cancer in males, and head and neck, and other cancer types in females. However, an inverse correlation was noted for pulmonary and central nervous system cancers in males and breast, lymphatic, hematological, and central nervous system malignancies in females.

Du XJ *et al* determine the predictive value of pretreatment serum uric acid (SUA) for metastasis in locally advanced nasopharyngeal carcinoma (NPC) treated with intensity-modulated radiotherapy. The study concluded that Pretreatment SUA may be a useful biomarker

for evaluating treatment options for patients with locally advanced NPC[18].

## Conclusion

The present study concluded that serum uric acid was lower in nasopharyngeal carcinoma patients compared with healthy volunteers and low serum uric acid was associated with increased risk of nasopharyngeal carcinoma development.

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