



## STUDY OF SERUM URIC ACID IN PATIENTS OF SENILE CATARACT AND CONTROL GROUP.

**Dr. Mahavir R. Mundra\***

Assistant Professor, Department Of Biochemistry, Govt. Medical College, Nagpur. \*Corresponding Author

**Dr. Prafulkumar Ramteke**

Assistant Professor, Department Of Biochemistry, Govt. Medical College, Nagpur

**Dr. Abhijit Ninghot**

Assistant Professor, Department Of Biochemistry, Govt. Medical College, Nagpur, Maharashtra.

### ABSTRACT

**Background:** Recent reports suggest an association between Oxidative stress and age-related cataracts (ARC). **Aim:** This study was planned and carried out to study the Uric acid level in Senile cataract patients.

**Materials and Methods:** We compared serum Uric acid level in 120 cases of ARC and 120 age and gender-matched controls. Statistical analysis was done using t-test. Significance was set at  $P \leq 0.05$ . **Results:** The overall mean serum levels of Uric acid was significantly lower in the cases as compared to control group. **Conclusion:** This study suggests that Serum uric acid can be used a marker of risk for development and progression of senile cataract.

### KEYWORDS :

#### INTRODUCTION

Cataract is a major cause of blindness and low vision worldwide.<sup>1</sup> It is estimated that 44.1% of blind cases and 51.6% of patients with low vision suffers from cataract.<sup>2,3</sup> Age is the most important risk factor and about 85 percent of involved patients have age-related cataract. This type of cataract is called "senile cataract". It has been shown to be the main cause of blindness in patients over 50 years of age.<sup>4</sup> In India cataract has been reported to be responsible for 50-80% of the bilateral blindness in general.<sup>5,6</sup> It is presumed that population above 60 years of age which was around 56 million in 1991 may rise twice by 2016.<sup>5,7</sup> It is estimated that a ten-year delay in the onset of cataracts could decrease the number of cataract surgeries by 45 per cent, thus considerably diminishing cost of care. Also, Patients with cataracts in low resource areas and developing countries have a poor chance for surgery due to economic reasons. This results in an increased risk of blindness in such population.<sup>2,8</sup> The development of senile cataract is a complex multifactorial process. Several factors such as genes, gender, diabetes, geographic location, UV light exposure, level of education, occupational status, nutritional factors and raised Body mass index have been found to be associated with cataract formation.<sup>2</sup> Some risk factors for cataract are modifiable; and the disease can be prevented by the elimination of these factors. Non-enzymatic antioxidants such as uric acid is a component of antioxidant defense system.<sup>9</sup> It acts as an antioxidant by scavenging free radicals, thereby protecting from the damage by oxidative stress. Uric acid is present not only in serum or plasma but also in sweat, nasal and bronchial lavage fluid and in eye fluids. Uric acid has been found in quite a similar amounts in tear fluid and aqueous humour. The average uric acid level in both fluids was two to three times lower than that found in serum samples but a significant correlation between the uric acid content of all these three body fluids in individuals has also been established by earlier workers.<sup>9,11</sup> But it is difficult to directly measuring it in the lens tissue or eye fluid. So, plasma or serum is used to characterize the antioxidant status in patients with cataract. Studies have shown that they are also the true representative of the lens antioxidant status.<sup>9,10</sup>

#### MATERIAL AND METHODS

This study was conducted in the Department of Biochemistry, with the help of Ophthalmology Department during the period of May 2019 to October 2019 in tertiary health care institute. The study population consisted of total 240 participants aged between 50 to 80 years and they were divided in two groups viz cases and controls. Cases consisted of patients suffering from

senile cataract and controls consisted of normal healthy individuals.

#### Inclusion criteria:

- 1) Patients diagnosed as a case of senile cataract
- 2) Normal healthy individuals as control group 3) Age group of 50 to 80 years.

#### Exclusion criteria:

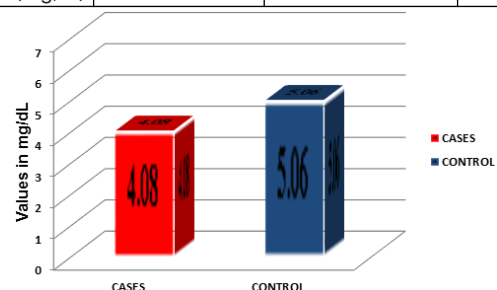
- 1) Not willing to participate in study
- 2) Cataract due to any other etiology like trauma, metabolic diseases, radiation therapy etc.
- 3) Any systemic disease like diabetes, hypertension etc.
- 4) Acute or chronic diarrhea
- 5) Patients of acute or chronic renal failure 6) Any H/O drug intake like steroid, antipsychotic, chemotherapy etc.

3 ml venous blood samples were collected after an overnight fast (10-12 hours) from all cases and controls and serum was separated by centrifugation and was analyzed for uric acid level on Beckman coulter AU5800 Clinical chemistry Auto-analyzer. Investigations were carried out by Uricase method using commercially available ready to use reagent kit. Statistical analysis Comparison of parameters was done between case and control group by using unpaired t- test. Interpretation was done according to p-value.

#### RESULT

**Table: Comparison Of Serum Uric Acid In Senile Cataract Cases And Controls**

Parameter	Cases (n=120) [mean $\pm$ SD]	Controls (n=120) [mean $\pm$ SD]	P value
Serum Uric Acid (mg/dl)	4.08 $\pm$ 0.73	5.06 $\pm$ 0.81	<0.0001



**Graph: Comparison Of Mean Serum Uric acid level In Senile Cataract Cases And Controls**

**DISCUSSION:**

In present study, it was found that serum uric acid level was highly significantly lower in senile cataract cases as compared to control group ( $p < 0.001$ ). Our study was consistent with the findings of **Adedapo K. et al (2012)**,<sup>12</sup> **Winter J. et al (2009)**,<sup>9</sup> **Benha MJ. et al (2001)**,<sup>13</sup> **Kaluzny J. et al (1996)**,<sup>14</sup> with respect to serum uric acid. In their studies they showed significantly lower serum uric acid level in senile cataract patients as compared to control group.

Reason behind the association between decreased level of serum uric acid and senile cataract may be due to the antioxidant properties of uric acid. Uric acid is the chain breaking water soluble extracellular antioxidant and waste product of purine metabolism. Uric acid is the most abundant aqueous antioxidants in humans, and contributes as much as two-third 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.<sup>15</sup> Uric acid contributes as much as 60% of free-radical scavenging in human serum, and elevated uric acid concentrations offer an evolutionary advantage in humans, this may be because of its powerful antioxidant properties.<sup>16</sup>

A randomized, placebo-controlled double-blind study of the effects of systemic administration of uric acid (1000 mg) in healthy volunteers, compared with vitamin C (1000 mg) observed a significant increase in serum free-radical scavenging capacity from baseline during uric acid and vitamin C infusion, using two methodologically distinct antioxidant assays. But, the effect of uric acid was substantially greater than that of vitamin C.<sup>16</sup>

Positive correlations for uric acid levels in tear fluid, aqueous humour and serum have been reported. This could be the reason for a link between plasma and ocular parameters, or between systemic status and the lens.<sup>9</sup> Significant decrease in uric acid observed in our study could have been as a result of its involvement in scavenging singlet oxygen in cataract patients. This hypothesis is also supported by **Winter J. et al (2009)**.<sup>9</sup>

**CONCLUSION:**

Serum uric acid level was significantly lower in senile cataract cases compared to controls. So, it can be concluded that serum Uric acid in combination with other antioxidant enzymes can be used as a marker of risk for development and progression of senile cataract.

**REFERENCES:**

1. Khurana AK, Diseases of the Lens. Comprehensive Ophthalmology. 4<sup>th</sup> edition. New Delhi: New Age International (p) Limited; 2007. p.170
2. Heydari B, Kazemi T, Zarban A, Ghahramani S. Correlation of cataract with serum lipids, glucose and antioxidant activities: a case-control study. West Indian Med J. 2012; 61(3):230-4.
3. Resnikoff S, Pascolini D, Etya'ale D, Kocur I, Pararajasegaram R, Pokharel GP. Global data on visual impairment in the year 2002. Bull World Health Organ 2004; 82:844-51.
4. Hyman L. Epidemiology of eye disease in elderly. Eye. 1987; 1: 330-41.
5. Murthy G, Gupta S, John N, Vashist P. Current status of cataract blindness and Vision 2020: The right to sight initiative in India. Indian J Ophthalmol. 2008 Nov-Dec; 56(6):489-494.
6. Nirmalan P, Thulasiraj R, Maneksha V, Rahmthullah R, Ramakrishnan R, Padmarathi A. A population based eye survey of older adults in Tirunelveli district of south India: Blindness, cataract surgery and visual outcomes. Br J Ophthalmol. 2002; 86:505-12.
7. Kumar S. Alarm sounded over Greying of India s population. Lancet. 1997;350:271.
8. Jose R, Bachani D. Performance of cataract surgery between April 2002 and March 2003. NPCB-India. 2003; 2:2.
9. Winter J, Kirchengast S, Meinitzer A, Wachswender C, Faschinger C. Determination of uric acid concentrations in human tear fluid, aqueous humour and serum. Acta Ophthalmol. 2009; 87(2):188-92.
10. Lam K, Liu K, Yee R, Lee P. Detection of uric acid in aqueous humour by high pressure liquid chromatography. Curr Eye Res. 1983; 2: 645-49.
11. Choy C, Benzie I, Cho P. Ascorbic acid concentration and total antioxidant activity of human tear fluid measured using the FRASC assay. Invest Ophthalmol Vis Sci. 2000; 41:3293-98.

12. Adedapo KS, Kareem ST, Bekibebe CO, Nwobi NL. Increased oxidative stress and non enzymatic antioxidant levels in senile cataract. Archives of Applied Science Research. 2012; 4(6): 2461-66.
13. Hassan, A.A., Belal, T.H., El-Abd, A.M., El-Sawy, A.F and Azab, N.I. Imbalance between free radical propagation and some antioxidants in patients with cataract. Benha Medical Journal. 2001 May; 18(2):67-87.
14. Kaluzny J , Kaluzny JJ, Rakuć D. Level of uric acid in aqueous humor of patients with cataract. Klin Oczna. 1996 Feb; 98(2):97-9.
15. Nieto FJ, Iribarren C, Gross MD, Comstock GW, Culter RG. Uric acid and serum antioxidant capacity: a reaction to atherosclerosis? Atherosclerosis. 2000; 148:131-9.
16. Waring WS, Webb DJ, Maxwell SRJ. Systemic Uric Acid Administration Increases Serum Antioxidant Capacity in Healthy Volunteers. Journal of Cardiovascular Pharmacology. 2001; 38:365-7