

# Original Article

## Correlation of Sodium and Potassium Levels in the Serum of Patients with Senile Cataract and Age Matched Individuals without Cataract

Tanvi R\* , Ugam U\*\*

\*Post Graduate, \*\*Prof & HOD, Department of Ophthalmology, Goa Medical College, Goa



Dr. Tanvi has done her M.S. in Ophthalmology from Goa Medical College. She is a University topper and Gold Medalist. She worked as junior resident in the Department of Ophthalmology, Goa Medical College.

Corresponding author - Dr. Tanvi A. Poy Raiturcar (tanvi1491@gmail.com)

Chettinad Health City Medical Journal 2017; 6(3): 118 - 120

### Abstract

**Aim :** To compare the serum sodium levels in patients with senile cataract, and age matched individuals without cataract.

**Materials and Methods :** A prospective case control study was conducted from November 2016 to February 2017, and included 300 patients aged 50 years and above. Patients were grouped into those having cataract and those without cataract. Mean serum sodium and potassium levels were measured in the cataract group and the non cataract group and compared. All patients were screened for presence of nephropathy and had normal functioning of kidneys. Hence any variation in the sodium levels were solely because of dietary influences and not due to abnormal kidney function.

**Results :** The comparison of serum sodium among study and control groups showed a higher level of sodium among the cataract group (135meq/l) compared to control group (133.3meq/l).

**Conclusion :** A diet low in sodium could hence delay the development or progression of senile cataract.

**Key Words:** Sodium, Potassium, Cataract.

### Introduction

Any opacification of the crystalline lens or its capsule is termed as cataract.

Various factors have been implicated in the causation of cataract, which include senility, exposure to ultra violet radiations,<sup>1</sup> genetic predisposition,<sup>2</sup> outdoor occupations, and dietary factors<sup>3</sup>.

Various studies have been done which have shown higher levels of sodium and potassium in aqueous samples of patients with cataract as compared to age matched individuals without cataract<sup>4</sup>.

In our study we have analysed serum sodium and potassium levels which could in turn affect the aqueous levels of these electrolytes and play a role in cataractogenesis by affecting lens metabolism.

### Aim

To compare the serum sodium and serum potassium levels in patients with senile cataract, and age matched individuals without cataract.

### Materials and methods

Our study was a prospective case control study done at a tertiary care hospital in Goa, conducted on patients who presented to the Department of Ophthalmology.

Institutional Ethical committee approval was obtained. The study was conducted from November 2016 to

February 2017, and included 300 patients aged 50 years and above.

Patients were grouped into those having cataract and those without cataract.

Mean serum sodium and potassium levels were measured in the cataract group and the non cataract group and compared.

Two fasting samples were collected from each patient at 8am by venepuncture to increase sensitivity and specificity.

### Inclusion criteria :

- Patients aged 50 years and above with senile cataract,
- Patients aged 50 years and above without cataract.
- Cataract was graded according to the Lens Opacities Classification System III (LOCSIII) on slit lamp examination.
- Fundus examination on Direct Ophthalmoscopy (DO) and Indirect Ophthalmoscopy (IDO) was also done.

### Exclusion criteria:

- Complicated cataracts,
- Steroid induced cataract,
- Patients with trauma,

- Systemic conditions such as diabetes, hypertension, renal dysfunction,
- Patients taking diuretic medications, and other medications which could alter electrolyte balance.

Informed consent was obtained from all patients that were included in the study.

Detailed history was obtained, thorough ophthalmic evaluation was done for all patients, which included slit lamp examination, intraocular pressure measurement by Goldmanns Applanation tonometry, and dilated fundus examination.

Serum sodium and potassium levels were measured from venous blood samples, using the principle of ion selective electrode. (Normal serum sodium - 130 to 143 meq/l, Normal serum potassium levels- 3.5 to 5.5 meq/l)<sup>5</sup>.

The data was analysed using SPSS14 software.

Non parametric tests were used for analysis.

## Results

Out of the total 300 patients that were studied, 150 had senile cataract and 150 were non cataract (controls).

There were 73 women and 77 men in the study group, and 71 women and 79 men in the control group.

The mean age in the cataract group was 62.5 years and in the control group was 63.5 years, the difference was statistically insignificant.

The comparison of serum sodium among study and control groups showed a higher level of sodium among the cataract group (135meq/l) compared to control group(133.3meq/l). The mean value in both groups were found to be within normal limits, however the difference was statistically significant (p value 0.01).

The serum potassium levels in the cases and the control group were compared (Table 1), and showed a lower level of mean potassium in the cataract group (3.65meq/l), as compared to the control group (3.66meq/l). The mean value in both groups was within normal limits, and was not statistically significant (0.20).

	Cataract group	Control
Mean sodium	135 meq/l	133.3meq/l
Mean potassium	3.65meq/l	3.66meq/l

**Table 1 - Sr. Sodium & Potassium levels.**

## Discussion

In our study we have found a higher serum sodium level in patients with senile cataract as compared to age matched individuals without cataract, however no such significant difference was found in the serum potassium values of patients with senile cataract and controls.

Few similar studies done in the past have shown similar results<sup>6-8</sup>.

Other studies conducted in the past have shown higher serum levels of bilirubin, alkaline phosphatase, in patients with senile cataract as compared to age and sex matched controls without cataract<sup>9</sup>.

Also a higher level of sodium and potassium was seen in aqueous samples of patients with cataract as compared to patients without cataract<sup>10</sup>.

## Conclusion

High serum sodium levels are seen in individuals with senile cataract, which could lead to high levels of sodium in the aqueous humor. Hence a diet low in sodium could be protective against cataract, conversely a diet high in sodium may act as a risk factor for cataractogenesis.

## Acknowledgement

I would take this opportunity to thank my colleagues and seniors for motivating me to take up this study, and for constantly inspiring me and helping me verify the diagnosis. I would also thank the laboratory technicians for helping me carry out the investigations. Last but not the least I would like to thank my patients for being a part of the study, without whom I would not have been able to undertake the study.

## Conflict of interest

No conflicts of interest was observed between the authors.

## References

- 1) McCarty CA, Taylor HR. A review of the epidemiologic evidence linking ultraviolet radiations and cataracts. *Dev ophthalmol* 2002;35:21-31.
- 2) Hammond CJ, Duncan DD, Sneider H, de Lange M, West SK, Spector TD, et al. The heritability of age-related cortical cataract: the twin eye study. *Invest Ophthalmol Vis Sci*. 2001;42(3):601-5.
- 3) Shiels A, Bennett TM, Knopf HL, Maraini G, Li A, Jiao X, et al. The EPHA2 gene is associated with cataracts linked to chromosome 1p. *Mol Vis*. 2008;14:2042-55.
- 4) Chandorkar AG, Bulakh PM, Albal MV. Electrolyte composition in normal and cataractous lenses. *Indian J Ophthalmol*. 1980;28(3):135-8.
- 5) Tietz NW. *Clinical guide to laboratory tests*. 2nd Ed. Philadelphia: WB Saunders; 1990. p 98456.
- 6) Clayton RM, Cuthbert J, Duffy J, Seth J, Phillips CI, Bartholomew RS, et al. Some risk factors associated with cataract in Scotland: A pilot study. *Trans Ophthalmol Soc U K*. 1982;102 Pt 3:331-6.

- 7)      Mirsamadi M, Nourmohammadi I, Imamian M. Comparative study of serum Na<sup>+</sup> and K<sup>+</sup> levels in senile cataract patients and normal individuals. *Int J Med Sci.* 2004;1(3):165-9.
- 8)      Mathur G, Pai V. Comparison of serum sodium and potassium levels in patients with cataract and age matched individuals without cataract. *Indian J Ophthalmol.* 2016;64(6):446-7.
- 9)      Donnelly CA, Seth J, Clayton RM, Phillips CI, Cuthbert J, Prescott RJ. Some blood constituents correlate with human cataract. *Br J Ophthalmol.* 1995;79(11):1036-41.
- 10)     Clayton RM, Cuthbert J, Phillips CI, Bartholomew RS, Stokoe NL, Fytch T. Analysis of individual cataract patients and their lenses: A progress report. *Exp Eye Res.* 1980;31(5):533-6.