Scholars Journal of Applied Medical Sciences (SJAMS) **ISSN 2320-6691 (Online)**
Sch. J. App. Med. Sci., 2016; 4(6F):2296-2298 **ISSN 2347-954X (Print)**

(An International Publisher for Academic and Scientific Resources)
www.saspublishers.com DOI: 10.36347/sjams.2016.v04i06.088

Original Research Article

Serum Sodium and Potassium Levels in Senile Cataract Patients Attending Tertiary Care Hospital in Northern India

Tariq Masood[1], Tarannum Shakeel[2], Rajeev Kushwaha[1], Narotam Sharma[1]
[1]Department of Biochemistry, Shri Mahant Indiresh Hospital and Shri Guru Ram Rai Institute of Medical & Health Sciences, Dehradun-248001 (UK), India
[2]Department of Ophthalmology, Shri Mahant Indiresh Hospital and Shri Guru Ram Rai Institute of Medical & Health Sciences, Dehradun-248001 (UK), India

***Corresponding author**
Narotam Sharma
Email: sharmanarotam5@gmail.com

Abstract: The aim is to assess and compare the mean serum sodium and potassium levels in patients of senile cataract with age matched controls.250 senile cataract patients visiting the eye OPD and 250 age matched controls were included in the study. Mean serum sodium (Na^+) and potassium (K^+) were measured and compared between the two groups. Statistical software SPSS14 was used for statistical analysis.Mean serum sodium level in cataract group was 145.83meq/L and 141.02meq/L in the healthy volunteers. Mean potassium concentration was 4.18meq/L in cataract patients which decreased to 3.90meq/Lin controls. Mean sodium levels among patients were significantly higher than controls ($p<0.05$). However, the mean potassium levels did not exhibit any significant change between the two groups. Diets with high sodium contents may be a risk factor for senile cataract formation and dietary revisions can possibly reduce the rate of cataract progression.
Keywords:senile cataract, serum sodium, serum potassium, healthy volunteers

INTRODUCTION

Senile cataract is the most common form of cataract and cataract surgery is the common surgery performed in the field of ophthalmology [1, 2]. Up to 50 million people in the world suffer from age-related cataract [3, 4] and its prevalence in developing countries is much more than the developed world [2]. Annual new cases of cataract in India are 4 million [4]. Various studies have been carried out to elucidate the potential risk factors that could affect the process of cataract genesis which includes genetic factors, exposure to UV B-rays, occupational, geographic and dietary factors [5-7]. Various studies have been conducted to study the role of nutritional status in the process of cataract formation and the possibility that biochemical parameters can be used as markers to determine the possibility of cataract genesis and thus assuming that it might be possible to modify these factors [2-4].

In the present study a comparison of the mean Na^+ and K^+ levels was made between the senile cataract patients and age matched controls. The results were compared with similar studies conducted in the past.

MATERIALS AND METHODS

This was a hospital based prospective case control study carried out in the Department of Biochemistry in collaboration with Department of Ophthalmology, SGRR Institute of Medical and Health Sciences (a tertiary level teaching hospital in northern India). The total of 250 senile cataract patients and 250 age and gender matched controls attending the eye OPD of were included in the study. Ethical clearance was taken from the institutional review board. All the subjects were informed about the scientific nature of the study and a written and informed consent was obtained. Individuals having diabetes mellitus, hypertension, other systemic diseases or on prolonged medication affecting serum sodium or serum potassium levels were excluded from the study. Patients suffering from secondary causes of cataract like post- inflammation or trauma were also excluded from the study. The included subjects underwent a detailed history and ophthalmic evaluation. The detailed ocular examination including slit lamp examination and fundus evaluation was done by a single experienced ophthalmologist. A fasting state 2ml blood sample was obtained from both cases and controls under all aseptic precautions. The samples

were analyzed for serum sodium and potassium levels by Direct Ion selective Electrode technique using HDCLyte electrolyte analyzer. Data was analyzed using SPSS 14 software.
Normal serum sodium levels - 130-143 meq/l.
Normal serum potassium levels - 3.5-5.5 meq/l [8].

RESULTS

In this study, the case group comprised of 250 senile cataract patients out of which 121 were males and 129 were females. The control group consisted of 250 age matched individuals out of which 123 were males and 127 were females. Mean age of the subjects in the cataract group was 63.4±14.4 years and in the control group was 61.1 ±13.8 years (Table-1).

Mean serum sodium levels were 145.83±4.23 meq/l in the cataract group and 141.02±2.36 meq/l in the age matched controls. This difference was statistically significant (p<0.01). The mean serum potassium levels were 4.18± 0.23 meq/l in the cataract group and 3.90±0.28meq/l in the control group. However this difference was not statistically significant (p=0.03) (Table-2).

Table 1: Age and sex distribution of cases and controls

Lens opacity group	Mean age (± SD) in years	Males (%)	Females (%)
Cataract group(n=250)	63.4 (±14.4)	121(48.4%)	129(51.6%)
Control group (n=250)	61.1 (±13.8)	123(49.2%)	127(50.8%)

Table 2: Mean serum sodium and potassium levels

Serum levels	Cataract group	Control group	P value
Serum sodium (meq/l))	145.83±4.23	141.02±2.36	< 0.01
Serum potassium (meq/l)	4.18±0.23	3.90±028	0.03

DISCUSSION

Identifying cataract risk factors provides new hopes in dealing with morbidity and costs of disease. The aim of our study was to compare the mean serum sodium and potassium levels in senile cataract patients with age matched controls. The level of serum sodium was significantly higher in the senile cataract patients as compared to the controls. The serum potassium levels were also higher in the senile cataract patients as compared to the controls though not statistically significant. (Table-2). Mansour et al in a study on 155 Iranian senile cataract patients versus a similar number of age matched controls reported significantly higher levels of serum sodium in the cataract group. However serum potassium levels were not significantly high in cataract group when compared to normals which is comparable to our study [9]. A study conducted by Mathur *et al* in Chennai[10] and a pilot study in Scotland has shown similar results [11].

Previous studies have found significantly higher levels of bilirubin, alkaline phosphatase, and glutamyl transpeptidase in senile cataract patients compared to normal individuals [12]. Alteration in cation concentration of aqueous humor which is attributed to alterations in serum cation concentration can be known as a risk factor for cataract formation[13]. Diets with high sodium contents could be a risk factor for senile cataract formation. As it seems, a high level of serum sodium in turn contributes to cataract formation[14]. It seems that lowering the dietary intake of sodium might retard the cataract progression [10, 15].

CONCLUSION

Serum sodium levels in senile cataract patients were found to be higher as compared to control group, while this did not hold true for serum potassium levels. These findings suggest that diets that are high in sodium content are a risk factor for the formation of senile cataract. Lowering the dietary intake of sodium might help in retarding the progression of cataract. Further studies to compare the progression of cataract with different dietary habits are required to support these findings.

REFERENCES

1. Donnelly CA; Some plasma constituents correlate with human cataract location and nuclear colour.Ophthalmic Research, 1997;26:207–21.
2. Sperduto RD; Epidemiological aspects of age-related cataract. In: Tasman W, Jaeger A, editors. Duane's Clinical Ophthalmology. Philadelphia: Lippincott-Raven publishers, 2000; 3–11.
3. Bunce GE, Kinoshita J, Horwitz J; Nutritional factors in cataract. Annual Review of Nutrition, 1990;10:233–54.
4. Minassian DC, Mehra V; Blinded by cataract: Each year projection from the first epidemiological study of incidence of cataract blindness in India. British Journal of Ophthalmology, 1990;74:341–343.
5. Hammond CJ, Duncan DD, Snieder H; The heritability of age-related cortical cataract: the twin eye study. Invest Ophthalmol Vis Sci., 2001;42:601-5.
6. Shiels A, Bennett TM, Knopf HL; The EPHA2 gene is associated with cataracts linked to

chromosome 1p. Mol Vis [serial online] 2008;14:2042-55.
7. McCarty CA, Taylor HR; A review of the epidemiologicevidence linking ultraviolet radiation and cataracts. DevOphthalmol., 2002;35:21-31.
8. Kuszak JR; Embryology and anatomy of the lens. In: Tasman W, Jaeger A, editors. Duane's Clinical Ophthalmology. Philadelphia: Lippincott - Raven publishers, 2000; 2–8.
9. Mirsasamadi M, Nourmohammadi I, Imamian M; Comparative study of serum Na^+ and K^+ levels in senile cataract patients and normal individuals. Int J Med Sci., 2004;1:165-9.
10. Mathur G, Pai V; Comparison of serum sodium and potassium levels in patients with senile cataract and age-matched individuals without cataract. Indian J Ophthalmol [Epub ahead of print] [cited 2016 Mar 8].
11. Clayton RM; Some risk factors associated with cataract in Scotland: A pilot study. Trans OphthalmolSoc UK, 1982;102:331-6.
12. Donnelly CA, Seth J, Clayton RM, Phillips CI, Cuthbert J, Prescott RJ; Some blood plasma constituents correlate with human cataract. Br J Ophthalmol., 1995;79:1036-41.
13. 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;31:533-6.
14. Phillips CI. Cataract: A search for associated or causative factors. Excerpta Med., 1980; 34:19-25.
15. Usha S Adiga, Adline Harris et al. Serum electrolytes in senile cataract patients. Al Ameen J Med Sci., 2014; 7:164-8.