

COMPARATIVE STUDY OF BIOCHEMICAL PARAMETERS AMONG ELDERLY PATIENTS WITH CATARACT

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Article Info: Received 02 June 2019; Accepted 21 July 2019

DOI: <https://doi.org/10.32553/ijmbs.v3i7.477>

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Conflict of interest: Nil

Abstract

Background: Cataract is among the most common ocular morbidity seen among elderly patients, its incidence is related to the aging process. It is an ocular morbidity and results in decreased eyesight. Incidence of cataract related to aging process is generally seen in patients who are aged above 45 years of age. In previous researches it was estimated that approximately seventy five percent of the general population above the 70 years of age has reported to suffer from lens opacity or cataract.

Material & Methods: Patients who were presenting with nuclear or cortical or posterior sub-capsular cataracts along with healthy age and gender matched controls were enrolled from outdoor and from ward by simple random sampling. Clearance from Institutional Ethics Committee was taken before start of study. Written informed consent was taken from each study participant.

Results: On the assessment of serum sodium levels it was found that mean serum sodium levels were 144.12 ± 2.43 meq/l in the cataract group and mean serum sodium levels were 139.37 ± 3.4 meq/l in the age matched controls. This difference among both the groups was statistically significant (P value < 0.05). On the assessment of serum potassium levels, it was found that mean serum potassium levels were 4.32 ± 0.11 meq/l in the cataract group and mean serum potassium levels were 4.10 ± 0.16 meq/l in the age matched controls. This difference among both the groups was statistically non-significant (P value > 0.05).

Conclusion: We concluded from the present study that the higher prevalence of raised serum sodium levels in patients of senile cataract. We found that any alteration in serum electrolyte concentration leads to alterations in aqueous humor's electrolyte concentration and is responsible for risk factor for development of senile cataract.

Key words: senile cataract, serum sodium, serum potassium.

INTRODUCTION

Cataract is among the most common ocular morbidity seen among elderly patients, its incidence is related to the aging process (1). It is an ocular morbidity and results in decreased eyesight. Incidence of cataract related to aging process is generally seen in patients who are aged above 45 years of age. In previous researches it was estimated that approximately seventy five percent of the general population above the 70 years of age has reported to suffer from lens opacity or cataract (2). However, cataract can be present among any age group and has vast etiology and represents the major burden of blindness and poor vision worldwide. In a previous study it was estimated that approximately 60 million people are suffering from elderly onset cataract in the world. Some studies among developing world also reported that higher burden of age related cataract in comparison to the developed countries

(3). In a study it was reported that, the annual burden of age related cataract in India was around 4 million (4). Therefore, it has been established that cataracts are responsible for huge burden on health care related to ocular morbidity and to combat the disease burden and to achieve health goals, various health programs were initiated for cataract surgeries to improve quality of life among elderly population and to prevent disabilities.

Along with the health programs directed towards cataract surgeries and secondary preventions it is also important to direct health programs towards etiology of cataract, so that we can prevent the occurrence of disease, so the outcome can be improved and out of pocket expenditure is reduced. In previous researches various etiologies were reported for the pathogenesis of age related cataract some of them are, oxidative stress, osmotic graduation, phase separation, protein aggregates and

post translational protein changes, however the etiopathogenesis is still a subject for research (5). Some studies also proposed the numerous risk factors contributing in its etiopathogenesis such as UV light exposure, some metabolic disorders, nutrition status, lens metabolism disorder, cationic pump malfunction and quality of life. The aqueous humor is the central component of lens metabolism, which is produced from plasma secretions. Therefore, the electrolytes concentration of aqueous humor is directly related to the serum electrolytes concentration and affects the metabolism of lens (6). Some studies reported that these biochemical changes in aqueous humor is directly related to etiopathogenesis of cataract formation among elderly population (7). Hence, we conducted present study to assess the biochemical changes related to major electrolytes in the etiopathogenesis of cataract formation among elderly population.

MATERIALS & METHODS

The present prospective study was conducted at department of ophthalmology of our tertiary care hospital. The study duration was of one year from March 2017 to April 2018. A sample size of 100 was calculated at 95% confidence interval at 10% acceptable margin of error. Patients who were presenting with nuclear or cortical or posterior sub-capsular cataracts along with healthy age and gender matched controls were enrolled from outdoor and from ward by simple random sampling. Clearance from Institutional Ethics Committee was taken before start of study. Written informed consent was taken from each study participant.

The data were collected by detailed history, general physical and clinical examination from each patient after taking the written consent. Patients who had hypertension, diabetes or any other chronic diseases, patients with secondary causes of cataract like post-inflammation and steroid induced cataract were excluded from the study. Detailed ophthalmic examination was done among all the study participants, including slit-lamp and fundus examination. For the grading of cataract LOCS III classification was used. All the study participants were subjected to serum sodium and serum potassium level estimation using flame photometry method. Data analysis was carried out using SPSS v22. All tests were done at alpha (level significance) of 5%; means a significant association present if p value was less than 0.05.

RESULTS

In the present study, we enrolled 100 patients of nuclear or cortical or posterior sub-capsular cataracts who were aged from 45 to 74 years. The mean age of the enrolled patients was 65.7 ± 5.4 years. Out of total patients diagnosed with nuclear or cortical or posterior sub-capsular cataracts 61% patients were male and 39% patients were females. In the present study, we enrolled 100 patients of healthy patients who were served as control group aged from 46 to 71 years. The mean age of the enrolled patients was 63.2 ± 4.8 years. Out of total patients diagnosed with nuclear or cortical or posterior sub-capsular cataracts 60% patients were male and 40% patients were females. (Table-1).

Table 1: Distribution of study participants according to age and gender.

Study groups	Mean age in years	Males (%)	Females (%)
Case group	65.7 ± 5.4 years	61	39
Control group	63.2 ± 4.8 years	60	40

In the present study, out of total study participants, we enrolled 100 patients of nuclear or cortical or posterior sub-capsular cataracts and 100 patients of healthy patients who were served as control group. All the study participants were subjected to serum sodium and serum potassium level estimation using flame photometry method. On the assessment of serum sodium levels it was found that mean serum sodium levels were 144.12 ± 2.43 meq/l in the cataract group and mean serum sodium levels were 139.37 ± 3.4 meq/l in the age matched controls. This difference among both the groups was statistically significant (P value <0.05). On the assessment of serum potassium levels it was found that mean serum potassium levels were 4.32 ± 0.11 meq/l in the cataract group and mean serum potassium levels were 4.10 ± 0.16 meq/l in the age matched controls. This difference among both the groups was statistically non-significant (P value >0.05). (Table-2).

Table 2: Distribution of study participants according to mean serum sodium and potassium levels

Serum levels	Case group	Control group	P value
Serum sodium (meq/l)	144.12 ± 2.43	139.37 ± 3.41	< 0.05
Serum potassium (meq/l)	4.32 ± 0.11	4.10 ± 0.16	> 0.05

DISCUSSION

In the present study, we enrolled 100 patients of nuclear or cortical or posterior sub-capsular cataracts who were aged from 45 to 74 years. The mean age of the enrolled patients was 65.7 ± 5.4 years. Out of total patients diagnosed with nuclear or cortical or posterior sub-capsular cataracts 61% patients were male and 39% patients were females. In the present study, we enrolled 100 patients of healthy patients who were served as control group aged from 46 to 71 years. The mean age of the enrolled patients was 63.2 ± 4.8 years. Out of total patients diagnosed with nuclear or cortical or posterior sub-capsular cataracts 60% patients were male and 40% patients were females. Similar results were obtained in a study conducted by Javanbakht M among patients of senile cataract and found that the statistically higher prevalence of raised serum sodium levels in patients of senile cataract. Most of characteristics of their study were similar to present study (8).

Similar results were obtained in a study conducted by Kaur J among patients of senile cataract and found that the statistically higher prevalence of raised serum sodium levels in patients of senile cataract. Most of characteristics of their study were similar to present study and concluded that age was not only risk factor for the senile cataract (9). Similar results were obtained in a study conducted by Schoenfeld E among patients of senile cataract and found that the higher prevalence of raised serum sodium levels in patients of senile cataract. However, their results were statistically non-significant (P value >0.05) (10). Similar results were obtained in a study conducted by Ross M among patients of senile cataract and found that the higher prevalence of raised serum sodium levels in patients of senile cataract. They reported that any alteration in serum electrolyte concentration leads to alterations in aqueous humor's electrolyte concentration and responsible for risk factor for development of senile cataract (11).

In the present study, out of total study participants, we enrolled 100 patients of nuclear or cortical or posterior sub-capsular cataracts and 100 patients of healthy patients who were served as control group. All the study participants were subjected to serum sodium and serum potassium level estimation using flame photometry method. On the assessment of serum sodium levels it was found that mean serum sodium levels were 144.12 ± 2.43 meq/l in the cataract group and mean serum sodium levels were

139.37 ± 3.4 meq/l in the age matched controls. This difference among both the groups was statistically significant (P value <0.05). On the assessment of serum potassium levels it was found that mean serum potassium levels were 4.32 ± 0.11 meq/l in the cataract group and mean serum potassium levels were 4.10 ± 0.16 meq/l in the age matched controls. This difference among both the groups was statistically non-significant (P value >0.05). Similar results were obtained in a study conducted by Clayton among patients of senile cataract and found that the higher prevalence of raised serum sodium levels in patients of senile cataract. They reported that any alteration in serum electrolyte concentration leads to alterations in aqueous humor's electrolyte concentration and responsible for risk factor for development of senile cataract (12). Similar results were obtained in a study conducted by Shoepheld-E among patients of senile cataract and found that the higher prevalence of raised serum sodium levels in patients of senile cataract. They reported that statistically significant association between raised sodium levels and cataract (13).

CONCLUSION

We concluded from the present study that the higher prevalence of raised serum sodium levels in patients of senile cataract. We found that any alteration in serum electrolyte concentration leads to alterations in aqueous humor's electrolyte concentration and responsible for risk factor for development of senile cataract.

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