RESEARCH ARTICLE

PROFILE OF AXIAL LENGTH IN KASHIMIRI POPULATION WITH CATARACT

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ABSTRACT

Background: Axial length (AL) of human eye is an important indicator of various refractive errors like myopia and hypermetropia. Myopia is characterized by longer AL and hypermetropia by a smaller AL. It's well known that myopes have increased risk of retinal pathologies like tears, retial detachment, staphylomas and age related macular degeneration; whereas hypermetropes who have a shallow anterior chamber and crowding of anterior segment have an increased risk of angle closure glaucoma.

Aims & Objectives: The aim of the study was to determine normal range of the AL and refractive status of adult population in Kashmir who had cataract.

Materials and Methods: This study was carried out in the post graduate department of ophthalmology at the associated hospital of Government Medical College, Srinagar in which a sample of consecutive 903 adult patients, who were due for cataract surgery, was included. The AL was measured using A-Scan ultrasound.

Results: Out of 903 patients, 828 had average AL of 22.48 mm. Males had an average AL of 22.66 and Females had 22.59mm. Approximately 91.66 % of subjects were seen to be emmetropes, myopes constituted 7.24% (average AL of 26.25 mm) and hypermetropes about 1.1% (average AL of 19.15 mm). Patients in the age group 40-60 years and 60-80 years had average AL of 22.74 mm and 22.52 mm respectively.

Conclusion: The study showed a slightly higher AL for male population, with a slight decline in AL with increasing age.

Key Words: Axial Length; Cataract; Male; Kashmir

Introduction

Ocular biometric parameters can be influenced by race, ethnicity and genetics. Their differences across different population probably can explain differences in refractive errors in such populations. Axial Length (AL) of the eye is an important parameter, which is required to determine the refractive status of the eye and is the basic, anatomic and major variable for the quality of the optical image on the retina. AL can help in knowing various conditions of the eye like staphyloma, risk of retinal detachment, intraocular lens power calculation before cataract surgery and refractive surgery and risk of choroidal neovascular membrane (CNVM) and predisposition of closed angle glaucoma.[1-3] Determining the AL and its components in epidemiological studies provides ophthalmologists with this important and valuable information. Reports concerning the distribution of ocular biometrics in population based studies have been published in various Asian centers like Mongolia, Taiwan, Myanmar, Singapore and China and also in West Asian countries like Iran.[1,4-8]

Several Studies have demonstrated the correlation between ocular biometrics especially AL with refractive errors.[4-10] Since these parameters can be influenced by race, ethnicity and genetics, their differences across different populations can probably explain differences in refractive errors. The aim of the study was to determine the normal range of AL and subsequently the various refractive statuses of the people of Kashmir.

Materials and Methods

This study was conducted in the Post-graduate department of ophthalmology in associated hospital of Government Medical College, Srinagar over a period of three years, from September 2010 to August 2013. A total of 903 consecutive patients in the age group of 40-80 years who had presented to the department with complaints of progressive painless loss of vision were included in the study, while known conditions like glaucoma, age related macular degeneration, corneal dystrophies and diabetes mellitus were excluded.

All the patients were interviewed to record their detailed clinical profile and their ophthalmologic history was analyzed. The patients were examined with slit lamp examination and the type of cataract was examined. All patients underwent ultrasound examination of eye and AL determination was performed by A-Scan by the same person and parameters were recorded in study form. Data was analyzed using SPSS software v 19x86 (IBM). Analytical methods were used to determine the mean value of AL in general patient population, in the two sexes and in age groups of 40-60 and 60-80 years. In the

second step, we determined AL in the patients on basis of refractive error of eye and divided them into three groups. Chi square test was used to determine the goodness of fit. ($p<0.05$).

Results

A total of 903 patients were included in the study. The mean age of study population was 60.5 years (range 41-79). The mean AL of the study population was 22.66 mm. The mean AL in men was slightly, though not significantly, higher than that in women – 22.73 mm and 22.59 mm respectively.

The various refractive statuses of sample population were determined and majority (828/903) were found to be emmetropes with mean AL of 22.48 mm. Myopes constituted about 7.24% (65/ 903) with mean AL of about 26.25 mm. Hypermetropes constituted only 1.1% (10/903) of total population – with mean AL of 19.1 mm. ($p<0.05$).

Mean AL for all age groups was 22.66 mm. Those in age group of 40-60 had mean AL of 22.74 mm, which was slightly, though not significantly, more than 22.52 mm seen in the age group 60-80years.

Discussion

Axial Length has various applications in ophthalmology. Describing the normal range of this index is very important in the choice of formula used for intra ocular lens (IOL) calculation in cataract patients, determining the refractive status of people and subsequently in the risk of complications like staphyloma, risk of retinal detachment, CNVM, and various types of glaucoma (open and closed angle glaucoma).

In our study, pattern of AL was studied in 903 patients, which came out to be 22.66 mm. which is less than but comparable to that seen by Wong et al in age group 40-81 years (23.23 mm).[7] In the study by Wickremasighe, AL in the age group of 40-49 years was 23.2 mm, in 50-59 Years it was 23.2 mm, in 60-69 years it was 23.3 mm, and in > 70 years, it was 23.3 mm.[4] In study conducted in the patients in Myanmar, AL in the age groups 40-49, 50-59, 60-69 and > 70 years was 22.75 mm, 22. 74mm, 22.75 mm and 22.73 mm respectively, which values are comparable in our study.[6] In Iranian population, Hassan Haeshmi found mean AL to be 23.14 mm in the age group of 40-64 years.[9] Shufelt reported a slightly higher mean AL (23.38mm) in US population > 40 years of age.[11] Smaller mean AL values in eastern population can be explained on basis of ethnicity and genetic variation, as is the case with the results derived in our study population. Fotedar reported mean AL in Australian population and found that it was 23.6 mm in age group 59-64 years, 23.44 mm in age group of 65-74 years and 23.39 mm in > 75 years of age.[12] Similar trend of decreasing mean AL with advancing age was also reported by Jivrajka in United States, He et al in China and Velez-Montoya in Mexico.[8,13,14]

Men in our study had a mean AL of 22.73 mm compared to 22.59 mm in women. It is comparable to the findings of Jordan et al, who reported AL to be 23.33 mm and 22.99 mm in male and female population respectively. [10] Similar findings of variation in AL based on gender have been reported from various different regions of the world by many researchers with mean AL being lower in female population compared to their male counterparts.[4,6,8,9,11,12,15,16]

In the backdrop of all these studies conducted, it can be safely said that AL is greater in men compared to women. Based on these findings, inter-gender differences in refractive errors can be expected.

This is the first study of its kind in Kashmiri population and we found that the majority (91.66%) of the patients had an AL in the range of 20-24 mm, followed by myopes (7.24%), who had a mean AL of 26.25 mm (>24mm) and the least (1.1%) of the population constituted hypermetropes, who had a mean AL of 19.15 mm (<20). The study provides valuable information regarding the axial length and thus the various refractive statuses of the said population. This could serve as a helpful guideline for diagnostic and clinical purpose. We have a good data in the age group of 40-80 years and thus a comparative study can be performed in younger age group 40 or less (not included in present study).

Conclusion

Axial Length has different applications in ophthalmology. Describing the normal range of this index is very important in the choice of formula used for Intra Ocular lens. The results from our study show the average AL in our population to be lower than that seen in various other regions of the world. Most patients had an AL ranging between 20-24 mm. There is slightly higher AL in male population and, with increasing age, the AL seemed to decrease which is the general trend across

different patient populations.

This study is a good beginning and provides an initiation into future studies including inclusion of younger population and study of other parameters like anterior chamber depth and its correlation with axial length.

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