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Corneal Astigmatism in Adults Attending Eye Clinic

KEYWORDS: Astigmatism, adults, refractive errors, WTR, ATR.

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ABSTRACT *The magnitude of corneal astigmatism among adults is not only high but also has a wide variation worldwide. In many developing countries including India, there is insufficient data on its magnitude among adults. In this retrospective study we have analyzed distribution of different types, axis and grades of astigmatism. Out of 3086 patients of refractive errors 957(31%) patients had Astigmatic error. Male to female ratio was 0.9:1. Myopic, hyperopic, and mixed astigmatism was present in 420(43.9%), 282(29.5%) and 255(26.65%) patients respectively. Out of 957 patients, 388(40.5%) are of simple astigmatism, 314(32.8%) of compound astigmatism and 255(26.7%) of mixed astigmatism. Mild, moderate and high astigmatism was present in 587(61.34%), 274(28.63%), and 96(10.03%) patients respectively. With the rule (WTR), against the rule (ATR), and oblique astigmatism was present in 488(51%), 291(30.4%) and 178(18.6%) patients respectively.*

Introduction

Astigmatism is a refractive error that occurs when parallel rays of light entering the non-accommodating eye, forms two or more images rather than a point focus due to unequal refraction of light in different meridians.[7] Astigmatism has been classified as simple, compound and mixed.[6,15] or it can be classified according to axis as with the-rule (WTR), against-the rule (ATR) and oblique, or by degree as low, medium and high. Since astigmatism affects the near and distance vision of an individual, its symptoms like, asthenopia and headache are more common than any other types of refractive errors.[1,8,10,13] Common symptoms of uncorrected astigmatism are as follows: blurry vision, asthenopia, eye strain, headache, tearing and Squinting.[2,3] Worldwide high prevalence of astigmatism and increasing educated and working adult population and their peculiar symptoms, compelled us for this study.

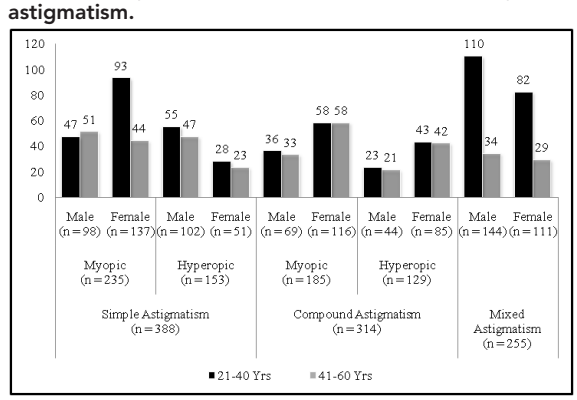
Materials and Methods

A retrospective, cross-sectional and record based study was done in private Eye Clinic. All the adults (21-60 years of age) who attended the Clinic from 1st April 2013 to 31st March 2014 were included in the study after their consent. Adults with ocular pathology, history of trauma or operation were excluded from the study. There were 3086 patients of refractive errors over the period of one year. Cylinder of 0.25 diopter or more was considered an error and included in the analysis. Because of the high correlation between eyes and similarity of results in left or right eyes, only the results of right eyes are reported. Astigmatism is divided into low (0.25 to 0.75 D), moderate (1.0 to 3.0 D) and high (>3.0 D). It is also divided into three groups according to the position of axis and its steepness namely, with-the-rule (WTR) astigmatism if the steep axis was 0°or180°±20°, against-the-rule (ATR) astigmatism if the steep axis was 90±20°, and oblique astigmatism if the axis was in between 20° to 70° and 110° to 160°. Proportions were compared using the chi-square test and P values of less than 0.05 were considered statistically significant.

Results

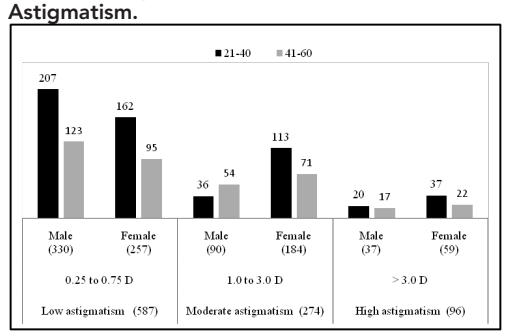
Out of 3086 patients who had refractive errors, 957 (31%) had astigmatism. There were 457 (47.8%) males and 500 (52.2%) females.

Graph 1:- Age and sex distribution in various types of astigmatism.



Graph 1 shows that out of the total 957 patients of Astigmatism, 388(40.5%) are of simple, 314(32.8%) of compound and 255 (26.7%) of mixed Astigmatism. Proportion of female patients 137(58.3%) of myopic Simple astigmatism is higher than males 98(41.7%). Vice versa, proportion of male patients 102(66.7%) of hyperopic simple astigmatism is higher than females 51(33.3%). This difference was statistically very highly significant (X^2 = 22.135, df = 1, p < 0.001). Proportion of young females 93(67.9%) is more in myopic simple astigmatism than males 47(48.0%). This difference was statistically highly significant (X^2 = 8.608, df = 1, p < 0.01). Proportion of cases of Mixed Astigmatism is higher amongst younger age group both in males as well as females.

Graph 2:- Age and Sex Distribution in varies Grades of Astigmatism.



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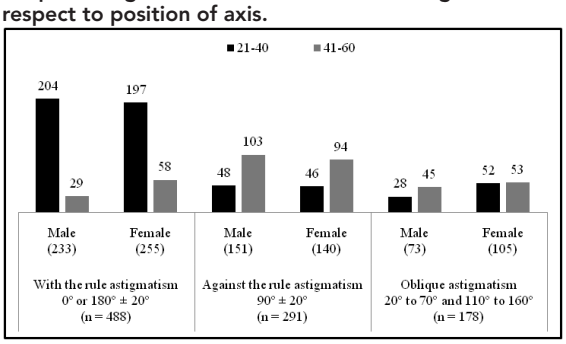
Graph 2 shows that the highest proportion of cases amongst various grades of Astigmatism are those with low grade (61.3%), followed by moderate grade (28.6%) and high grade astigmatism (10.1%). Proportion of females 184(67.1%) in moderate grade astigmatism is more than in low grade astigmatism 257(43.8%). This difference was statistically very highly significant ($X^2 = 39.909$, df = 1, $p < 0.001$).

Graph 3:- Age and sex distribution of astigmatism with respect to position of axis.



Graph 3 shows that there are 51.0% cases of with the rule astigmatism, 30.4% of against the rule and 18.6% are of oblique astigmatism. Proportion of 'with the rule astigmatism' cases is more in young adults 401(82.1%), while proportion of 'against the rule astigmatism' cases is comparatively lesser in adults 94(32.3%). This difference is statistically very highly significant ($X^2 = 193.558$, df = 1, $p < 0.001$).

Discussion

There is increasing trend of refractive errors in India, with astigmatism as second most common refractive error.[2,14] In our study prevalence of astigmatism is 31%, which is less than (32.4% to 59.6%) other studies.[4,9,11,12] This may be due to stringent criteria of selection. Males to females ratio is 0.9:1which is similar to other studies. Myopic astigmatism (43.9%) is more common than hyperopic (29.5%) or mixed (26.6%), which is a worldwide trend.[4,9,11,12,16,17] Myopic simple astigmatism is more common in young (21 -40 years) females 93(67.9%) than males 47(48.0%). Other studies did not find such significance.[4,9,11,12,16,17] Low grade astigmatism was found in 61.3% patients, which very common and agrees with all studies.[4,9,11,12,16,17] Higher proportion of females 184(67.1%) amongst moderate grade astigmatism as compared to those in low grade astigmatism 257(43.8%) is our new finding. With the rule astigmatism (51%) in young adults and higher proportion of against the rule astigmatism in adults above 40, is the common finding in other studies.[4,9,11,12,16,17]

Conclusions

Astigmatism is the second most common refractive error. Simple, low grade and with the rule astigmatism is more common in young adults, while, mixed and against the rule astigmatism is common in adults above the age of 40. Females are more affected with simple myopic astigmatism. Asthenopia and headache are common symptoms. Correction of astigmatism may be tricky, but it should be corrected with spectacles, contact lens, surgery or laser procedure.

REFERENCE

1) Akinci A, Güven A, Degerliyurt A, et al. The correlation between headache and refractive | errors. J AAPOS 2008;12(3):290-3. | 2) Arlappa N. (Dr) Epidemiological Overview of Preventable Blindness in India. Vision 2020 India. | 3) Borish I.M. (1975). Clinical Refraction (3rd ed). The Professional Press, Inc. Chicago, Illinois. p. 5-694. | 4) Bourne RR, Dineen BP, Ali SM, et al. Prevalence of refractive error in Bangladeshi adults: results of the National Blindness and Low Vision Survey of Bangladesh. Ophthalmology. 2004;111: 1150-60. | 5) Dandona L., Dandona R., Naduvilath T.J., McCarty C.A., Srinivas M., Mandal P., et al. (1999). Burden of moderate visual impairment in an urban population in Southern India. | Ophthalmology 106: 487-504. | 6) Dr. Richard James Potvin Cataracts and Astigmatism 2: Astigmatism in the Cataract Patient Population. Continuing education (CE) article Clinical & Refractive Optometry | 7) Duke-Elder S: Duke-Elder's Practice of Refraction, 9th Edition, Churchill Livingstone Inc. 1978; 52-5. | 8) Farbrother JE, Welsby JW, Guggenheim JA. Astigmatic axis is related to the level of spherical ametropia. Optom Vis Sci 2004;81(1):18-26. | 9) Garcia CA, Orefice F, Nobre GF, et al. Prevalence of astigmatism in Noortheastern Brazil. Arg Bras Oftalmol. 2005;68: 321-5 | 10) Gwiazda J, Grice K, Held R, et al. Astigmatism and the development of myopia in children. Vision Res 2000;40(8):1019-26. | 11) Harvey EM, Dobson V, Miller JM. Prevalence of high astigmatism, eyeglass wear, and poor visual acuity among Native American grade school children. Optom Vis Sci. 200; 83: | 206-12. | 12) Hashemi H, Hatef E, Fotouhi A, et el. Astigmatism and its determinants in the Tehran population: The Tehran Eye Study. Ophthalmic Epidemiol. 2005; 12: 373-81. | 13) Kaye SB, Patterson A. Association between total astigmatism and myopia. J Cataract Refract Surg 1997;23(10):1496-502. | 14) Kulkarni S.(2013), Prevalence of Avoidable blindness. IJAR : vol. 3,issue 5:487-488. | 15) Mittelman D: Geometric Optics and Clinical Refraction. In Principles and Practice of Ophthalmology, W B Saunders Company. 1980; 1: 199. | 16) Quek TP, Chua CG, Chong CS, et al. Prevalence of refractive error in teenage high school students in Singapore. Ophthalmic Physiol Opt. 2004; 24: 47-55. | 17) Saw SM, Gazzard G, Koh D, et al. Prevalence rates of refractive errors in Sumatra, Indonesia. Invest Ophthalmol Vis Sci. 2002; 43: 3174-80. |