PREVALENCE OF LATTICE DEGENERATION IN AXIAL MYOPIA

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ABSTRACT

Lattice degeneration is an important predisposing factor for retinal detachment. A cross sectional study of 221 patients and 405 eyes with axial myopia of 25mm (–3.oo diopters) or more, was conducted with an objective to find out prevalence of lattice degeneration of the retina among them. Of 221 patients, 48 (21.7%) had the lattice degeneration consisting of 35 uniocular (72.9%) and 13 binocular patients (27.1%). Of 139 males, 36 (25.89%) had lattice degeneration; of 82 females, 12 (14.63%) had lattice degeneration (RR=1.26; 95%CI=1.03-1.55; p=0.049). Axial length was from 25mm to 35.77mm (mean=27.63mm, SD 1.98). The greatest prevalence of lattice degeneration.9% (16 of 73 eyes) was found in eyes with axial length of 26mm to 26.99 mm (-6.0D to –8.97.0D), and the least incidence was 8.6% (8 of 93 eyes) in eyes with axial length 25mm to 25.99 mm (-3.0 D to –5.97.0 D). Over all prevalence of lattice degeneration was 15% (61 of 405 eyes) of eye(s) with axial length of 25 mm (-3.0 D) or more. In the age groups below 40 years, the prevalence of lattice degeneration was highest 85.24% (59 of 61 eyes). The lattice degeneration of retina is more prevalent in males of age less than 40 years with moderate axial myopia.

Key Words: Lattice degeneration, axial myopia, retinal detachment.

INTRODUCTION

Lattice degeneration of the retina is an important retinal abnormality, which is related to the retinal detachment (RD). The pathogenesis of lattice degeneration is still not well understand. However, the important mechanisms, which plays role in development of lattice degeneration are developmental, degenerative (abiotrophic) and ischemic (retinal and choroidal) process.[1] Typical lattice lesions are sharply defined circumferentially oriented areas of retinal thinning located anterior to the fundus equator.[2] A fishbone or crosshatched pattern of sclerotic, white retinal arterioles and venules within the base of the lattice degeneration are a frequent finding.[3] However, it can be present in association with other several clinical features like localized round, oval, or linear retinal thinning; pigmentation; whitish yellow surface flecks; round, oval, or linear red craters; small atrophic round holes; branching white lines, yellow atrophic spots and rarely tractional tears at the ends or posterior margins of the lesion, which are the frequent cause of retinal detachment.[4] The estimated prevalence of lattice degeneration is 6% - 8% of the general population[1,5] and the incidence is higher in individuals older than 10 years[6] and in myopic eyes.[7] However it is not restricted to eyes with myopia as it was found in emmetropic cases (4.5%)[8] and in hyperopic or emmetropic eyes (25%)[8] Hyams and Newmann[8] reported a 15% incidence of lattice degeneration in 332 eyes with more than one diopter of myopia. Lattice degeneration is present in approximately 20% of patients with RD[9] and in fellow eyes of phakic RD.[10] The prevalence of lattice lesion was found to increase directly with increasing axial length in study by Karline and Curtin,[11] whereas reverse was true in the study by Celorio and Pruett.[12]

OBJECTIVE

Study the prevalence of lattice degeneration in axial myopia.

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PATIENTS AND METHODS

This prospective study was carried out in retina clinic of Shree Rana Ambika Shah Eye Hospital in Bhairahawa, over a period of February 2003 to January 2004. All patients with axial myopia of 25mm and more, and the patients not mentioned in exclusion criteria, were included in this study. Cases excluded in this study were: eyes having poor visibility of fundus due to hazy ocular media (Corneal opacity, dense cataract, vitreous hemorrhage or opacities), myopia related with other ocular pathology (retinitis pigmentosa, retinopathy of prematurity, retinal detachment surgery), nonaxial myopia (corneal or lenticular), enophthalmos (scleral depression is poor) and recent intra-ocular operative cases (those who are not suitable for scleral depression due to risk of wound opening). All myopic cases were referred from general out patient door clinic to the retina clinic for evaluation. All included (consecutive) cases underwent anterior segment examination with slit lamp followed by fundus evaluation only in well- dilated eyes after counseling for good cooperation and scleral depression and with Goldman Three-mirror contact lens. Examination was performed without general anesthesia. Axial length was measured only with A-scan (contact method) for study and one highest reading was taken. Ultrasonography (USG B scan) was used in those cases having posterior staphyloma (to locate and measure it) followed by A-scan for more accurate reading. The parameters recorded after completing the examination were: demography, age, gender, axial length in mm (A-scan), presence of lattice degeneration and it's type, location, orientation and extent, presence of retinal breaks and retinal detachment. Above data was analyzed using general statistical tool.

RESULTS

Overall 221 cases and 405 eyes were included in this study. Among 221 cases 69 were from Nepal and 152 from India. Out of 221 cases 48 (12 Nepalese and 36 Indian) and out of 405 eyes, 61 (16 Nepalese and 45 Indian) had lattice degeneration. There were 139 males and 82 females and it consisted of 36(25.89%) male and 12 (14.63%) females with lattice degeneration (RR=1.26; 95%CI=1.03-1.55; p=0.049). Out of 221, their were184 bilateral myopic and 37 uni-lateral myopic patients. Of 184 bilateral myopes, 13 (7%) patients (10 males and 3 females) had bilateral lattice degeneration and of 37 uniocular, 6 (16.2%) patients (4 males and 2 females) had lattice degeneration. There were 37 right and 24 left eyes with lattice degeneration. Among 61 eyes with lattice, there were 2 eyes with 360- degree lattice, 43 eyes with temporal and 16 eyes with nasal lattice degeneration (4 eyes with around 270 degree lattice overlapping nasal and temporal sides). Lattice with pigmented feature was found predominantly (49.1%, 29 eyes) followed by linear white patches (19.6%, 12 eyes), branching white patches (18%, 11eyes) and retinal thinning (14.7%, 9 eyes). The majority of lattice was located in ora serrata area (62.3%, 38 eyes), followed by lattice in equatorial area (34.42%, 21 eyes) and 2 eyes with lattice were located posterior to posterior border of vertex veins. (Above

Table I : Distribution of Study Population

Axial length (mm)	No. of eyes	Sex		Age (years)		
		Male	Female	Range	Mean	SD
25 to 25.99	93	54	39	8—70	25.08	14.25
26 to 26.99	73	46	27	9—78	28.59	18.13
27 to 27.99	83	54	29	8—70	27.09	14.17
28 to 28.99	59	35	24	8—62	24.56	11.86
29 to 29.99	42	28	14	6--62	29.33	14.82
30 to 30.99	25	14	11	14--54	32.16	12.36
31 to 31.99	14	9	5	16--65	41.00	16.09
32 to 32.99	14	13	1	16--50	30.85	11.86
33 to 35.99	2	2	0	36-46	41.00	7.78
Axial length (mm)	**405**	**255**	**150**	**6--78**	**31.00**	**14.93**

Table II : Distribution of Eyes According to Age Groups

Age Groups (Years)	No of Myopic Eyes	No of Eyes with lattice	In Percentage
6 – 10	24	3	12.5
11 – 19	121	23	19
20 – 29	105	16	15.23
30 – 39	54	10	18.51
40 – 49	45	5	11.11
50 – 59	39	3	7.69
60 – 69	13	1	7.69
70 – 79	4	0	0
Total	**405**	**61**	

Table III : Presence of Lattice According to the Gender Distribution

Axial length in mm	Male		Female		Total eyes	
	RE	LE	RE	LE	RE	LE
25 - 25.99	3	2	1	2	4	4
26 - 26.99	7	5	2	2	9	7
27 - 27.99	5	3	1	2	6	5
28 - 28.99	4	4	3	1	7	5
29 - 29.99	6	0	0	0	6	0
30 - 30.99	3	0	0	1	3	1
31 - 31.99	2	0	0	0	2	0
32 - 32.99	0	2	0	0	0	2
Total Eyes	**30**	**16**	**7**	**8**	**37**	**24**

classification of fundus periphery in three areas, was done by Schepens and Rutnin from anatomoclinical point of view[13] and gives quick orientation to retinal periphery. According to Duke-Elder[14] peripheral retina can be divided into four regions on the basis of histological changes and these are: near periphery, middle periphery, far periphery and extreme periphery i.e. ora serrata). Most of these lesions were oriented circumferentially (96 .72%, 59 eyes) and rarely (2 eyes) radial. It was found that twelve unilateral and two bilateral eyes had retinal breaks associated with lattice degeneration and only retinal breaks without lattice was found in four unilateral and one bilateral myopic eyes. There were altogether ten unilateral and 2 bilateral retinal detachments. The highest prevalence of lattice degeneration (21.9%, 16 of 73 eyes) was found among the eyes of axial length 26 to 26.99mm and the lowest prevalence 8 of 93 eyes (8.6%) was among the eyes with axial length of 25 to 25.99mm. In the age groups between 6 to 39 years, 85.24% (52 out of 61 eyes) had lattice.

DISCUSSION

Several studies have been done to show the prevalence of lattice degeneration in axial myopia and this study has similar results in many aspects. Over all in our study, the prevalence of lattice degeneration was 15% (61 of 405 eyes) of eye(s) with axial length of 25 mm (-3.0 D) or more, which was less than that of Celerio and Prutte[12] and Cambiaggi[15] et al ((24.1% and 20% respectively) in myopia of 6.0 D or more. The present study also showed that males were affected by lattice degeneration more than females (3:1 ratio) in contrast to Celorio and Prutte, where females were more commonly affected. Our finding of 42.62% (26 of 61 eyes) bilaterally affected was similar to the results of Celorio et all (45.8%), Karlin et al (40%), Byer[6] (34%) and Shiomi [16] (31.6%). Most of the lattice lesion (70.49%) in our study was found in temporal area and it was similar to Celorio (89.5%). Pigmented lattice was more common (82%)[17] in occurrence and it was predominantly (49.1%) found in our study too. Most frequently affected age groups by lattice (51 of 160 cases) in Celorio were 21 to 40 years where as it was highest (49 of 280 cases) in 11 to 39 years in our finding. In age group older than 40 years, the lattice occurrence was less (9 of 61 eyes) which is comparable with the similar study by Celorio. Celorio and Pruett (Fig.1) found lattice in myopic eyes (-6.00 to –8.70 D) by 40.9%, Karlin and Curtin (Fig.2) by 11% in myopia with -7.50 D and this figure was 15.3% in moderate myopia between -2.25 D to -8.0 D by Shiomi in Japanese patients, where as our result was in between (14.45%) in eyes with –3.0D to –8.70 D (Fig.3).

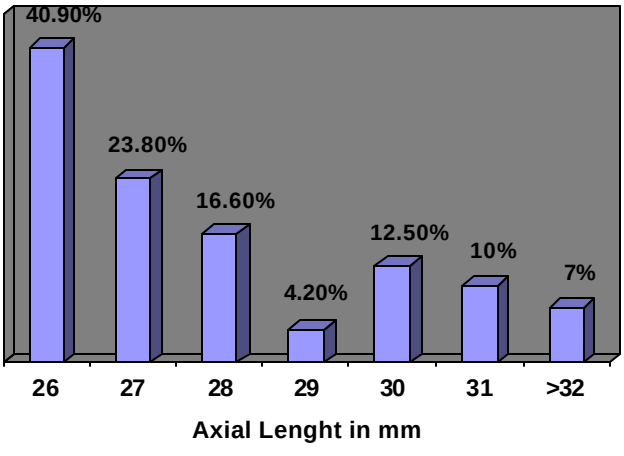

Fig. 1 : Prevalence of lattice degeneration by Celorio and Pruett.

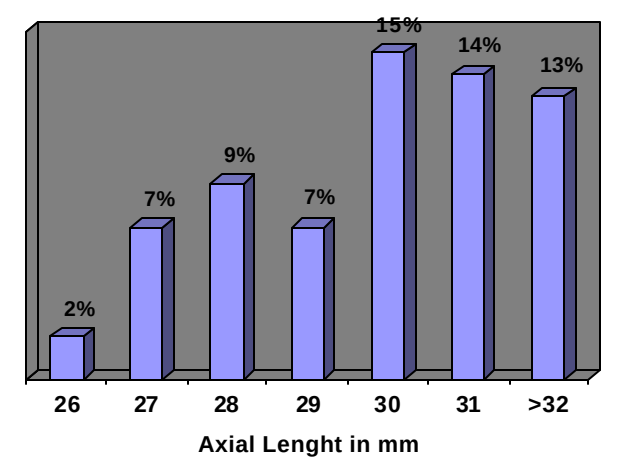

Fig. 2 : Prevalence of lattice degeneration by Kartin and Curtin.

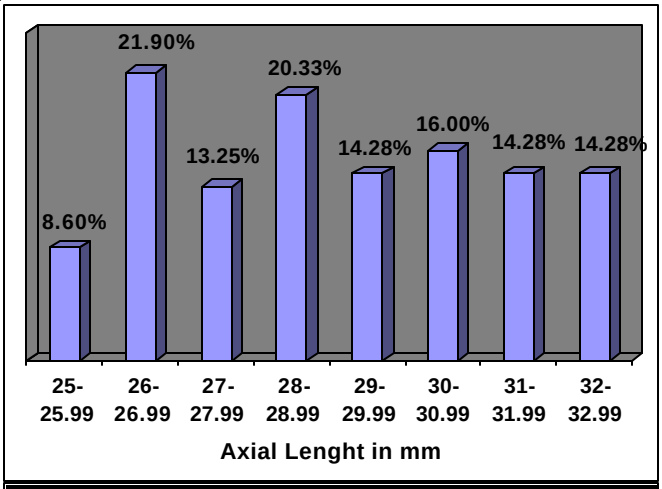

Fig. 3 : Prevalence of lattice degeneration by S Subedi.

Similar results of higher prevalence of lattice degeneration, was observed by others[18, 19] too in myopia of axial length 25 mm to 27 mm (-3 to –10.0 D).

In contrast to the results of Shiomis' and Celorio (Fig.1), our study showed tendency of decreasing lattice with increasing axial length only in myopia of more than –15.0 D (Fig.2). It can be explained, on the basis of Yuras[20] finding, that in high myopic eyes with posterior staphyloma, the lattice is significantly less than the entirely elongated eyes. The other factor is that lattice degeneration may be more closely linked genetically with mild (physiologic) than with severe (pathologic) myopia.

Smith and associates[21] observed in 3065 consecutive postoperative eyes and found 6.3% prevalence of retinal detachment in moderate myopic –3 D to -7.50 D (25 to 26.5 mm axial length) and for severely myopic greater than -7.5 D, it was 4.8%. However, the incidence of retinal detachment is nearly double[22] after clear lens extraction for high myopia greater than –10 D.

CONCLUSION

Overall prevalence of lattice degeneration was 15% in the eye (s) with axial length of 25 mm or more and males of age less than 40 years with moderate axial myopia, were affected predominantly.

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