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Prevalence of Lattice Degeneration in Myopia

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Abstract:
Purpose: To find the prevalence of lattice degeneration in the various degrees of myopia and to assess its relation with respect to gender, age, location on retina and the presence of other peripheral Retinal lesions.
Materials And Methods: The study was done in 300 eyes of 154 patients with myopia more than 1 dioptre. Patients with myopia <1D and those with history of optic nerve disease and past history of any surgery to the eye were excluded from the study. All patients included in the study were divided into 2 groups according to their refractive error as high myopic (>6D) and low myopic (<6D) groups. All patients underwent a complete ophthalmologic examination including refractive error assessment, indirect ophthalmoscopy as part of their routine clinical workup. Statistical calculations were performed using statistical software (SPSS version 16.0).
Results: The prevalence of lattice degeneration was found to be 11.33%. Prevalence of lattice degeneration in myopia <6D was 6.25% and those of 6D or more was 20.37%. 135 eyes of 71 people of age group <20 years showed prevalence of 6.7%. Prevalence of lattice degeneration in age group 20-40 years was 16.15% and age group >40 years was 11.42%. Lattice degeneration associated with holes showed a prevalence of 12% and those with white without pressure (WWOP) showed prevalence of 38.2%. Isolated Lattice degeneration was prevalent in 50%. 131 eyes of 68 males showed a prevalence of 10% and 169 eyes of 87 females showed 12.4%. 56% of lattice was prevalent in superotemporal quadrant and 35.2% was prevalent in inferotemporal quadrant. Lattice degeneration was uniocular in 53% and binocular in 47.5%.
Conclusion: Lattice degeneration was more prevalent in refractive error >6D.Age group of 20- 40 years showed more prevalence for lattice degeneration. Lattice associated with WWOP was found to be more prevalent than lattice associated with holes and other peripheral lesions. Lattice was found to be more common in superotemporal quadrant and was slightly more prevalent among females.

Keywords: *lattice degeneration, myopia*

1. Introduction

Myopia, or short sight, is that form of refractive error wherein parallel rays of light come to a focus in front of the sentient layer of the retina when the eye is at rest. High myopia is one of the leading causes of low vision in the world [1, 2]. Both genetic and environmental factors are involved in its aetiology [3]. Developing countries have significantly higher rates of myopia, especially Asian countries, but it is estimated that 1% of the global population exhibits high myopia [3, 4].

The epidemic of myopia is a major health concern. Myopia is a growing health problem and its prevalence and severity is increasing in different parts of the world including Asia. Pathologic myopia is one of the leading causes of blindness and may be associated with a myriad of potentially blinding, irreversible conditions such as retinal detachment, posterior staphyloma, chorioretinal atrophy, and macular atrophy. Myopic retinopathy refers to a cluster of signs that indicate degeneration of chorioretinal tissues associated with excessive axial elongation of the myopic eye, leading to mechanical stretching and thinning of the choroid and RPE [5, 6]

Posterior pole changes include posterior staphyloma, lacquer cracks, Fuchs' spot, and chorioretinal atrophy. Peripheral retinal features of myopic retinopathy include lattice degeneration, pavingstone degeneration, white-without-pressure, and pigmentary degenerations, as well as retinal tears and holes. Most of these peripheral retinal lesions are predisposing factors for retinal detachment. Lacquer cracks or ruptures in the retinal pigment epithelium-Bruch's membrane-choriocapillary complex have been reported in patients with high myopia. The prevalence of lacquer cracks has ranged from 0.2% to 9.2% in highly myopic populations and may characterize an unfavourable prognosis in patients with pathologic myopia [7].

Chorioretinal atrophy mainly occurs in the late stage of myopic degeneration. Macular hole formation is an important complication of highly myopic eyes, and it is frequently associated with gross reduction in visual acuity. Macular choroidal

neovascularisation is also a common vision threatening complication of high myopia. High myopia also predisposes eyes to RD after cataract surgery, such as phaco-emulsification. Axial length, in addition to myopic pathology, is a factor associated with such retinal detachments [8]. Patients with pathological myopia have also been shown to experience impaired quality of life.
Myopia has become a focus of epidemiologic research for many reasons. Myopic patients are at more risk of developing rhegmatogenous retinal detachment. Retinal detachment, epiretinal membrane, macular hole, choroidal neovascularisation, lacquer cracks, posterior staphyloma, Fuchs spot, chorioretinal atrophy, and macular atrophy are more frequent in high myopia and are the reason for low visual acuity. The life time incidence of retinal detachment in myopic patients is found to be 0.7-6%. The yearly incidence of retinal detachments has been estimated as 0.015% in patients with less than 4.75 D myopia, increases to 0.07% in patients with ≥5 D myopia and 3.2% in patients'≥6 D myopia [9, 10].
Myopia is present in at least 30% of patients with retinal detachment [11]. Myopia predisposes to retinal detachment for a variety of reasons, including premature and high rates of posterior vitreous detachment, increased incidence of lattice degeneration and due to possible thinner retina [12, 13, 14]. Hence peripheral retinal examination is essential in all myopes to prevent ocular morbidity.

2. Aim of Study
To find the prevalence of lattice degeneration in the various degrees of myopia and to assess its relation with respect to gender, age, location on retina and the presence of other peripheral retinal lesions.

3. Objectives of the Study
- To study the prevalence of lattice degeneration among various degrees of myopia.
- To compare the prevalence of lattice degeneration as per Gender and Age
- To study the association of lattice degeneration with other peripheral retinal degenerations
- To study the prevalence of lattice degeneration in different quadrants of retina.

4. Materials and Methods
A cross sectional study design of 300 eyes from 154 patients with myopia >1D was conducted with an objective to find out the prevalence of lattice degeneration. This study was carried out in the eye OPD of DR SMCSI Medical College Karakonam over a period from January 2014 to June 2014. All patients included in this study underwent a complete ophthalmologic evaluation including best corrected visual acuity, IOP measurement using Goldmann Applanation tonometry, and detailed ophthmological evaluations using Indirect ophthalmoscopy. Retinoscopy and post mydriatic tests were performed. B scan was done to detect posterior staphyloma.

4.1. Inclusion Criteria
All patients with myopia >1D, Patients without any history of neurophthalmic disease, Patients without any past history of surgery to the eye

4.2. Exclusion Criteria
Children < 3year old, Use of any ocular drugs at initial evaluation, History of trauma, Patients with systemic syndromes, Patients with lens opacities, Any acute infections of the eye ,Patients with history of diabetes mellitus

5. Results and Observations
300 eyes of 154 patients attending the OPD were selected. 131 eyes (43.66%) were that of males and 169 (56.33%) were that of females. The Youngest patient was 5 years old while the oldest being 75 years of age. These patients were then grouped according to their refractive status into, 192 cases of myopia < 6D and 108 cases of myopia of 6D or more. A written informed consent was obtained for participation in the study from all subjects recruited for the study after explaining the purpose and design of the study. A chi square analysis was done. The statistical analysis was done with the results thus obtained using SPSS version 16.0. P value < 0.001 was considered to be significant.

6. Results
Overall 300 eyes of 154 patients were included in this study. Among them 34 eyes showed lattice degeneration. A prevalence of 11.33% was obtained as shown in FIGURE [5]

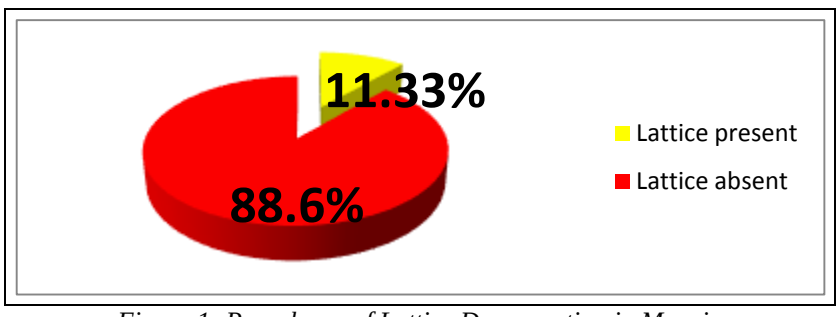

Figure 1: Prevalence of Lattice Degeneration in Myopia

6.1. Refractive Error and Prevalence of Lattice Degeneration

Of the 300 eyes, 192 had myopia <6D and 108 had myopia of 6D or more. Of the 192 eyes 12 had lattice degeneration. The prevalence is 6.25%. And among 108, 22 had lattice degeneration, with a prevalence of 20.37 %.(p value =0.0002, OR = 3.84, CI=1.72 – 8.68) Thus a significant association was found between the degree of refractive error and the presence of lattice degeneration (FIG 2)

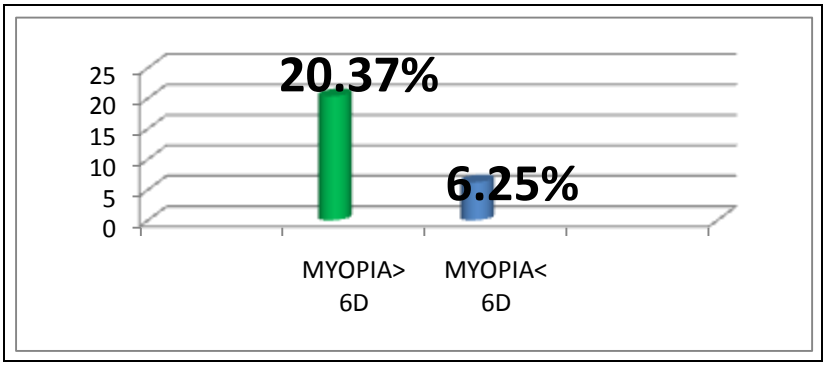

Figure 2

6.2. Gender and Prevalence of Lattice Degeneration

There were 131 eyes from 68 males and 169 eyes from 87 females. Of them 13 eyes among males and 21 eyes among females showed lattice degeneration. The prevalence of lattice degeneration in males were 10% and that of females were 12.4 %.(p value-0.49, OR=0.78, CI=0.35-1.7) (figure 3). Though no significant association was found between gender and the prevalence of lattice degeneration, a slight female preponderance was seen.

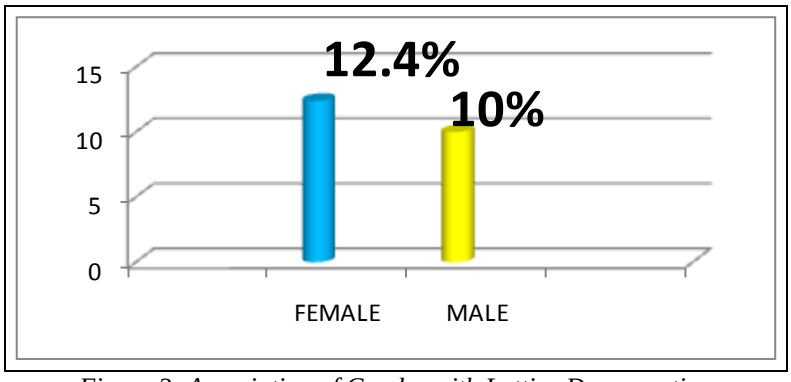

Figure 3: Association of Gender with Lattice Degeneration

6.3. Age and the Prevalence of Lattice Degeneration

Age distribution of lattice degeneration is shown in FIG 4. Among 135 eyes of age group <20 years, 9 eyes showed lattice degeneration, a prevalence of 6.7% (OR=1). Number of cases between 20-40 years was 130 of which 21 cases showed lattice degeneration which has a prevalence of 16.15% (OR=2.7). In cases of age group more than 40 years 35 eyes were studied in which 4 of them was found to have lattice degeneration. The prevalence was 11.2% (OR=1.81). P value=0.08. Thus this study showed no significant association in prevalence of lattice with different age groups though the prevalence was found to be higher in 20-40 years of age.

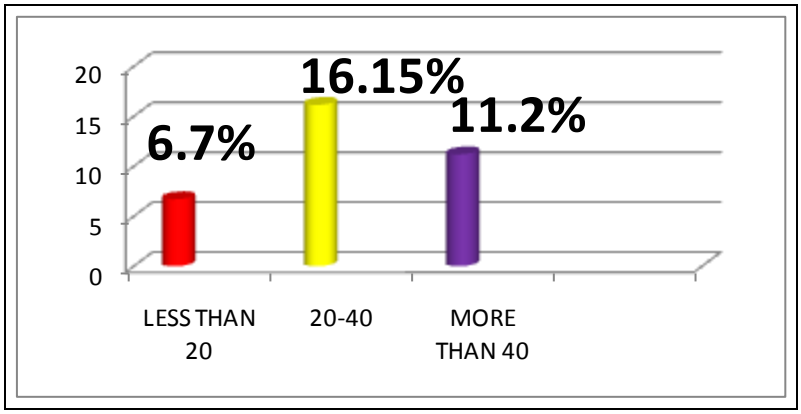

Figure 4: Age Distribution In Lattice Degeneration

6.4. Prevalence of Other Peripheral Lesions in Cases of Lattice Degeneration

The data is summarised in FIG 5. White without pressure associated with lattice degeneration was seen in 13 eyes, with a prevalence of 38.2%. 4 eyes showed holes associated with lattice degeneration, prevalence of 12%. None of the eyes with lattice showed retinal tears. Lattice was associated with no other lesions in 17 eyes (50%).

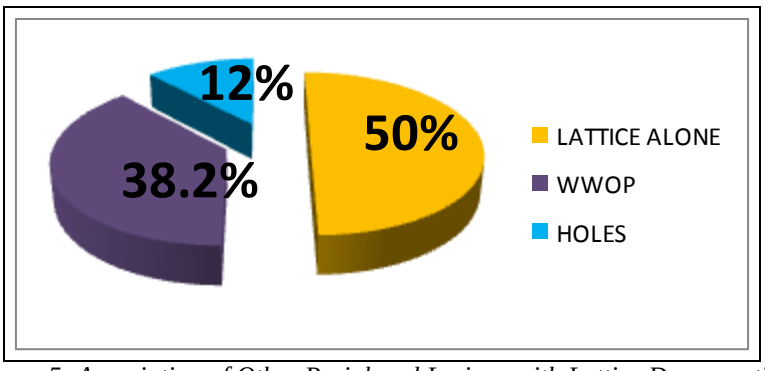

Figure 5: Association of Other Peripheral Lesions with Lattice Degeneration

6.5. Prevalence of Location of Lattice Degeneration

Location of lattice degeneration is shown on table 1. Among the 34 eyes with lattice 19 were seen in superotemporal quadrant, prevalence is 56%. 12 were in the inferotemporal quadrant with a prevalence of 35.2% and only 3 were seen in other quadrants, prevalence 9%.

Location of lattice	No. of lattice	Prevalence
Superotemporal	19	56%
Inferotemporal	12	35.2%
Others	3	9%

Table 1: Prevalence of location of lattice degeneration

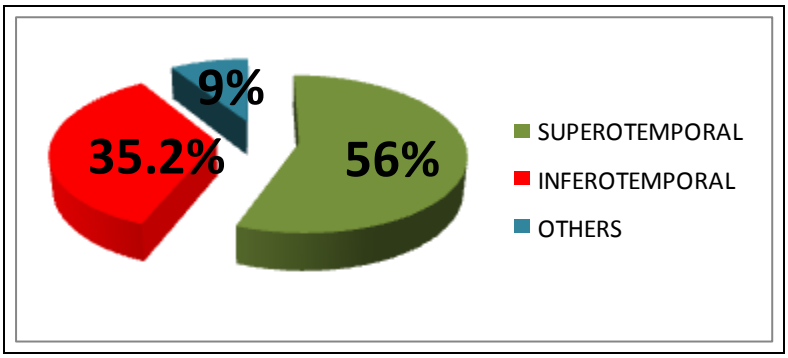

Figure 6: Location Wise Distribution of Lattice Degeneration

Laterality of lattice degeneration. Table (2)

Laterality	Eyes with lattice	Prevalence
Uniocular	18	53%
Binocular	16	47.05%

Table 2: Laterality of lattice degeneration

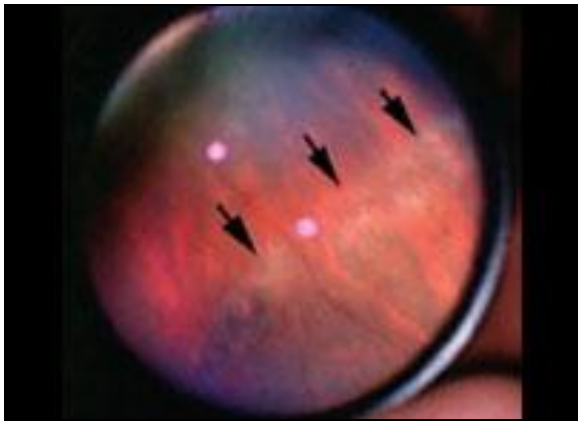

Figure 7: Lattice Degeneration

7. Discussion

Myopia is a common optical aberration. Physiological myopia is by far the most prevalent and is considered a normal biological variation [15]. Lattice degeneration, one of the peripheral retinal lesions is clinically acknowledged to be a precursor of retinal detachment and its prevalence has been reported as 5-10 %[16,17]. Several studies have been done to show the prevalence of lattice degeneration in myopia and this study has similar results in many aspects.

Overall in this study 300 eyes were examined and the prevalence of lattice degeneration was found to be 11.33%. This was found to be more than the prevalence of lattice degeneration in a study conducted by Everett who reported 9.5% of 200 pairs of eyes in his study [18]. This study showed that females (12.4%) are more affected than males (10%) by lattice degeneration which was similar to a study done by Celorio and Prutte[19], who also showed a higher prevalence in females(p value= o.49). This shows that there is no significant gender predisposition but slightly more common in females.

This study showed a higher prevalence of lattice degeneration in 20-40 years which was 16.15% which is similar to the study done by Celorio[19]. In Byer's study of 1300 consecutive routine cases, he noticed a highest incidence of lattice degeneration in the 20-29 years of age group and an actual decreased incidence in the older age group[20]. In this study also an increased prevalence was seen in age group > 20 years (16.15%) but a decreased prevalence was seen in age group < 20 which is against the study of Byer.

Also in this study lattice degeneration was more prevalent among refractive error >6D. Among this the prevalence was more among myopes of 6-9D (23.43%). This is slightly lower than the study by Celorio and Pruett in which lattice in myopic eyes from 6.0 0 to 8.00D was 40.9%. Sanchez and Roldan found highest frequency of lattice degeneration for myopia 3D to 10 D[21]. Smith and associates observed in 3065 consecutive post operative eyes and found 6.3% prevalence to retinal detachment in moderate myopic 3D to 7.5D and for severely myopic > 7.5D, it was 4.8%[22]. Shiomi (1981) reported that lattice degeneration was found with a significantly high incidence in myopia of 2.25 to 8.00 D compared with eyes of hyperopia , emmetropia , and low myopia less than 2 D[24].

In this study out of 34 cases of lattice degeneration, holes were found in 4 eyes (12%) , white without pressure was found in 38.2% and 50% showed no associated lesion. No cases of retinal tear associated with lattice degeneration were found. Byer, in his clinical series found 16% -24% of atrophic holes associated with lattice degeneration and the risk of retinal detachment with atrophic holes in 0.27 %[20]. In another clinical series of Byer [20] found 1.5% of retinal tears in eyes with lattice lesion. In eyes without other predisposing factors, however lattice degeneration rarely cause a retinal detachment [20,23].

This study showed that in 34 cases of lattice 53% were uniocular and 47.05% were binocular. This is almost similar to the study done by Celorio and Pruett[19], who found lattice lesions to be 54.2% uniocular and 45.8% binocular. Karlin et al showed 40% prevalence of lattice being bilateral affected. Most of the lattice lesion in this study was found in superotemporal area (56%) which is similar to Celorio (89.5%).

Burton, has shown that patients with lattice degeneration between 40 and 60 years of age and with low to moderate degrees of myopia tend to develop detachments caused by premature posterior vitreous separation and traction tears. The study also verified the previous suspicions that those with myopia exceeding 5.0 D and lattice degeneration have an increased risk for detachment during their life. Detachments in this group tend to cluster in the second, third, and fourth decade, typically are caused by atrophic holes, are slowly progressive, and often are simultaneously bilateral [23, 25, 26, 27]. Therefore this study emphasises the importance of peripheral retinal examination for early detection and treatment of possible pathological ocular conditions like retinal detachment.

8. Summary

Lattice degeneration was seen in 11.3% of patients, which was significantly higher in myopia > 6D (20.37%). Thus there was a strong relationship between prevalence of lattice degeneration and degree of myopia. No significant association of lattice degeneration was seen between genders though a slight female preponderance was seen. Prevalence was found to be higher in supero temporal quadrant (56%) and in age groups of 20-24 years (16.15%). Prevalence of lattice with white without pressure (38.2%) was found to be higher than those with holes and tears. No significant difference was found between the laterality of lattice degeneration though it was most commonly uniocular in this study.

9. Conclusion

Our study has revealed the magnitude of prevalence of Lattice degeneration in various groups of myopes. Most of the factors studied had a significant association with its prevalence. This highlights the significance of routine peripheral fundus examination in myopes for early detection of peripheral retinal degenerations and provides appropriate treatment for them to prevent complications in future

10. References

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