

ASSOCIATION OF LATTICE DEGENERATION IN PATIENTS WITH CHRONIC SEROUS CHORIO-RETINOPATHY

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ABSTRACT

Objective: To establish the association of lattice degeneration in patients with chronic serous chorio-retinopathy at tertiary care ophthalmology hospital.

Study Design: Comparative cross-sectional study.

Place and Duration of Study: Armed Forces Institute of Ophthalmology, Rawalpindi, from Sep 2019 to Dec 2020.

Methodology: The sample population comprised of 80 subjects which included 40 cases of chronic serous chorio-retinopathy and 40 controls. Chronic serous chorio-retinopathy was diagnosed by consultant ophthalmologist on basis of fluorescein angiography and spectral-domain optical coherence tomography. Peripheral retinal examination was done among all the study participants to look for lattice degeneration. Pearson chi-square test was applied to look for the relationship of various factors with lattice degeneration including the presence of chronic serous chorio-retinopathy.

Results: Two groups with equal number of subjects were included in the study. Mean age of the study participants was 49.14 ± 2.93 years. 60 (75.0%) participants were male while 20 (25%) were female. Fifty-four (67.5%) had no lattice degeneration while 26 (32.5%) showed the presence of lattice degeneration on detailed ophthalmic examination. Chi-square test showed that having chronic serous chorio-retinopathy and use of steroids were statistically significantly associated with presence of lattice degeneration among the study participants.

Conclusion: Chronic serous chorio-retinopathy emerged as a condition strongly associated with lattice degeneration of peripheral retina. Use of topical or systemic steroids also increased the chances of developing lattice degeneration in our study population.

Keywords: Chronic serous chorio-retinopathy, Lattice degeneration, Retina.

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INTRODUCTION

Retinal diseases have been diagnosed commonly in all parts of the world including Pakistan.¹ Limited number of trained retinal specialists are present in this part of the world. Most of the burden of the retinal pathologies have been dealt with by routine ophthalmologists. Acute and Chronic serous chorio-retinopathies have been encountered in eye clinics routinely.² Symptoms in chronic serous chorio-retinopathy may range from being asymptomatic to partial or complete vision loss depending upon the duration and extent of this progressive retinal disease.³

Lattice degeneration is a peripheral retinal degeneration in which the retina becomes so thin that it may be broken or torn leading to a retinal detachment which is a serious condition and involves more aggressive management.⁴ Though it has been studied for a

long still no exact cause of this condition could be determined.⁵ Degeneration of this pattern may be present in a normal healthy population or it may be associated with other serious ocular or systemic conditions. Early diagnosis by treating ophthalmologist is usually the key for managing this condition in the long run.⁶

Various types of peripheral retinal pathologies have been studied along with central serous chorio-retinopathy. They sometimes make the overall picture more grave both for the patient and the treating physician. Oztas *et al*, studied the peripheral retinas of patients with central serous chorioretinopathy (CSCR) and concluded that peripheral retinal abnormalities, particularly lattice degeneration, were more common in patients with CSCR. They recommended regular retinal examinations, with the inclusion of peripheral retinal assessments, for patients with CSCR.⁷ Demiroglu *et al*, in Turkey by using the mean, minimum, superior-nasal, superior, superior-temporal, inferior-nasal, inferior, and inferior-temporal ganglion cell complex values obtained using OCT and revealed that ganglion

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cell complex was significantly reduced in both acute and chronic CSCR compared to healthy subjects.⁸ A similar study performed by Yu *et al.* in order to investigate the changes of retinal microvascular network in patients with central serous chorio-retinopathy. They used optical coherence tomography angiography to scan 6×6 mm macular retinal blood flow images with the application of a series of customized image segmentation processing program software to obtain microvascular and macrovascular density, and compared the superficial microvascular (SMIR), superficial macrovascular ring (SMAR) and the superficial total microvascular (STMI) density between CSCR patients and control group. They concluded that the density of superficial total microvascular and superficial microvascular were significantly decreased in patients with central serous chorio-retinopathy.⁹

Central serous chorio-retinopathy is a progressively deteriorating disorder usually with a chronic course. This disorder when gets complex with peripheral retinal involvement may lead to serious consequences. Burton did a longitudinal study and concluded that lattice degeneration in these patients increases the chances of development of retinal detachment which highlights the importance of examining the peripheral retina among these patients with central serous retinopathy.¹⁰ We, therefore, planned this comparative cross sectional study with the rationale to establish the association of lattice degeneration in patients with chronic serous chorio-retinopathy at our tertiary care ophthalmology hospital.

METHODOLOGY

This comparative cross-sectional study was conducted at Armed Forces Institute of Ophthalmology, from September 2019 to December 2020. Sample size was calculated with the help of World Health Organization (WHO) sample size calculator by using population prevalence proportion of chronic serous chorioretinopathy 5.8 per 100,000.¹¹ AFIO is a tertiary care teaching eye hospital which receives patients from the military as well as the civil population from all over the country. Non-probability consecutive sampling technique was used to select the cases presenting with chronic serous chorio-retinopathy (group I). Group-II were age and gender-matched people from the general population, recruited via convenience sampling.

Inclusion Criteria: All the patients between the age of 18 and 60, diagnosed with chronic serous chorio-retinopathy by consultant ophthalmologist on basis of

fluorescein angiography and spectral-domain optical coherence tomography were included in the study.

Exclusion Criteria: Patients with chronic serous chorio-retinopathy, glaucoma, corneal diseases, history of trauma to eyes, uveitis and pathological myopia were excluded from the study.

All the subjects underwent refraction with spherical equivalents, best-corrected visual acuity measurements, slit-lamp biomicroscopy, intraocular pressure measurements, and fundoscopy by an independent consultant ophthalmologist who did not know about the diagnosis of the subject. The initial fundus examination was performed with a 90-diopter noncontact lens (Volk Optical Inc., Mentor, OH) by providing pupillary dilation. Then, the peripheral retinal examination was performed using a Goldmann three-mirror lens (Volk), and all of the retinal findings and their localizations, extending from the macula to the ora Serrata, were noted in the retinal drawing papers.^{12,13} All the peripheral retinal degenerative changes were documented and only cases of lattice degeneration were included in the study.

After ethical approval from the ethical review board committee (via letter-number ERC/120819) and written informed consent from all the participants, study subjects were included in the study. Data were collected on a structured proforma specially designed for this study. Findings of detailed ophthalmological examination including slit-lamp examination were also documented on the same proforma.

Statistical analysis required for the study data was performed by using the Statistics Package for Social Sciences version 23. Frequency and percentages for gender, number of patients suffering from lattice degeneration, and the use of steroids were calculated. Chi-square analyses were performed to look for the association of age, gender, use of steroids, and presence of chronic serous chorio-retinopathy with the lattice generation among the study population. The *p*-value of less than or equal to 0.05 was taken as significant for describing any association.

RESULTS

A total of 80 subjects were included in the study. Among them 40 (50%) were cases while 40 (50%) were controls. Table-I summarized the main characteristics of the study population. Mean age of the study participants was 49.14 ± 2.93 years. Sixty (75%) participants were male while 20 (25%) were female. Fifty four

(67.5%) had lattice degeneration while 26 (32.5%) did not show the presence of lattice degeneration on detailed ophthalmic examination. Five (12.5%) subjects from control group had lattice degeneration while 21 (87.5%) from the case group had shown this type of peripheral retinal degeneration. Chi-square (Table-II) showed that having chronic serous chorio-retinopathy and use of steroids were statistically significantly associated with the presence of lattice degeneration among the study participants (p -value<0.05).

Table-I: Characteristics of study participants.

Factors	n (%)
Age (years)	
Mean ± SD	49.14 ± 2.93 years
Range (min-max)	21-59 years
Gender	
Male	60 (75)
Female	20 (25)
Presence of Lattice degeneration	
No	54 (67.5)
Yes	26 (32.5)
Systemic or topical steroid use	
No	62 (77.5)
Yes	18 (22.5)

Table-II: Characteristics of the study group and presence of Lattice degeneration (chi-square test).

Socio-demographic factors	No lattice degeneration n (%)	Lattice degeneration n (%)	p-value
Age			
40 years or less	22 (40.7)	12 (46.1)	0.647
>40 years	32 (59.3)	14 (53.9)	
Gender			
Male	39 (72.2)	21 (80.7)	0.401
Female	15 (37.8)	05 (19.3)	
Use of steroids			
No	46 (85.2)	16 (61.5)	0.021
Yes	08 (14.8)	10 (38.5)	
Types of subjects			
Cases	19 (35.2)	21 (80.7)	<0.001
Controls	35 (64.8)	05 (19.3)	

DISCUSSION

Retinal specialists recognize the importance of intactness of all parts of retina, may it be central and peripheral. Sometimes the presence of pathology in the central retina may lead to pathologies in the peripheral retina.¹⁴ A huge chunk of degenerative processes in the peripheral retina may be secondary to pathological processes in other parts of the eye or body. Early recognition of these primary processes may prevent these secondary pathologies. A lot of incidental degenerative findings in the retina may warrant detailed ophthalmic and systemic inquiry in order to find the primary

process. Lattice degeneration has been a fairly common pattern found in some healthy individuals as well as in various eye diseases. The consequences of lattice degeneration may be grave or irreversible, therefore early detection is the key.¹⁵ We planned this study with the rationale to establish the association of lattice degeneration in patients with chronic serous chorio-retinopathy at tertiary care ophthalmology hospital.

Mathew *et al*, published an interesting case of a 35-year-old lady with an atypical lattice degeneration variant with peripheral retinal detachment. There were also areas of white without pressure, chorioretinal scarring, and retinal breaks.¹⁶ We did not study the retinal detachment in our study population and only focused on presence of lattice degeneration. Our results concluded that though lattice degeneration could be found in an otherwise healthy population but there are clearly more chances to find this type of degeneration in patients with chronic serous chorio-retinopathy.

Oztas *et al*, also picked this idea that peripheral retina should not be ignored among the patients with central serous retinopathies and performed a study with the objective to investigate the peripheral retinas of patients with central serous chorioretinopathy (CSCR).⁷ They revealed that six types of peripheral retinal degeneration were observed in the study population including lattice degeneration, micro cystoid degeneration, honeycomb (reticular) degeneration, snail-track degeneration, senile retinoschisis, and white without pressure. We only studied lattice degeneration and it was found in 26 (32.5%) of the study subjects with statistically significantly high number in cases of chronic central serous chorioretinopathy as compared to healthy controls.

Role of steroids has been controversial in various aspects in retinopathies. Nakatsuka *et al*. published a literature review and concluded that prolong use of intranasal corticosteroids may lead to chronic serous chorio-retinopathy.¹⁷ Discontinuing steroids lead to better clinical and imaging picture. We studied the relationship of use of topical or systemic steroids with the presence of lattice degeneration and found that it has been statistically significantly related. More research is required in this perspective to formulate some guidelines regarding the use of steroids in high-risk patients.

Madanagopalan *et al*, studied similar phenomenon with different angle and investigated peripheral

retinal avascularity and peripheral capillary leakage on wide-field fluorescein angiography in non-dependent quadrants, in eyes with bilateral chronic central serous chorioretinopathy.¹⁸ They concluded that peripheral retinal avascularity and peripheral capillary leakage have been seen in patients of chronic central serous chorio-retinopathy and reported very rarely. We did a similar analysis and found lattice degeneration was a common finding among the patients suffering from chronic central serous chorio-retinopathy.

CONCLUSION

Chronic serous chorio-retinopathy emerged as a condition strongly associated with lattice degeneration of peripheral retina. Use of topical or systemic steroids also increased the chances of developing lattice degeneration in our study population.

Conflict of Interest: None.

Authors' Contribution

FUA: Conception data collection and analysis, MHS: Statistical analysis and interpretation, HJ: Data collection and manuscript drafting, AK: Research supervision and approval, SK: Conception and research analysis, HJ: Data analysis..

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