



ANTERIOR CHAMBER ANGLE IN EXFOLIATION SYNDROME: A SINGLE INSTITUTIONAL OBSERVATIONAL STUDY

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ABSTRACT

Introduction: Exfoliation syndrome (ES) is associated with a variety of findings in the angle of the anterior chamber of the eyes. We undertook the present study to record such findings with the help of gonioscopy.

Materials and Methods: Complete ocular examination including visual acuity, slit-lamp examination, applanation tonometry, dilated fundus examination, gonioscopy, and perimetry was done, and the findings recorded in all the patients of ES detected from among 1000 consecutive patients above the age of 40 from the outpatient department of tertiary hospital in northern India.

Results: A total of 1000 patients were examined of which 31 (3.1%) were detected as having ES. On gonioscopy, angle was found to be open in 28 (90%) and occludable in 3 (10%) patients. Deep pigmentation of trabecular meshwork (TM) was seen in 27 (87%) patients. Sampaolesi line was seen in all the 28 (90%) patients with angles open and was not seen in the 3 patients who had occludable angles. The average intraocular pressure (IOP) of the study group was 19.4 mmHg with 9 (29%) patients having IOP >21 mmHg. Fundus examination was normal in all the patients. The visual field examination showed glaucomatous field defects in one patient.

Conclusions: Open angles showing dense pigmentation of the TM and the presence of Sampaolesi line were the most common findings on gonioscopy. Sampaolesi line was not seen in patients having occludable angles.

KEYWORDS : Angle of anterior chamber, exfoliation syndrome, gonioscopy

INTRODUCTION

Exfoliation syndrome (ES) is characterized by deposition of distinctive fibrillar material considered to be a product of abnormal extracellular matrix material metabolism in the anterior segment of the eye.[1] The fibrillar material probably represents a generalized basement membrane disorder. The material is deposited in a target-like pattern on the lens capsule best seen on pupillary dilatation. A central area and a peripheral zone are usually separated by an intermediate clear area due to rubbing off by the iris movement. However, in the setting of early or subtle findings, a careful examination on slit lamp is necessary to diagnose ES. The clinical findings may be detected only in one eye as are shown in many studies.[2]

ES is associated with a variety of findings on gonioscopy related to the amount of pigmentation of trabecular meshwork (TM), presence of exfoliative material, presence of Sampaolesi line, but also to the depth of angle. We undertook this study with the purpose of studying the gonioscopic findings of patients with ES.

MATERIALS AND METHODS

This was a hospital based case series study including that all patients detected with ES from among consecutive 1000 patients above the age of 40 years who were examined in the ophthalmology outpatient department of a tertiary care hospital in northern India after approval by the Institutional Ethics Committee. Patients who had undergone cataract surgery and those with congenital or abnormality of anterior segment of the eye following trauma were excluded from the study. The relevant ocular and systemic history was recorded with special emphasis on history of skin disorders and cardiovascular diseases. The ophthalmic examination included recording of visual acuity, examination of pupillary reaction, slit-lamp examination, recording of intraocular pressure (IOP) with Goldmann applanation tonometer, gonioscopy with Goldmann 3-mirror gonioscopy, and fundus examination. Visual field examination was done in patients with IOP >21 mmHg.

RESULTS

Of a total of 1000 consecutive patients above the age of 40 years who were examined during the study period, 31 (3.1%) patients were diagnosed as having ES. Of these, 18 (58%) were male and 13 (42%) were female. The average age of the study population was 52

years, but the average age of the male and female patients diagnosed with ES was 65 and 70 years, respectively, with the youngest patient being 57 years old. The occupation of 16 patients (52%) with ES was farming. Two patients (6%) had a dermatological problem in the form of senile Xerosis. Four patients (13%) were hypertensive, 3 (10%) were diabetic, and 3 (10%) patients had diabetes and hypertension. Exfoliation was present bilaterally in 12 (39%) patients. The average IOP of study group was 19.34 ± 4.91 mmHg (14–24) on applanation tonometry. In 9 patients (29%), the IOP was higher than 21 mmHg. The IOP was elevated in both the eyes in 6 patients (19%), with the eyes with ES showing higher average IOP (20 ± 6.16 mmHg) as compared to the eyes without ES (19.47 ± 4.39 mmHg) though the difference was not statistically significant ($P = 0.56$). The IOP was elevated in one eye only in 3 (10%) patients in whom the eye with ES had higher IOP. In 22 (71%) patients, the pupils did not dilate well. Nuclear sclerosis Grade II–III was present in the majority 28 (90%) of the patients whereas a small minority 3 (10%) had posterior subcapsular cataract. On gonioscopy, the anterior chamber angle was open in 28 (90%) patients of which 8 (26%) had wide open angle (Schie classification), 7 (23%) had Grade I open angle, and 13 (42%) had Grade II open angle. In our study group, only 3 (10%) patients had occludable angles. [Figure 1]. Deep pigmentation of the TM was seen in 27 (87%) patients. Sampaolesi line was seen in 28 (90%) patients of which 1 patient had two Sampaolesi lines. Sampaolesi line was not detected in the three patients with occludable angles [Figure 2]. Exfoliative material was seen in the angle in one patient (3%). Laxity of the zonules was detected on slit-lamp examination as phacodonesis and confirmed when operating for cataract was seen in 4 (13%) patients, but their angle was open. The fundus findings were unremarkable in all the patients. The visual field examination showed glaucomatous changes in one patient.

Figure 1 Gonioscopy showing occludable angle and lack of Sampaolesi line

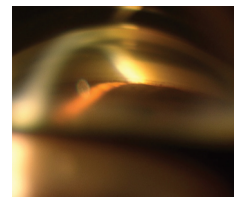


Figure 2 Gonioscopy showing open angle with deeply pigmented trabecular meshwork and Sampaolesi line



DISCUSSION

There is a worldwide distribution of ES with variable prevalence. It is diagnosed by slit-lamp visualization of white powdery deposits on the lens capsule. The presence of exfoliative material is associated with an increased risk of developing glaucoma but can be present in the eye without associated glaucoma.[3] This disorder has been known to have an association with narrow angles secondary to zonular weakness, increased rate and risk of cataract formation, and with an increased risk of complications during cataract extraction associated with zonular dehiscence.[3] The prevalence of ES is variable regionally as well as globally.[3] A hospital based study from India has reported a prevalence of ES as 7.4%[4] whereas another study from South India has reported a prevalence of 3.8%,[5] which is similar to our results which show a prevalence of 3.1%. The average age of our study population was 52 years, but the average age of those with ES was 67.5 years. Previously published studies also report an age-related increase, with ES being reported to be less common below the age of 60 years.[2] The association of prevalence of ES with sex is varied, with a few studies reporting a greater incidence in women.[2,6,7] However, a few studies showed no sex predilection.[8,9] Our results show a greater prevalence among male patients which has also been the observation in other Indian studies.[4,5] The mean IOP of the study population was 19.4 mmHg. The study shows that though 29% patients had IOP >21 mmHg, none of them showed glaucomatous optic disc changes, and only 1 (2%) patient showed glaucomatous field defects which are comparable to the prevalence rates of exfoliative glaucoma ranging from 0.07% to 14.2% shown in other studies.[10] Ocular hypertension was seen in 27% of the study population which is comparable with the rate of ocular hypertension reported by another study to be 22.7%.[9] However, in a study conducted on 100 consecutive patients with ES, glaucoma was detected in 7% and ocular hypertension in 15% patients.[6] Nuclear sclerosis Grade II–III was the most common associated finding in the lens. Other studies have also noted this association although the occurrence of nuclear sclerosis type of cataract due to natural coincidence because of increased age or probable increased oxidative stress in the anterior segment of the eye.[11] ES has been associated with a number of findings related not only to the appearance of the angle but also to the depth of the angle. In our study population, 90% patients were found to have open angles as are agreed upon by most other studies.[12] In our study, the prevalence of occludable angles is 10% that is within the range of prevalence of 9%–18% of occludable angle reported by other studies.[3] Pigment accumulation in the angle is considered to be pathognomonic of ES and is seen as Sampaolesi line and dense dark uneven pigmentation of the TM.[12] However, in our study population, the presence of Sampaolesi line was a consistent finding in all the patients of ES with open angles but not in those with occludable angles in whom the line was not detected. This finding has not been reported in any other study. However, this observation needs to be studied further in a large sample size and may not be considered conclusive. Increased pigmentation of the TM has been correlated with increased IOP.[13,14] However, in our study, no such correlation was found. In many of the patients showing dense pigmentation of TM, the IOP was normal. Laxity of zonules suspected on slit-lamp examination due to phacodonesis and confirmed while performing cataract surgery was seen in a small minority of study group although their angles were open which may be explained by the fact that the laxity was present over a small extent which did not lead to marked phacodonesis and subsequent narrowing of angle. On the other hand, the patients detected to have occludable angles did not have laxity of zonules.

CONCLUSIONS

Open angles showing dense pigmentation of the TM and the presence of Sampaolesi line were the most common findings on gonioscopy in a large majority of patients with ES. Sampaolesi line was not seen in patients having occludable angles. Since the sample size was small further studies with larger sample size need to be performed to confirm our findings and validate their reproducibility.

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