

Trabeculectomy in exfoliation glaucoma: its effectiveness in a hospital based prospective study.

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Abstract

Introduction: Exfoliation syndrome is present worldwide, although reported prevalence rates vary extensively. In exfoliation syndrome there is characteristic production and excessive accumulation of a fibrillar material in many ocular tissues. Elevated intraocular pressure (IOP) with or without glaucomatous changes occurs in approximately in 25% of persons with exfoliation syndrome.

Objective: The aim of this study was to analyze the effect of trabeculectomy in controlling intraocular pressure in patients with exfoliation glaucoma.

Material and Methods: The present prospective study was conducted in a tertiary care hospital of north India. One hundred diagnosed cases of exfoliation glaucoma underwent trabeculectomy. Postoperative follow up was done at one, fourth, sixth week and at six months. Intraocular pressure, slit lamp examination, visual acuity, visual field analysis and development of early and late postoperative complications were recorded.

Results: The mean age of the studied subjects was 56.54 with SD of 9.2 years. Mean preoperative intraocular pressure was 27.89 SD 4.32mmHg. Mean postoperative intraocular pressure at 1st week was 14.68 SD

3.80mmHg, at 4th week was 14.16 SD 3.71mmHg, at 6th week 14.09 SD 3.30mmHg and at 6th month 14.38 SD 3.48mmHg. The difference between mean intraocular pressure preoperatively and postoperatively at all stages was statistically significant (p-value 0.000) and success rate of trabeculectomy in relation to postoperative intraocular pressure at 6th month was 93%. Visual acuity at 6th month remained same in 72% of the cases. Similarly visual fields remained same in 83% of the cases at 6 months of follow up. Main complications were progression of cataract (9%), striate keratitis (8%), hyphema (8%), shallow anterior chamber (7%) and iritis (3%).
Conclusion: The study concludes that exfoliation glaucoma shows quite effective response to trabeculectomy and a lasting control of intraocular pressure is usually attained.
Key words: Exfoliation, Intraocular pressure, Glaucoma, Trabeculectomy.

Introduction

Although modern understanding of glaucoma dates back only to the mid-19th century, this group of disorders was apparently recognized by the Greeks as early as 400 B.C. In Hippocratic writings it appears as ‘Glaucosis’ in his book named ‘Athorism’ in reference to the Bluish-green hue of the affected eye¹. Glaucoma is considered second

leading cause of blindness worldwide². It affects more than 67 million people worldwide of whom about 10% are estimated to be blind. It is the leading cause of irreversible blindness worldwide³. The clinical examination is vital to make this diagnosis⁴. Peculiar about exfoliation syndrome is the production and progressive accumulation of a fibrillar extracellular material in many ocular tissues. Based on the identification of accumulations in orbital tissues (**Figure-1**), skin specimens, and visceral organs, exfoliation syndrome appears to be a generalized disorder of the extracellular matrix⁵. The expected ramifications of this disorder appear to be far more important than ever before realized. Since early pigment-related signs of exfoliation syndrome are found in the majority of unaffected fellow eyes, and since exfoliation fibers may be detected on conjunctival biopsy in virtually all unaffected fellow eyes, these cases are actually asymmetric⁶⁻⁷.

Exfoliation syndrome occurs worldwide, although reported prevalence rates vary extensively. Exfoliation syndrome increases in prevalence with age⁸. Men and women are almost equally affected. In Scandinavia, where exfoliation syndrome was first described, the highest rates in studies of persons over age 60 have been reported from Iceland (about 25%)⁹ and Finland (over 20%)¹⁰. These results reflect a combination of true differences due to racial, ethnic, or other as-yet-unknown reasons; the age and sex distribution of the patients or population group examined; the clinical criteria used to diagnose exfoliation syndrome; the ability of the examiner to detect early stages; the thoroughness of the examination; and the awareness of the observer¹¹. There is a significantly higher frequency and severity of optic nerve damage at the time of diagnosis, worse visual field damage, poorer response to medications, more severe clinical course, and more frequent necessity for surgical intervention.

Different treatment modalities of Glaucoma consist of topical and systemic medication, laser treatment¹², and conventional surgical procedures¹³, its prognosis on medical treatment is worse in comparison with other glaucoma¹⁴⁻¹⁵. Trabeculectomy means the creation of a fistula connecting the anterior chamber and the subconjunctival space. This provides an alternative method of aqueous humor filtration when the natural trabecular outflow pathway is blocked or poorly functioning in cases of glaucoma. The aim of this study was to emphasize on the effectiveness of trabeculectomy in patients with exfoliation glaucoma.

Material and Methods

The study was conducted prospectively in a tertiary care hospital of north India. Identification of the glaucoma type was made clinically by preoperative slit lamp examination and by gonioscopy. Exfoliation glaucoma was diagnosed if exfoliation material was seen on the corneal endothelium, iris surface, angle structures of the anterior chamber, pupillary margin, or lens capsule. In this study 100 diagnosed cases of exfoliative glaucoma were included, and after proper workup was done they were subsequently subjected to trabeculectomy. Data was collected concerning patients' age, sex, glaucoma type, preoperative treatment as well as intraocular pressure, best corrected monocular visual acuity, occurrence of cataract, and results of visual field analysis before operation. Only these patients were included in the study (patients with exfoliation glaucoma, in cases where both eyes were operated only the first operated eye was included in the study, no surgery performed in the operated eye before trabeculectomy). Patients with history of trauma or uveitis in the operated eye was excluded from the study. Main indications of trabeculectomy were as follows: unsatisfactorily controlled IOP (>21mm Hg) despite maximum tolerable medical treatment, side effects of

medical treatment, progression of optic disc cupping, progression of visual field defects despite good control of IOP, poor compliance with treatment.

One day before surgery all patients were admitted in the ward. Before operation patients were given anti-glaucoma treatment for the reduction of the increased intraocular tension. For this purpose either oral acetazolamide, oral glycerol or inj. mannitol by I/V infusion were given in addition to their routine antiglaucoma drugs, depending upon the level of intraocular pressure. After taking informed consent, all patients were operated under local anaesthesia by giving a peribulbar block using 2% xylocaine. Trabeculectomy procedure was executed in the following manner:- After the insertion of superior rectus bridle suture, a fornix based conjunctival flap was fashioned, followed by raising a 0.3mm thick limbus based scleral flap. Paracentesis was done at 9 o'clock position. The anterior chamber was then penetrated under the scleral flap and an approximately 3mm block of limbal tissue was excised. then iridectomy was done. After completing this scleral flap was reposed back. Conjunctiva was repositioned back by giving one suture. Dexamethasone and gentamicin were given subconjunctivaly at the end of operation. Eye was bandaged and patients were instructed to take rest in the bed for a short period of 5-6 hours, after which they were allowed for minor movements without making much strain. The bandage was removed after 24 hours. Special attention was paid to condition of filtering bleb, cornea for striate keratopathy or edema, anterior chamber for depth and contents, pupil for reaction and shape, and lens. Intraoperative and postoperative complications were recorded. Next day patients were put on antibiotic-steroid eye drops every 3hrs and topical cyclopentolate 1% qid for one week. Then the antibiotic/steroid eye drop tapered gradually over following 5-6 weeks.

Follow Up: Postoperative follow up was done on 1st, 4th and 6th week, followed by 6 months after operation. On each of these visits patient was evaluated for the following:- intraocular pressure, visual acuity, slit lamp examination—status and type of bleb, results of visual field, and for any complication.

Results

The age of the patients ranged from 23 years to 75 years. The maximum number of cases was in the 51–60 (48%) years age group. Mean age of patients was 56.54 with SD of 9.2 years. Males were 54 and females were 46. Preoperative intraocular pressure:- Preoperative intraocular pressure was taken as intraocular pressure of the patient one day prior to surgery whether on medical treatment or not. Maximum number of cases (64%) were in the range of 21-30mmHg (on medical treatment) preoperatively. 7% of cases were in the range of >15-20mmHg, who though medically controlled had to undergo trabeculectomy either due to progressive loss of field or intolerance to medical therapy. Rest of the patients IOP was more than 30mmHg. Preoperative type of exfoliation (on slit lamp and gonioscopic examination):- Maximum number of patients had exfoliation material on pupillary border (82 cases). 44 cases had exfoliation material present on the anterior lens capsule at the time of diagnosis. More than one site was involved at the time of diagnosis in many patients (Table-1).

Table-1. Preoperative type of exfoliation as per Slit Lamp Examination and Gonioscopy.

Findings	No. of cases
Exfoliation material on papillary border	82
Exfoliation material on anterior lens capsule	44
Loss of papillary ruff	17

Exfoliation material on corneal endothelium	15
Exfoliation material in angle with angle pigmentation	14

Indications for trabeculectomy:- Patients with exfoliation glaucoma were mainly subjected to trabeculectomy due to failed medical therapy; which was either to continued raise in intraocular pressure (>21mmHg) despite maximal tolerable medical treatment (62%); to both increased intraocular pressure and continued field loss (14%); intolerance to medical therapy (13%); to progression of visual field loss despite intraocular pressure being <21mmHg (7%); or to poor compliance (4%).

Postoperative intraocular pressure:- Postoperative reduction of intraocular pressure was very satisfactory for the whole group with about 83 cases having postoperative intraocular pressure in the range of 10-20mmHg at first week. Moreover, further 13 cases had postoperative intraocular pressure of less than 10mmHg, making the total percentage of controlled cases as 96% in the first week. However, in overall follow-ups, 12 cases showed unsatisfactory postoperative intraocular pressure reduction. Five among them showed controlled intraocular pressure on postoperative medical treatment, and 7 cases maintained a postoperative intraocular pressure >21mmHg, even after continuation of postoperative medical treatment (Table-2).

Table-2. Postoperative intraocular pressure at 6 months.

Postoperative intraocular pressure	No. of cases	Percentage
Control without treatment	88	88
Control with additional treatment	5	5

Total controlled with and without additional treatment	93	93
Failure (intraocular pressure not controlled)	7	7

Changes in mean intraocular pressure from preoperative level at different follow ups of all cases:-Statistically mean postoperative intraocular pressure showed highly significant reduction from its preoperative levels at all follow-ups (Table-3).

Table-3. Changes in mean intraocular pressure from preoperative level at different follow-ups.

Time of intraocular pressure measurement.	Preoperative intraocular pressure (mean with SD)	Postoperative intraocular pressure At 1 st week (mean with SD)	Postoperative intraocular pressure At 4 th week (mean with SD)	Postoperative intraocular pressure At 6 weeks (mean with SD)	Postoperative intraocular pressure At 6 months (mean with SD)
Intraocular pressure	27.89 SD- 4.32	14.68 SD- 3.80	14.16 SD- 3.71	14.09 SD- 3.30	14.38 SD 3.48
Change in intraocular pressure	N.A	13.21	13.73	13.80	13.51
P- value (2- Tailed)	N.A	.000	.000	.000	.000

Postoperative visual field status: Postoperative visual field status at 6 months when compared with preoperative visual fields showed the same visual field status in 83% of cases. Deterioration was observed in 17% of cases. Postoperative visual acuity status at 6 months:- Postoperative visual acuity at 6 months when compared with preoperative visual acuity showed deterioration in 28% of patients. However, visual acuity remained same in 72% of cases. Postoperative fundus examination (cup-disc ratio) at 6 months:- Postoperative cup-disc ratio remained same in 84% of cases, whereas it deteriorated in 16% of cases. However, it showed improvement in none.

Complications and further surgical interventions: No serious complication was seen in the present study, but some minor complications were observed. Cataract

progression was found in 9% of cases postoperatively. In 8% of cases striate keratitis was noted, 8% cases had hyphema (Figure-2), 7% cases presented with shallow anterior chamber and 3% developed iritis in postoperative period. Cataract extraction was done in 7 cases during the course of the study. Rest all the complications were managed conservatively.

Conclusion

The study concludes that patients of exfoliative glaucoma respond very effectively to trabeculectomy operation, and a lasting control of the intraocular pressure is usually attained. Even in cases where the postoperative reduction of the intraocular pressure is not satisfactory, medical treatment gives better control of intraocular pressure than when it is given before trabeculectomy. Based on our study results and the results provided by other authors, we favour trabeculectomy as one of the safe and effective treatment modality in patients with exfoliation glaucoma.

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Figure-1. Exfoliative material on pupillary border.



Figure-2. Postoperative cystic bleb.

