



CLINICAL STUDY OF TRABECULECTOMY USING SUTURELESS SCLERAL TUNNEL TECHNIQUE

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ABSTRACT

Purpose:- This study was conducted to study the success rate in terms of control of intraocular pressure (IOP) and complications of trabeculectomy using sutureless scleral tunnel technique in patients with primary open angle glaucoma (POAG).

Methods:- The study was conducted on 50 patients with primary open angle glaucoma whose IOP was more than 21mmHg with administration of maximally tolerated medications or had poor compliance to treatment. Informed consent was obtained from each patient before entry into the study. All of the patients underwent sutureless scleral tunnel trabeculectomy under peribulbar anaesthesia and were followed for six months. Patient data such as age, sex, IOP, visual acuity, cup disc ratio, gonioscopy, perimetry, intraoperative and postoperative complications, bleb status and success rate were evaluated.

Results:- Mean age was 60.86±9.09 and 78% of the patients were male. Mean IOP was 30.56±7.16mmHg before surgery and 16.00±2.32mmHg (p<0.001) six month after surgery. No intraoperative complications were encountered. 5 patients (10%) has hyphaema, 4 patients (8%) had hypotony, 7 patients (14%) had shallow anterior chamber that was managed medically. The absolute success rate was 90%.

Conclusion:- Sutureless scleral tunnel trabeculectomy is an easy, safe and effective drainage procedure for treating primary open angle glaucoma not controlled by medical therapy.

KEYWORDS :

INTRODUCTION

The first person to report successful trabeculectomy was Cairns¹ in 1968 with several modifications of original technique by others.^{2,3,4} it is common and successful method of permanently lowering intraocular pressure (IOP). Conventional trabeculectomy consist a partial thickness scleral flap to cover the internal ostium and this flap is usually secured with sutures. Conventional trabeculectomy has many complications such as laceration of the scleral flap, foreign body reaction, excessive tissue trauma and local irritations due to use of sutures,⁵ hypotony, shallow anterior chamber and choroidal detachment.^{6,7,8} Sutureless scleral tunnel trabeculectomy has overcome many complications associated with classic trabeculectomy with sutures and has good success rate.

This study was conducted to evaluate the safety and effectiveness of sutureless scleral tunnel trabeculectomy by measuring the intra and postoperative complications and monitoring intraocular pressure (IOP) for six months after surgery.

PATIENTS AND METHODS

This study was conducted on 50 cases in the Department of Ophthalmology, Government Medical College, Srinagar and followed up for six months. Informed consent was obtained from each patient before entry into the study.

Patients with primary open angle glaucoma (POAG) whose intraocular pressure was more than 21mmHg inspite of maximum tolerated medical therapy and/or eye with advanced cupping and advanced field loss, patients intolerable to various side effects of anti-glaucoma medications and patients with poor compliance to medical treatment were included in this study.

The exclusion criteria included; patients with presence of acute or chronic inflammatory eye disease, patients with previous ocular surgeries including failed trabeculectomy, patients with previous anterior segment laser therapy, patients with primary angle closure glaucoma and congenital claucoma.

Preoperatively, baseline data were obtained from each patient and included; local examination of eyes under diffuse illumination and

slit lamp examination, visual acuity, applanation tonometry, mydriatic funduscopy (C.D. Ratio), gonioscopy and perimetry with the Humphrey visual field analyzer.

Surgery was conducted under local anaesthesia by peribulbar block. A fornix-based conjunctival flap was made and bleeding episcleral vessels were cauterized. A linear, partial thickness groove 5mm long was made 2mm behind the limbus using a blade. A scleral tunnel was created using a crescent knife and the tunnel extended into the clear corner 1mm in front of the limbus. Anterior chamber paracentesis at the peripheral corner either at the 10'O clock (right eye) or 2'O clock (left eye) position was performed. Viscoelastic substance was injected into the anterior chamber through the paracentesis site. The anterior chamber was entered with keratome knife. Trabeculectomy was performed using the Kelly Descemet membrane punch. Peripheral iridectomy was performed using a pair of Vannas scissors. The viscoelastic substance was washed out. The filtration rate was tested by injecting balanced salt solution through the paracentesis site. The desired drainage was achieved when aqueous oozed out through the edge of the scleral flap with maintenance of anterior chamber. The sclerotomy was enlarged if there was under drainage. The conjunctiva was sutured with interrupted 8-0 vicryl stitches. Subconjunctival injection of dexamethasone and gentamycin was administered 180 degree away from the drainage site.

Topical antibiotic steroid eyedrops were given for 6 weeks and topical cycloplegic eyedrops for 1-2 weeks postoperatively.

Postoperative follow up was done on 1 week, 3 and 6 months. At each visit a full ocular examination was performed, including visual acuity, slit lamp examination of the anterior chamber and the bleb, intraocular pressure measurement and fundus examinations. Postoperative complications were also recorded.

RESULTS

In our study, there was 38 (76%) males and 12 (24%) females with mean age in years 60.86 ± 9.09. Mean preoperative IOP was 30.56 ± 7.16mmHg. Mean postoperative IOP was 12.32 ± 5.97 mmHg in first

week, 13.56 ± 3.64mmHg at 1 month, 14.08 ± 2.45 at three months and 16.00 ± 2.321mmHg in six month. Statistically there was highly significant reduction of IOP from preoperative level. Average postoperative IOP fall at sixth months from initial value was 14.50mmHg. The absolute success rate (<21mmHg) without medications was 90% and qualified success (<21mmHg) with medications was 10%. At 6 months, 28 out of 50 patients (56%) had thin pale polysystic bleb.

No intraoperative complication was observed. Postoperative complications included shallow anterior chamber (14%) which was successfully treated by patching, hyphaema (10%) hypotony (8%), uveitis (2%) and cataract progression (8%).

TABLES

Table – 1
Age and Sex Distribution of Studies Subjects

| Age Group (Years) | Male | | Female | | Total | |
|-------------------|------|------|--------|------|-------|------|
| | No. | % | No. | % | No. | % |
| 31-40 | 2 | 5.3 | 0 | 0.0 | 2 | 4.0 |
| 41-50 | 3 | 7.9 | 2 | 16.7 | 5 | 10.0 |
| 51-60 | 16 | 42.1 | 3 | 25.0 | 19 | 38.0 |
| 61-70 | 15 | 39.5 | 6 | 50.0 | 21 | 42.0 |
| 71-80 | 2 | 5.3 | 1 | 8.3 | 3 | 6.0 |
| Total | 38 | 100 | 12 | 100 | 50 | 100 |

Mean Age ± 60.86 ± 9.09

Table – 2
Postoperative Visual Acuity at 6 months in Relation to Preoperative Levels

| Postoperative Visual Acuity | Preoperative No. of Cases | Improved | Same | Deteriorated |
|-----------------------------|---------------------------|----------|------|--------------|
| 6/6-6/9 | 3 | 0 | 3 | 0 |
| 6/12-6/18 | 6 | 1 | 4 | 1 |
| 6/24-6/36 | 19 | 1 | 17 | 1 |
| <or = 6/60 | 22 | 1 | 19 | 2 |

Table-3
Distribution of Cases According to Preoperative Intraocular Pressure

| IOP (mmHg) | Cases | Percentage |
|------------|-------|------------|
| >21 to 30 | 23 | 46.0 |
| 31 to 40 | 18 | 36.0 |
| 41 to 50 | 8 | 16.0 |
| 51 to 60 | 1 | 2.0 |
| Total | 50 | 100 |

Mean IOP ± SD = 30.56±7.16

Table – 4
Distribution of Cases According to Postoperative Intraocular pressure

| IOP (mmHg) | 1 Week | | 1 Month | | 3 Months | | 6 Months | |
|------------|------------|----|--------------|----|-------------|-----|-------------|-----|
| | No. | % | No. | % | No. | % | No. | % |
| <5 | 4 | 8 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6.20 | 41 | 82 | 48 | 96 | 50 | 100 | 50 | 100 |
| >21 | 5 | 10 | 2 | 4 | 0 | 0 | 0 | 0 |
| Mean ±sd | 12.32±5.97 | | 13.56 ± 3.64 | | 14.08± 2.45 | | 16.00 ±2.31 | |

DISCUSSION

Surgical techniques used in trabeculectomy vary widely. Conventional trabeculectomy consists of a partial thickness scleral flap to cover the internal osteum, and this flap is usually secured with sutures.⁹ However, conventional technique can lead to problems with preparation of the scleral flap and the use of sutures. Sutures are used to control aqueous drainage by their tension on the scleral flap; however, tight sutures may result in inadequate drainage and loose sutures in excessive drainage. Although tight suture can be removed to increase aqueous drainage postoperatively, this is not without risk. Conjunctival perforation, sudden hypotony, shallow anterior chamber, and malignant

glaucoma have been reported after laster suture lysis.^{10,11,12} The sutureless scleral tunnel technique may help solve these problems. This technique has several advantages over conventional trabeculectomy: creation of scleral tunnel is simpler than scleral flap, the punch produces a standard trabeculectomy aperture, the scleral tunnel acts like a valve that limits overfiltration during the early postoperative period, and there is more posterior diversion of aqueous, which reduces the risk of postoperative leakage.¹³

Without suturing, astigmatism and amount of surgical manipulation and trauma is less. It minimizes local tissue irritation and foreign body reaction- thus less fibrosis and scarring of conjunctival and scleral flap. Risk of suture associated complication like button holing through the conjunctival bleb or suture abscess formation is removed. The aqueous outflow is through one sided wound measuring 4-5mm in length as opposed to conventional trabeculectomy where filtration is through all sides (9mm for a square flap). With a single outflow, flow/unit length is higher; therefore better chances of fistula remaining patient. Surgical area is small and close to limbus, bridle suture may be avoided. This technique can be combined with phacoemulsification (phaco trabeculectomy).^{14,15,16} In our study mean IOP was 30.56±7.16mmHg preoperatively and 16.00±2.321mmHg postoperatively which compares favourably with the studies conducted by Lai JSm et al (1999)⁹ and Yadollah Eslami et al (2009).¹³ Although this sutureless scleral tunnel technique has several advantages over conventional trabeculectomy. Certain complications arise in our study which included hyphaema (10%), shallow anterior chamber (14%). Our complication rates were comparable to those reported by Lai JSM et al (1999)⁹ 10.5% for hyphaema and 15.8% for shallow anterior chamber.

The absolute success rate of six months was 90% which compares favourably with those studied by Vouri MI et al (2001)¹⁷ 82.5%. Five cases (10%) required additional antiglaucoma medication for control of intraocular pressure <21mmHg.

From our study, it was concluded that the sutureless scleral tunnel trabeculectomy is a safe, easy and effective drainage procedure for treating uncontrolled POAG.

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