Site of trabeculectomy and control of intraocular pressure: a preliminary report

C. D. Mpyet, S. K. Alli and N. E. Zaure

Department of Ophthalmology, Jos University Teaching Hospital, Jos, Nigeria.
Reprint requests to: Dr Caleb Mpyet, Department of Ophthalmology, Jos University Teaching Hospital, P. .M. B. 2076, Jos, Nigeria. E-mail: mpyetc@unijos.edu.ng

ABSTRACT

Background/Objective: To determine the extent to which the site of trabeculectomy affects the extent of drop in intraocular pressure in an African population.
Methods: A prospective study involving 54 eyes randomly allocated to a nasal, central and temporal trabeculectomy group and followed up for a period of six months.
Results: The nasal group had consistently lower intraocular pressures though there was no statistically significant difference between the groups. A good number of patients were lost to follow up.
Conclusion: Surgeons performing primary trabeculectomy should consider the nasal site leaving the easily accessible temporal and central sites for repeat trabeculectomies when the need arises.

Key Words: Trabeculectomy, intraocular pressure, site, control

Introduction

Glaucoma is the third major cause of blindness worldwide. 70% of global glaucoma are found in developing countries with about two-thirds becoming blind due to primary open angle glaucoma. [1] In people of African descent, primary open angle glaucoma poses some special problems. It is commoner, more aggressive, occurs earlier with blindness occurring at a younger age and is more resistant to medical and laser therapy. [2] Compounding these problems is the fact that most anti-glaucoma drugs are either costly or unavailable in most developing countries. This makes compliance difficult hence surgery seems to be the only reasonable treatment option in most cases.

Trabeculectomy is the most common surgical procedure used in the treatment of primary open angle glaucoma. It has been shown to have a success rate of between 76.4 - 94%. [3,4] Various factors affecting the success of this procedure have been studied. While performing tenectomy [4] and using different types of conjunctival flap [5] do not seem to influence the control of intraocular pressure, performing surgery as a primary procedure [6] and the use of antimetabolites [7,8] produce a better control of intraocular pressure. In African populations, the long-term effectiveness of this procedure is enhanced by the use of anti-metabolites. Considering the magnitude of the problem of glaucoma in developing countries, there is a need to explore various means of increasing the effectiveness of

trabeculectomy. One wonders if the site of trabeculectomy would have any effect on the control of intraocular pressure. This study looks at the effect of varying the site of trabeculectomy around the corneo-scleral limbus on the intraocular pressure and the complications in an African population.

Materials and Methods

This is a prospective study involving 54 eyes of 31 patients diagnosed by funduscopy, intraocular pressure (applanation tonometry), gonioscopy and visual field assessment (lister perimetry) as having primary open angle glaucoma. Inclusion into this study was restricted to patients who have not had previous topical antiglaucoma medications. At diagnosis, patients were placed on acetazolamide tablets, 250mg tds. Those included in this study had surgery within four weeks of diagnosing glaucoma. Patients excluded from this study included; those not followed up for up to two months, those who developed post-operative complications (like wound leak, uveitis, hyphaema) that were likely to affect the intraocular pressure. These patients were randomly allocated to undergo a nasal, central or temporal trabeculectomy. Pre-operatively, patients had their intraocular pressures recorded and were placed on oral acetazolamide tablets, 250mg tds for 24hrs before surgery, Gutt Chloramphenicol o.5% tds in both eyes for 24hrs.

Under the operating microscope, and with the aid of the calipers, trabeculectomy were centered on 12.00 (Central) 10.30 or 1.30 clock hours (for nasal or temporal) depending on the eye. All surgeries were performed by one surgeon and standardized in all patients for type of conjunctival flap, size of scleral flap and size of trabecular block abscised. A fornix based conjunctival flap was raised. Tenons capsule was dissected with conjunctiva down to sclera. No tenectomy was performed. Homeostasis was secured using a hot point cautery to bleeding scleral vessels. A 4mm x 4mm superficial square-shaped scleral flap of one-third thickness was raised and a 2mm x 2mm-trabecular block was excised then a peripheral iridectomy was performed.

The scleral flap was anchored with two 8/0 virgin silk sutures at the free ends of the flap. Conjunctiva was sutured with two 8/o virgin silk sutures at the limbus. A sub-conjunctival injection of 20mg Gentamicin and 2mg Dexamethasone was given on the table. No antimetabolites were used, and conjunctival sutures were not removed.

Post-operatively, patients were placed on;
Gutt fluoromethalone 0.1% qds
Gutt Tropicamide 0.5% tds
Gutt Chloramphenicol 0.5% tds

These drugs were gradually withdrawn over a period of six weeks depending on the amount of inflammation. Examination was performed every day until discharge on the fourth postoperative day when the intraocular pressure was recorded and also at one week, 1month, 2months 3months, 4months and 6months after surgery. All patients were followed up for at least 2 months.

Results

A total of 54 eyes of 31 patients were recruited for this study. There were 17 males and 14 females with an average age of 40 years. There was no significant difference between the three groups regarding sex and age distribution (Fig 1). There were eighteen eyes in each group. Twelve eyes were excluded from the study: seven could not be followed-up for up to 2 months, while five eyes developed complications, there were 5 eyes in the nasal group, 4 in the central group and 3 in the temporal group.

Pre-operative intraocular pressures ranged between 20-40mmHg with an average intraocular pressure of 30.6mmHg. There was no significant difference in pre-operative intraocular pressure between the three groups (table 3). No intra-operative complications occurred. Postoperative complications were as seen in Table 2.

Table 1:Age and sex of each trabeculectomy group

	Nasal	Central	Temporal
Male	6	6	5
Female	4	6	8
Age range (years)	41-60	23-45	26-60
Mean age (years)	48	34	40

Table 2: Early postoperative complications in each trabeculectomy group

Complications	Nasal	Central	Temporal	%
Iris prolapse	1	1	-	3.7
Wound leak	-	1	-	1.9
Shallow anterior chamber	2	2	1	9.3
Hyphaema	-	-	2	3.7
Uveitis	1	-	-	1.9
Dellen's ulcer	-	-	2	3.7

Table 3: Average pre- and postoperative intraocular pressures in each trabeculectomy group

Group	Pre-op	1 wk	1 month	2 months	3 months	4 months	6 months
Nasal	32.0	6.1	11.9	15.1	14.4	14.8	15.4
Central	30.3	7.0	13.7	16.7	17.6	18.6	18.9
Temporal	29.5	6.8	13.8	17.1	14.9	16.5	16.8

Postoperative, over the 6 months follow-up period, average intraocular pressure ranged between 6.1mmHg to 15.4mmHg for the nasal group; 7.0 - 18.9mmHg for the central group and 8 - 16.8mmHg for the temporal group. The nasal group had the lowest average intraocular pressure during the period of the study at each visit (table 3).

Using the student t-test, there was no statistically significant difference between the average 10P in the nasal group and the central or temporal group throughout the period of our follow-up. Average drop in the intraocular pressure at 6 months follow-up was 16.6mmHg; for the nasal group 11.4mmHg for the central and 12.7mmHg for the temporal group (table 3). There was no statistically significant difference between the groups as to the extent of drop in intraocular pressure.

Two eyes in each group (6; 20%) were started on Gutt Betoptic 0.5% bd. at 3months follow-up on account of raised 10P above 22mmHg. There was an average drop in intraocular pressure of 17.0mmHg (44.4%) in all eyes at 6months follow-up.

Discussion

To the best of our knowledge, this is the first study examining the effect of site on primary trabeculectomy in an African population. During the six months follow-up, the nasal trabeculectomy group had consistently lower average intraocular pressure. Though there was no statistically significant difference between the nasal and the central or temporal groups, it will be interesting to evaluate these values after a longer

period of follow-up and with a larger sample size. It has been shown that the central and temporal groups tend to have greater rise in intraocular pressure after eight months follow-up. [9]

The nasal group showed a higher average reduction in intraocular pressure at the end of six months. Six eyes (2 in each group) needed topical anti-glaucoma medications over the study period. This high success rate (85.7%) could be attributed to the short period of follow-up, and the fact that surgery was performed on virgin conjunctiva as prior administration of topical anti-glaucoma medications has been shown to have adverse effects on bleb fibrosis and pressure control. [6]

One eye each in the nasal and central group developed iris prolapse while one eye in the central group developed wound leak. This could be due to poor access to the nasal site, differences in conjunctiva or poor suturing techniques as suggested by Sanders et al. [9] There were no adverse complications except in one eye who developed uveitis due to default on use of his postoperative, medications.

Patients in this study are relatively younger than in studies conducted in Caucasians. [9]This agrees with the fact that glaucoma occurs at a younger age in people of African descent.

Sanders et al [9] have considered differences in the conjunctival morphology could be responsible for the differences in outcome seen in these trabeculectomy groups. The average age of the nasal group was slightly higher. This may be responsible for their lower intraocular pressure as the elderly develop less fibrosis. Another factor that should be considered is the regional blood supply to these sites and its effect on bleb morphology and absorption of sub-conjunctival aqueous humor.

Nasal trabeculectomies give consistently lower intraocular pressures without adverse complications. Surgeons performing first trabeculectomies should consider the nasal site as this is likely to give a lower intraocular pressure and leaves the easily accessible central and temporal sites for subsequent trabeculectomies if the need arises.

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