Afr. J.Med.med. Sci (2002) **31**, 33-35

Trabeculectomy in young Nigerian patients

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Summary
The results of 89 trabeculectomies performed on 56 patients under the age of 30 years were reviewed. Data collected included age, sex, type of glaucoma, number of years of glaucoma before surgery, visual acuity, intraocular pressure, complications of surgery, presence of a filtering bleb and follow-up period. Complete success, denoted by a postoperative IOP of 21mmHg or less without medical therapy, occurred in 50 eyes (56.2%). Qualified success, in which IOP was 21mmHg or less with additional medical therapy occurred in 31 eyes (34.9%) and failure, in which IOP was greater than 21mmHg in spite of medical treatment occurred in 8 eyes (8.9%). Success was therefore achieved in 91.1% attaining an IOP of 21mmHg or less, with or without additional medical therapy. The most statistically significant factor was age groups in which the highest success rate of 100% was achieved in the age group 20-29 years. The difference in the success rate across the age groups was statistically significant ($x^2 = 8.04$, $p = 0.01$). Fornix based conjunctival flaps were also found to be associated with a statistically significant higher success rate (97.9%) as opposed to limbal based flaps (85.4%), $x^2 = 4.81$, $p = 0.03$. Males in the study group had a significantly higher success rate (97%) than females (78.3%), $x^2 = 5.86$, $p = 0.011$. A success rate of 100% was recorded in patients with developmental glaucoma, 86.1% in congenital glaucoma and 33.3% in secondary glaucoma. All the repeat trabeculectomies had congenital glaucoma. The presence of a bleb, although it had a higher success rate (93.4%) compared with the absence of a bleb (84.6%), was not statistically significant ($x^2 = 1.19$, $P = 0.27$). Complications of surgery were mostly transient.

Keywords: *Glaucoma , trabeculectomy, young patient, bleb*

Résumé
Il y avait une révision des résultats 89 trabeculectomies pratiques sur 56 patients que leur âges ne dépassent pas 30ans. Parmi les données ramassée sont, l'âge, sexe, type de glaucome, les nombres des années que les malades ont souffert cela avant la chirurgie, l'acuité visuelle, la tension intraoculaire, les complications chirurgiennes la présence d'une bulle filtrant et la période de suivi. Une succès complet indique par un PO1 postoperatif de 21 mmHg ou moins sans une thérapie médicale dans 50 yeux (56,2%). Succès qualifié, dans lequel le P) était 21mmHg ou moins avec une thérapie médicale supplémentaire figurant en 31 yeux (34,9%) et échec là où le POI était plus grande que 21 mmHg en dépit de soins médical en 8 yeux (8,9%). Le succès était atteint en 91,1% ayant un POI de 21mmHg ou moins, avec ou sans une thérapie médicale supplémentaire. Le facteur le plus statistiquement signifiant était les groupes d'âge dans lequel letaux du succès le plus élevé de 100% était realize dans le groupe d'âge de 20-29 ans. La différence entre le taux du succès entre les groupes d'âge était statistiquement signifiant ($x^2=8.04$, $p=0.01$). Les rabats conjonctivaux au base fornix étaient trouvés d'être associé par un taux du succès plus élevé de signifiant statistique (97,9%) par contre les rabats en base de « limbal' (85,4%) $x^2= 4,81$, $p = 0,03$. Le sexe masculin dans le groupe avait un taux de succès signifiquement plus élevé (97%) que la sexe féminine (78,3%), $x^2 = 5,86$, $p=0.011$. Parmi les malades de glaucome progressif, 100% taux du succès était noté, 86,1% dans le cas du glaucome congénital, et 33,3% dans le cas du glaucome secondaire. Tous ceux qui ont subi une deuxième trabeculectomies ont eu un glaucome congénital. La présence d'une bulle, même qu'il y avait un taux du succès plus élevé (93,4%) en comparaison avec l'absence d'une bulle (84,6%) n'était pas statiquement signifiant ($x^2 =1,19$, $p= 0,27$). Les complications de la chirurgie étaient plus éphémère.

Introduction

Trabeculectomy is reported to be more frequently successful in patients over the age of 40 years[1], most especially in patients over the age of 60 years[2,3] than in younger patients[4] . Studies on black patients have also shown a greater success in patients over the age of 60 years[5,6] . Drainage operations are more prone to fail in Negroes, due to excessive fibrosis in the subconjunctival tissues[7]. In view of the high risk of failure of trabeculectomy in young African patients. this study was initiated to report on the outcome of surgical intervention in the hands of certain surgeons on young Nigerians and to look at factors which may contribute to the poorer surgical prognosis associated with youth with a view to identifying ways of minimizing these factors.

Materials and methods

All patients under the age of 30 years who underwent trabeculectomy over a ten year period, January 1987 to December 1996 at the University College Hospital, Ibadan were included in the study. Information extracted from their case notes included: age, sex, type of glaucoma, number of years of glaucoma before surgery, eye involved, visual acuity pre operatively and post operatively. Intraocular pressures at presentation, pre operatively and post operatively were also recorded. Other data collected included pre operative antiglaucoma therapy, complications of surgery, presence of a filtering bleb and follow-up period post operatively. The technique of trabeculectomy was generally Watson's[8] modification of the Cairn's[9] technique and the Luntz modification[10].

An operating microscope was used in all cases for effective magnification and to minimize surgical trauma.The conjunctival flap was either fornix-based or limbal-based. The superficial scleral flap was mainly rectangular (5 x 4mm) but an occasional triangular flap (5 x 5) was used.

The deep block (3 x 3mm) was excised and a peripheral iridectomy was made. The superficial scleral flap was sutured with 8/0 virgin silk (2 for rectangular and 3 for triangular). The conjunctiva was also closed with 8/0 silk. Subconjunctival Gentamycin (20mg) and Depomedrol (0.3ml) were given into the inferior fornix followed by topical chloramphenicol and

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atropine drops and padding of the eye. Antimetabolites were not utilized in any of the eyes. Postoperative antibiotic, mydriatic and steroid drops were utilized.

All data were double entered using EPI-INFO. Statistical analyses were done with the Epi - Info analysis package. Chi squared test and t-test were used for the analysis of categorical and continuous data respectively.

Results

Out of 493 trabeculectomies performed over the 10 year period, 89 were performed on 56 young patients under the age of 30 years. All the cases were performed by Consultant Ophthalmologists. The youngest patient was 1 week old and the mean age for the 89 eyes was 14.4. years. The age ranges are seen on Table 1.

Table 1: Age range of young trabeculectomy patients

Age (years)	Number (Eyes)	% of total
0 - 9	30	33.7
10 - 19	25	28.1
20 - 29	34	38.2
Total	89	100%

There were 40 males and 16 females as 26 males and 7 females had both eyes done (in total 66 males and 23 females for the 89 eyes), a male to female ratio of 2.5:1.

The types of glaucoma are on Table 2, the commonest being developmental glaucoma (56.2%). The number of years glaucoma was diagnosed pre-operatively ranged from zero years (at birth) to 14 years with a mean of 0.42 + 1.63 (standard deviation). 94.4% of cases (84 eyes) had their surgeries within the first year of presentation. Of these, 74 cases (83.2% of total) had their surgery immediately after diagnosis i.e. primary surgical treatment. Presenting intraocular pressure (IOP) ranged from 12 – 70mmHg with a mean of 36.4mmHg. The eye with the 70mmHg IOP had a first postoperative day IOP of 9mmHg and at 12 months the IOP was recorded at 8mmHg with no additional therapy.

Table 2: Type of Glaucoma

	Number (Eyes)	Percentage
Congenital	36	40.4
Development	50	56.2
Secondary	3	3.4
Total	89	100%

Forty-nine eyes had fornix based conjunctival flaps while 40 had limbal based flaps. 83eyes (93.3%) had their surgery under general anaesthesia while only 6eyes (6.7%) were under local anaesthesia. This is because of the young age of most of the patients who are very anxious and uncooperative under local anaesthesia. 43 were right eyes, while 46 were left eyes. 75eyes (84.3%) had a subconjunctival bleb post-operatively while 12 had no bleb, there was no record on the remaining 2 eyes.

Postoperative complications are seen on Table 3, the commonest being increase intraocular pressure which was transient in most patients. 4 patients (4.5%) required repeat trabeculectomy to treat uncontrolled post-operative raised intraocular pressures and 31 patients (34.8%) required further antiglaucoma therapy. All the repeat trabeculectomies (4 eyes) were in patients with congenital glaucoma, a 3 month old patient and a 9 month old patient (both eyes).

Complete success, denoted by a postoperative IOP of 21mmHg or less without medical therapy occurred in 50 eyes (56.2%). Qualified success, in which IOP was 21mmHg or less with additional medical therapy occurred in 31 eyes (34.9%) and failure, in which IOP was greater than 21mmHg in spite of medical treatment occurred in 8 eyes (8.9%). Success was therefore achieved in 91.1% attaining an IOP of 21mmHg or less, with or without additional medical therapy.

Table 3: Complications of trabeculectomy

	Number	% of total
Transient increase in intra-ocular pressure	36	38.2
Shallow anterior chamber	4	4.5
Endophthalmitis	2	2.2
Choroidal detachment	1	1.1
Total	41	46%

Follow up of patients ranged from 1 month to 11 years with average of 3.03 ± 3.05 years, some patients abscunding soon after surgery. 71eyes (79.8%) had a follow up of over 1 year. Statistical analysis performed (Table 4) revealed the highest success rate in the 20-29 age group (100%) and the lowest success rate of 80% was recorded in the age group 10-19 years. The age group 0-9 years had a success rate of 93.3%. The difference in the success srate across the age groups was statistically significant ($x^2 = 8.04$, $p = 0.01$).

Comparing the sexes in the 89 eyes, males had a higher success rate of 97% while females were 78.3% successful, the difference in rates was statistically significant ($x^2 = 5.86$, $P = 0.011$). All the 50 eyes with developmental glaucoma had a successful outcome following surgery, while only one of the subjects with secondary glaucoma had a successful outcome.

Comparing conjunctival flaps, success rate was 97.9% for fornix based flaps, as opposed to 85.4% for limbal based flaps, the difference in rates was statistically significant ($x^2 = 4.81$, $P = 0.03$).

Table 4: Characteristics of patients and success rate

Characteristics	Success - Eyes	p-value
Age		
0 - 9	30 (93.3)	
10 - 19	25 (80)	0.01
20 - 29	34 (100)	
Sex		
Male	66 (97)	0.01
Female	23 (78.3)	
Bleb		
Present	75 (93.16)	0.27
Absent	12 (84.6)	
Type of Glaucoma		
Congential	36 (86.1)	
Developmental	50 (100)	0.00
Secondary	3 (33.3)	

Patients who had blebs had a higher success rate (93.4%) compared to those without blebs (84.6%). However, the difference was not statistically significant ($x^2 = 1.19$, $p = 0.27$).The mean preoperative years of all the patients was 0.42 ± 1.63 years. Comparing the mean pre-operative years and success rate, those who had a successful outcome had lower mean pre-operative years (0.26 ± 0.75) compared with unsuccessful outcome 2 ±

4.87. Statistical analysis was not done as the only patient with a long pre-operative period of 14 years had a failed surgery. All others were less than 4 years between diagnosis and surgery.

Discussion

The overall success rate of trabeculectomy in this series was 91.1% slightly lower than that of older patients in other series (93.2% [6], 95%[4]). This lower success rate in the youth may be due to various factors. According to Gressel et al[4], youth itself may be a determinant of surgical outcome because of anatomic factors, such as a greater thickness of Tenon's capsule which could impede filtration. Failure of filtering operations in most cases is related to wound healing[12,13], and wounds seem to heal more vigorously in youth than in later life.

The most statistically significant factor was age groups. The age group 20-29 years had 100% success rate while the lowest success rate was in the 10-19 year age group with a success rate of 80%.. In the study by Gressel et al on young patients[4] in 1984, the success rate for the 0-9 year age group was 0%, 10-19 year age group was 37% and 20-29 year age group was 38%.. The difference in success rates for the two studies could be due to an improvement in surgical technique and the use of the operating microscopes in recent times, which tremendously improves the accuracy of the surgical procedure. The reason for a much higher success rate in males (97%) as opposed to females (78.3%) is not fully understood as this has never been noted in previous studies on trabeculectomy in young patients.

The other statistically significant factor was the type of conjunctival flap. Fornix-based conjunctival flap had a success rate of 97.9% while limbal based flaps had 85.4%. It has previously been shown that fornix based comnjunctival flaps are more likely to give rise to diffuse blebs with a normal vascular pattern[14]. This may be more important in young patients who normally have thickened Tenon's capsule. Fornix-based conjunctival flaps cause the least disruption in the vasculature of the conjunctiva and so may be associated with a better control of intraocular pressure.

Although those who had blebs had a higher success rate (93.4 %) compared with those without blebs (84.6%), this was not statistically significant. This is at variance with previous studies[6,11] where success rate was significantly higher in the presence of a filtering bleb. The highest success rate of 100% was achieved in patients with developmental glaucoma, the lowest being in the secondary glaucoma (33.3%). Congenital glaucoma had a success rate of 86.1%. No real statistical analysis could be done on these as the number with secondary glaucoma were only 3 as opposed to 50 with developmental glaucoma. Further studies with larger sample sizes would probably show the relationship more clearly.

Follow up was reasonable in our patients as 71 eyes (79.8%) were followed up for more than a year. The average follow up was 3.03 years, the longest being 11 years.

In a study by Olurin in 1972[15], it was found that patients initially did well after surgery but in a few weeks, the IOP rose again and the drainage blebs scarred down, giving a final success rate of 70%. In the present study, most of the patients were followed up for over one year with a success rate of 91.1%.

Complications in this study were mostly transient, the commonest being increased intraocular pressure which resolved within the first few days after surgery. 4eyes had late uncontrolled increase in intraocular pressure and required repeat trabeculectomy to bring down the pressure. All the complications on Table 3 are well recognized complications of trabeculectomy [5,11,16].

In this study, we did not have to recourse to accessory surgical means such as excising Tenon's capsule [17,18], non-suturing, loose suturing, or minimal suturing of the scleral flap[16-19] as suggested by other authors for black eyes, to obtain the high success rate we achieved.

This study has been able to show that the age group 20-29 years have a higher success rate (100%) compared to older patients in previous studies[6,11]. .It has also been shown that fornix - based conjunctival flap is recommended for the younger Patients as this is associated with a higher success rate (97.9%) As opposed to the limba based flap (85.4%).

One of the most innovative factors in recent times is the use of the microscope and microsurgical instruments in ophthalmic surgery. It is advised that these should be used in trabeculectomy to minimize the surgical trauma which may lead to the failure of trabeculectomy in young patients.

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