

Original Research Article

Initial treatment of glaucoma in a rural eye clinic in Cameroon: surgery or medications.

Abstract

Objective : To report the outcome of one year follow-up after primary trabeculectomy with application of mitomycin-C in patient with primary open angle glaucoma in a rural Black West African population in Cameroon.

Patients and methods: Sixty six consecutive patients were enrolled in this retrospective study. Outcomes measured were post operative visual acuity, intra ocular pressure and complications at one year follow up. Absolute success was achieved when the IOP was ≤ 20 without adjuvant medication.

Results: Sixty tree records (57.14 % (n=3) males and 42.86% (n=27) females) were included in this study. The mean age was 56 ± 14 years. The pre operative NCVA was ≥ 0.2 in 73.01% of eyes (n=46). At one year follow-up visual acuity was stable in 79.36 % (n=50) eyes. The mean pre operative IOP was 34 ± 3.3 mm Hg, given a target IOP of 19.44 mmHg. The mean post operative IOP was 17.60 ± 4.70 mmHg . This was significantly lower than the target pressure ($p= 0.001$). Trabeculectomy was indicated at the first consultation in 76.20% (n=48) patients. The absolute success rate was achieved in 73,01% of cases. Post operative complications included: 7 intraocular inflammations, 3 early IOP elevation, 11 late IOP elevation, 12 cataracts and 1 endophtalmitis.

Conclusion: Trabeculectomy with anti metabolites despite potential limitations in follow-up, can be effective in reducing the risk of glaucomatous progression over long-term follow-up in Africa.

Keywords: *Primary open angle glaucoma, primary trabeculectomy, MMC, rural eye clinic*

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33 **Introduction**

34 Primary open angle glaucoma (POAG) , the most common form of glaucoma, is a real public
 35 health problem especially in Sub -Saharan countries where due to its early onset, and late
 36 diagnosis often results in blindness. Glaucoma is the second leading cause of blindness
 37 globally and the highest prevalence of open-angle glaucoma occurs in Africans Cook C [1]. In
 38 a population-based, cross-sectional study Budenz DL et al [2] found that the prevalence of
 39 primary open-angle glaucoma was 6.8% in an urban West African population in Ghana.
 40 Preussner PR et al [3] reported a prevalence of 8.2%. in a rural Cameroonian region.
 41 Glaucoma is often undiagnosed thus reveals itself mostly by its complications. The
 42 management of POAG lies essentially on the reduction of intraocular pressure by medical,
 43 physical or surgical means. Only early recognizing and treating affected subjects can reduce
 44 the glaucoma blindness. The aim of this study was to report the one year outcome of the
 45 trabeculectomy with Mitomycin-C (MMC) at a rural eye clinic in Cameroon

46 **Patients and Methods:**

47 Ninety nine consecutive patients with POAG who underwent the first trabeculectomy with
 48 Mitomycin-C (MMC) at Manna eye clinic Nkongsamba between 2007 and 2010 were eligible
 49 for this retrospective study. Thirty six patients were excluded from analysis because they did
 50 not complete at least a follow-up period of one year. Sixty six patients were enrolled in this
 51 study.

52 **Ophthalmologic Examination**

53 Pre operative evaluation included; non corrected visual acuity (NCVA) tested on decimal
 54 chart, intra-ocular pressure (IOP) taken by aplanation with Goldmann tonometer, papillary
 55 excavation evaluated by the indirect fundoscopy. The mean target IOP was obtained from the
 56 mean IOP using the Thierry Zeyen method [4]. The time frame between the diagnostic and
 57 the trabeculectomie was also analyzed. Postoperative data were collected at one week, 1
 58 month, 3 months 6 months and 1 year. At each visit VA, IOP, current medications and

complications were assessed. Follow-up was done in our clinic or by our outreach team in out stations. Worsening of VA was defined as a decrease of two lines of pre operative VA at the one year follow-up. Global success of the filtering surgery was defined after one year as an IOP ≤ 20 mmHg with or without adjuvant glaucomatous medications. Absolute success was achieved when the IOP was ≤ 20 without adjuvant medication. Failure was defined as an IOP higher than 20 mmHg despite topical treatment with anti glaucomatous medication.

Surgical Procedure

All procedures were performed by the same surgeon. After a peri bulbar bloc with 2% Xylocaine, a fornix –based temporal conjunctiva flap was made. The sclera was slightly cauterized. A piece of cotton saturated with 0,4mg/ml MMC was placed over the sclera for 5 minutes, and then irrigated with 40 ml saline. A 4x4 rectangular sclera flap, one half of the sclera thickness, was performed. Paracentesis was made temporally. After the trabecular meshwork excision and peripheral iridectomy, the sclera flap was sutured by 10.0 nylon (2 to 4 sutures). The anterior chamber was reformed with the saline through the paracentesis and at this moment, the filtration was tested and adjusted. Conjunctiva was sutured continuously with 8.0. vicryl suture. Sub conjunctival depot of Triamcinolone was given and the eye was patched under antibiotic- steroid ointment until following morning. Postoperative, patients received topical antibiotic-steroid combination 2 hourly for 3 days, then 3 times daily for one week. a Tropicamide was given twice daily for 3 days. Thereafter, topical AINS was given 3 times daily for 3- 4 months. Anti glaucomatous drugs was given according to the level of the IOP.

Statistical analysis

Data were analyzed using Epi-Info 3.5.1. Qualitative variables were presented as percentages (%) while quantitative ones as mean $\pm$ standard deviation. The Student T test was used to compare mean of quantitative variables. *P*-values less than 0.05 were considered statistically significant.

Results.

In the study period, a total of 2381 eye surgery were carried out in Manna eye clinic, among which 4.16%. (n=99) trabeculectomies for POAG. Data from 63 patients who completed a follow-up of one year were analyzed. There were 57.14 % (n=36) males and 42.86% (n=27) females. 63.49 % (n=40) underwent trabeculectomy within 3 months after the diagnosis. The

mean age at presentation was 56 ± 14 years ranged 12 to 79 years. The pre operative NCVA on the operated eye was ≥ 0.2 in 73.01% of eyes ($n=46$) while in the non operated eye, NCVA was >0.2 in 15.87% ($n=10$). At one year follow-up operated eye showed a stabilized visual acuity in 79.36 % ($n=50$) of cases and decreased in 20.64 % ($n=13$) of cases. The mean pre operative IOP was 34 ± 3.3 mm Hg, given a target IOP of 19.44 mmHg. The mean post operative IOP was 17.60 ± 4.70 mmHg at one year follow up. This was significantly lower than the target pressure ($p= 0.001$). The cup/disc ration was > 0.8 in 68.25% ($n= 43$) of patients with violations of the ISNT rule. Trabeculectomy was indicated at the first consultation in 76.20% ($n=48$) patients presenting with newly diagnosed (previously untreated) glaucoma in advanced stage. In 23.80% ($n=15$) surgery was indicated because of poor compliance to medical therapy. Trabeculectomy success included: global success 87,30 % ($n=55$), absolute success 73,01% ($n=46$), relative success 14,29% ($n=9$) . Failure accounted for 12.69% ($n=8$). Post operative complications included: 11,11% ($n= 7$) intraocular inflammation, 22.22% ($n=14$) IOP elevation (3 early and 11 late elevation), 19.04% ($n=12$) cataracts and 1.58 % ($n=1$) endophthalmitis.

Discussion

Trabeculectomy represents 5.70% of all surgical procedures in our clinic. This does not represent the total number of patients presenting an indication for surgery but only those who accepted the surgery and gave a signed consent form. Adekova BJ et al [5] reported a significant proportion of patient who, for various reasons refused glaucoma the surgery in Nigeria. The mean age at presentation of 56 ± 14 year is higher than 42.62 year reported by Ellong A et al [6] in the urban milieu in Douala. This suggests that in the rural areas glaucoma patient present too late in the eye services. Appropriate program for early detection and treatment of glaucoma in this area should be undertaken. In their study, Kyari F et al [7] showed that POAG may starts earlier and progresses more rapidly in Africans patients than in Caucasians. Therefore, screening for glaucoma should be started early between 20 to 30 years in African population. The male predominance presented in our study was also reported by other authors [2], this corroborates the fact that POAG is more frequent and has a faster evolution in men than in women. However, Ombwa Eballe A et al [8] reported females predominance in their study carried out in the gynecologic and pediatric hospital in Yaounde. In the current study the decreased in visual acuity was attributed to the lens opacity secondary

to the trabeculectomy. The work of Karlen ME et al [9] and Mermoud A et al [10] showed that visual acuity generally returned to its preoperative value after trabeculectomy. The primary goal in treatment of glaucoma is the lowering IOP to prevent further progression of the disease. This can be achieved either conservative by medical or physical means or by surgery. According to many authors [11,12] medical therapy is currently the first line of glaucoma treatment and trabeculectomy must be considered only after failure of medical and physical treatment. This can be explained in developed countries by the availability and accessibility of strongly effective new drugs such as prostaglandins. In our study, surgery was indicated at the first consultation in 66.66% (n=66) patients presenting with advanced glaucoma with a CD of more than 0.8. Balo KP et al [13] Gessesse GW [14] also advised trabeculectomy as the primary therapy in sub-Saharan countries for advanced glaucoma. Sherwood MB [15] advocated that filtration surgery provides better intraocular pressure control than medical treatment. Moreover, long-term side effects of topical administration of eye drop may affect the quality of life of the patient. In 33.02%, surgery was indicated because of poor compliance to medical therapy. Glaucoma is an asymptomatic disease. In the absence of clinical signs such as severe pain and decreased visual acuity, it is difficult to convince patients in rural areas to administer eye drop for the whole life. Socio-economical factors, lack of awareness, poor education and inadequacy of trained eye care personnel contributed to the late presentation. Similar findings were reported in Ethiopia by Giorgis AT [16]. In developed country, the first screening for glaucoma is done by the age of 40 when the patient needs the first reading glasses. In our milieu, shippers' reading glasses are available on the road side and everybody can get it without eye examination.

In the current study, MMC was used in all cases. Indeed, it was demonstrated that melanoderma and young age were risk factors for trabeculectomy failure. Mwanza JC [17] et al in Congo reported a high success rate of trabeculectomy with MMC. In our study, 0.4mg/ml of MMC was applied on the sclera for 5 minutes. Klos-Rola J et al [18] subjected that topical application of topical bevacizumab 5 mg/ml five times a day for 20 days might favor functional bleb formation after trabeculectomy in eyes with a high risk of failure. In a recent study on trabeculectomy, Hogewind BFT et al [19] found that the bleb failure rates for MMC and for sub-tenon injection of purified triamcinolone acetonide were comparable up to five years. Corticosteroid appears thus an appropriate alternative for antifibrotic agent. The use of MMC is more likely the cause of the case of endophthalmitis reported in this series. It appeared 12 weeks after the surgery. This rare late complication has also been reported by

Wallin O et al [20] who found 8 (0.7%) late infection with the use MMC in 1171 surgeries. Thirty six patients did not achieved one year follow-up. Some reasons for follow-up drop out were the raining season, farming season and sometimes the lack of careers or no improving in visual acuity. The mean preoperative IOP overall was significantly lower than the target pressure ($p=0.001$). In our series the global success rate (IOP<20 mmHg) at one year follow-up was 87.30%, of whom 14.28% with anti glaucomatous drugs. Ours result is similar to 81.1% reported by Komolafe OO et al [21] in Nigeria who performed the trabeculectomy with 5-fluorouracil using releasable suture technique. However, our success rate is lower than 93.75% and reported by Ellong A et al [22]. This difference could be due to their success criteria (IOP less than 21mmHg). Intraocular inflammation appears frequently after the trabeculectomy and continues until one month after the operation. It is mostly due to the opening of the anterior chamber and peripheral iridectomy which induce the rupture of hemato – aqueous barrier, causing the release of various inflammatory mediators, as well as the recruitment and stimulation of many cells of inflammation. This can lead to a transient early increasing in IOP. The postoperative intraocular hypertension is the result of decreased filtration through the newly formed filtration channel. Excessive conjunctiva fibrosis represented the main etiology for late IOP elevation. Cataracts accounted for 19.04% of complications in the current study. This finding is more than 8.5% reported by Bernadin P et al [23]. Cataract formation after trabeculectomy depends on the surgical technique, the patient age, and the presence of other cataractogenous factors (diabetic, higher myopia) and the pre existing lens opacity. The worsening in VA secondary to cataract formation can constitute a barrier for glaucoma surgery.

Conclusion:

This study suggest that trabeculectomy with MMC is effective in reducing the risk of glaucomatous progression over long-term follow-up in Africa. Surgery must be thus considered as the initial glaucoma treatment in Africa. Appropriate strategies must be developed to facilitate early detection and early surgery. However, the lack of Visual field and pachymetry data were the main limits of our study. We could not prove that the achieved post operative IOP was sufficient to stabilize the glaucoma.

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202 **CONSENT**

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204 Written informed consent was obtained after explaining the nature of the procedure from all
205 patients (or legal relatives) before surgery.

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207 **ETHICAL APPROVAL**

208 The study was approved by the national ethics committee (N° 125/CNE/SE/20010)

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