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## Research Article

### Effect of small incision cataract surgery (SICS) and intra ocular lens implantation in patients after previous successful trabeculectomy.

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#### Abstract

**Objective:** To assess the outcome of small incision cataract surgery (SICS) with posterior chamber lens implantation on patients with previous successful trabeculectomy for primary open angle glaucoma. **Patients and Methods:** Were viewed medical records of 25 consecutive patients in which, after a successful trabeculectomy for primary open angle glaucoma, small incision cataract surgery (SICS) with posterior chamber lens implantation was performed. Socio-demographics characteristics including age and gender as well as clinical variables: intraocular pressure (IOP), visual acuity (VA), operative complications of the cataract surgery, and the need for anti glaucoma medication were analyzed. Student's paired t-test was carried out to compare pre-operative and post-operative visual acuity (VA) and intraocular pressure (IOP). A simple linear regression was performed to find out the relationship between Post-operative IOP and the duration between trabeculectomie and cataract surgery. P-values less than 0.05 were considered statistically significant. **Results:** Twenty-fourth (25) patients were included in the study; fourteen males (56%) and eleven female (44%). The mean age was  $48.4 \pm 13.8$  years (range 21 to 77 years). The mean follow-up duration was  $11.32 \pm 6.38$  months (range 1 to 24 months). The duration between trabeculectomie and cataract surgery ranged from 2 to 40 months with mean of  $15.08 \pm 9.95$  months. The post-operative visual acuity in log MAR (mean= $0.58 \pm 0.33$ ) improved significantly ( $p=0.00$ ) compared to pre-operative visual acuity (mean= $1.15 \pm 0.21$ ). The average change in intraocular pressure (IOP) increased significantly ( $p=0.001$ ) from pre-operative ( $14.68 \pm 2.91$  mmHg) to post-operative ( $18.08 \pm 4.49$  mmHg). Worsening of glaucoma was observed in six patients (25%). Furthermore, Post-operative IOP decreased marginally with the duration between trabeculectomie and cataract surgery ( $p=0.048$ ). **Conclusion:** The results of this retrospective study indicate that SICS increases the risk of trabeculectomy failure and the need for antiglaucoma drugs. This risk is potentialized if the time between trabeculectomy and cataract surgery is shorter.

**Keywords:** cataract, glaucoma, small incision cataract surgery, trabeculectomy, bleb failure.

#### Introduction

Glaucoma represents a leading cause of preventable vision loss in Sub-Saharan Africa<sup>1</sup> Primary trabeculectomy with anti metabolites application is the most suitable glaucoma therapy

in Africans because of its efficacy, and problems encountered during medical therapy<sup>2</sup> Cataract is a well documented complication of trabeculectomy<sup>3,4</sup>. It can be due to direct damage

of the lens during the procedure or by other factors such as patient age and pre existing lens opacity or to the presence of other cataractogenous factors such as diabetic and myopia. The Advanced Glaucoma Intervention Study (AGIS) after adjustment for age and diabetes showed that, trabeculectomy increased the risk of cataract formation by 78%. [4] Its formation increases the patient's visual problems who may have already developed peripheral visual field loss. In their series, Manoj B et al reported that IOP was better controlled after phacoemulsification than ECCE in patients with previous filtration surgery<sup>5</sup>. The aim of the present study was to analyze the visual outcome of small incision cataract surgery (SICS) with posterior chamber lens implantation and its effect on intraocular pressure in patients after previous successful trabeculectomy

## Method

In this retrospective, non comparative, case series study, we reviewed medical records of 25 patients in which, after a successful trabeculectomy for primary open angle glaucoma, small incision cataract surgery (SICS) with posterior chamber lens implantation was performed from January 2008 to December 2013 at Manna Eye Hospital Nkongsamba, Cameroon. Informed written consent was obtained from all patients before surgery. The study protocol was approved by local ethical committee. All patients with cataract who needed anti glaucomatous drugs to control their IOP despite trabeculectomy and those with uncontrolled IOP despite trabeculectomy and anti glaucomatous drugs were excluded from this study. Data were collected on: (1) patient demographics, (2) disease history including: the time between the trabeculectomy and cataract surgery, operative complications of the cataract surgery, the follow up length and the need for anti glaucoma medication, (3) non corrected visual acuity (NCVA) tested on Snellen chart before and after the cataract surgery, (4) intra ocular pressure (IOP) taken by applanation with Goldmann tonometer, before and after the cataract surgery especially at the last follow up visit. Trabeculectomy failure was defined as an intraocular pressure of greater than 21 mm Hg with anti glaucoma drugs.

## Visual acuity definitions

Visual acuity was measured in this current study using letters on the Snellen chart and converted into log MAR units for statistical purposes. Non-numerical vision was arbitrary assigned a log MAR value so, counting finger (CF) = log MAR 1.70, hand motion (HM) = log MAR 2.00 intact light perception = log MAR 2.30, defect light perception = log MAR 2.70, and no light perception (NLP) = log MAR 3.00.

## Surgical technique

All procedure was performed by the same surgeon and the technique used was similar throughout the study. After the peri ocular anesthesia, a limbal peritomy was done at 2 hours meridian from the filtration bleb (Fig.1). Sclera incision of 5 mm long was made with a blade. After capsulorhexis and hydrodissection the nucleus of the lens was removed by means of a vectis, cortex remnants were washed out and aspirated with simcoe canula. Next, a posterior chamber lens was implanted into the capsular bag under viscoelastic. Surgery was concluded with the sub conjunctiva injection of corticosteroid and antibiotics. Usually no sutures were needed.

## Statistical analysis

Data analysis was performed using IBM-SPSS Version 21. Qualitative variables were presented as percentage (%). Since all continuous variables deviated significantly for normal distributions, they presented as median (Interquartile range, IQR). A related sample Wilcoxon signed rank test was used to compared median between pre and post operative variables (VA and IOP). Boxplot were used to graphically compare the distribution of variables. A simple linear regression was performed to find out the relationship between Post-operative IOP and the duration between trabeculectomy and cataract surgery; and also between age and post-operative intraocular pressure. P-values less than 0.05 were considered statistically significant

## Results

Baseline characteristics of the study population are summarized as Table 1. A total of 25 eyes (of 25 patients) underwent cataract surgery after a successful trabeculectomy for primary open angle glaucoma. There were 14 (66%) males and 11 (44%) females. The mean age was 48,  $36 \pm 13.75$  years. The median time between the trabeculectomy and the cataract surgery 15.08 months (ranged 2 to 40). The median follow up time was 11.32 months with a minimum of 1 month and the maximum of 24 month. The mean visual acuity increased significantly ( $P=000$ ) from log MAR  $1.15 \pm 0.20$  preoperatively to log

MAR  $0.53 \pm 0.32$  at the last follow up visit( Fig 2). Four patients did not show any changes in the VA. The mean IOP increased significantly ( $P=001$ ) from  $14.68 \pm 2.91$  mmHg to  $18.08 \pm 4.49$  mmHg at the last follow up visit (Fig 3). IOP decreases significantly with the time between trabeculectomy and cataract surgery ( $p=0.02$ ) (Fig 4). Each additional month leads to a decrease of IOP of  $0.18$  mmHg ( $p=0.02$ ). Worsening of IOP control was seen in 7 patients (28%). Anti glaucoma drugs were needed to control the IOP in 3 patients (12%). By four patients (16%) IOP was not controlled despite one or more anti glaucoma medications. Surgery complications included: one posterior capsule rupture with vitreous loss.

Table 1: Demographic and Clinical Characteristics of patients

<b>Age at presentation; Median (IQR)</b>	<b>47 (39-56.5)</b>
<b>Gender</b>	
Male, n (%)	14 (56)
Female n (%)	11 (44)
Pré operative Visual Acuity (logMAR); Median (IQR)	1.1 (1-1.3)
Post operative Visual Acuity (logMAR) Median (IQR)	0.5 (0.3-0.85)
Pre operative Intra ocular pressure (mmHg); Median (IQR)	15 (12-17)
Intra ocular pressure at the last follow up visit (mmHg); Median (IQR)	18 (15-20)
Time between trabeculectomy and cataract surgery (Months), Median (IQR)	12 (8-22.5)
Follow up duration(Months), Median (IQR)	10 (6-15)
Overall success (n %)	21 (84=21/25)
Absolute success (n %)	18 (85.7=18/21)
Bled failure (n %)	4 (16=4/21)

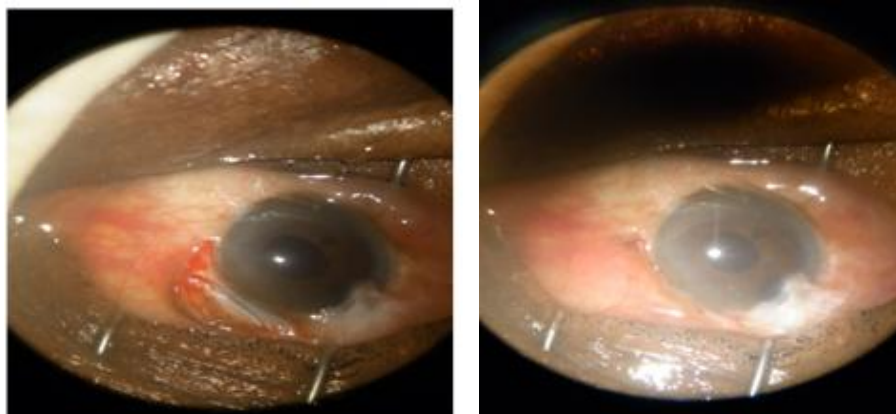
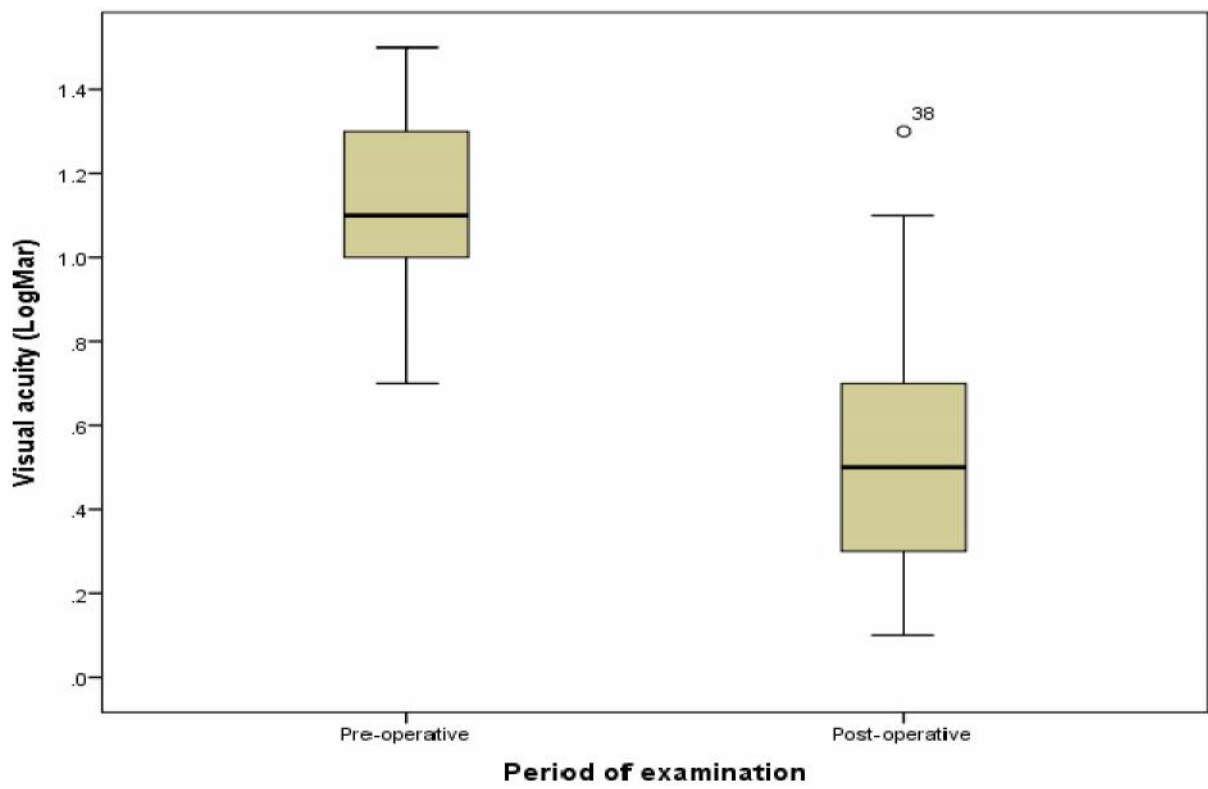
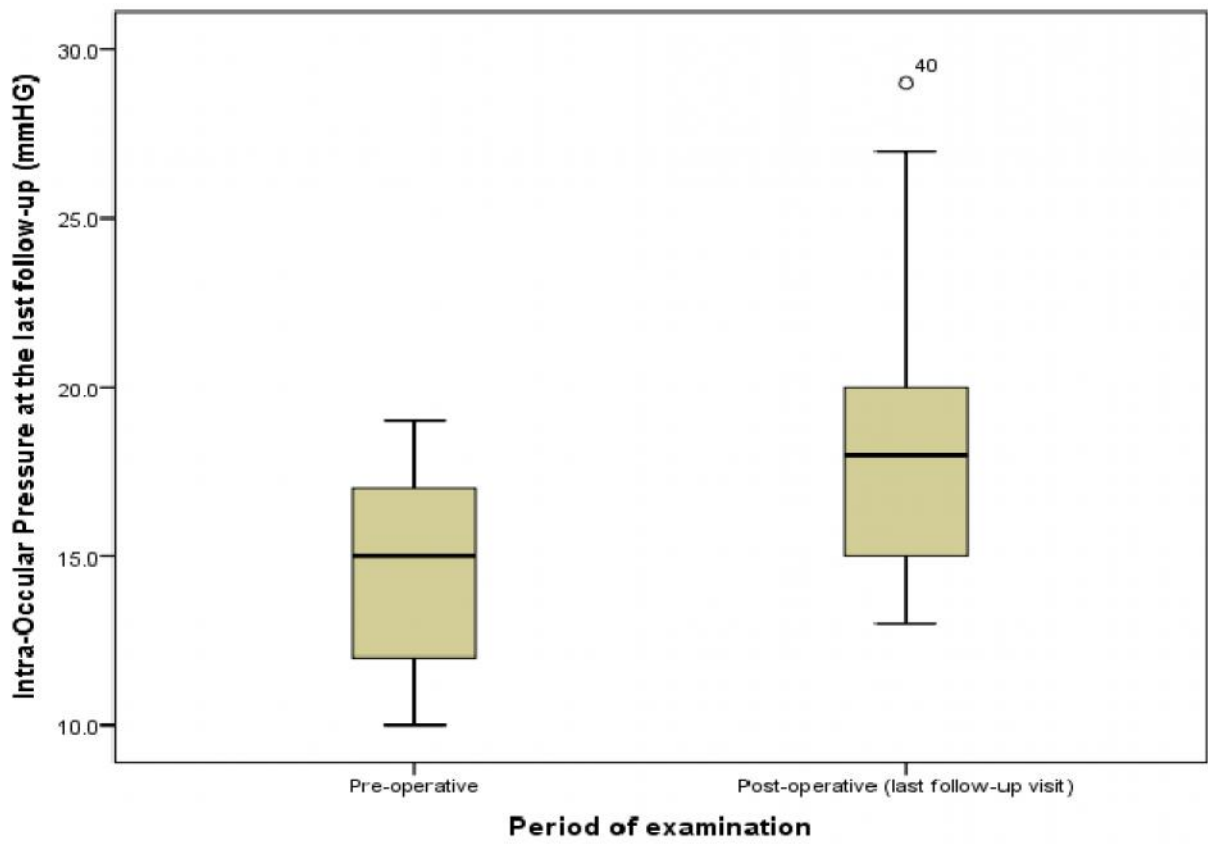


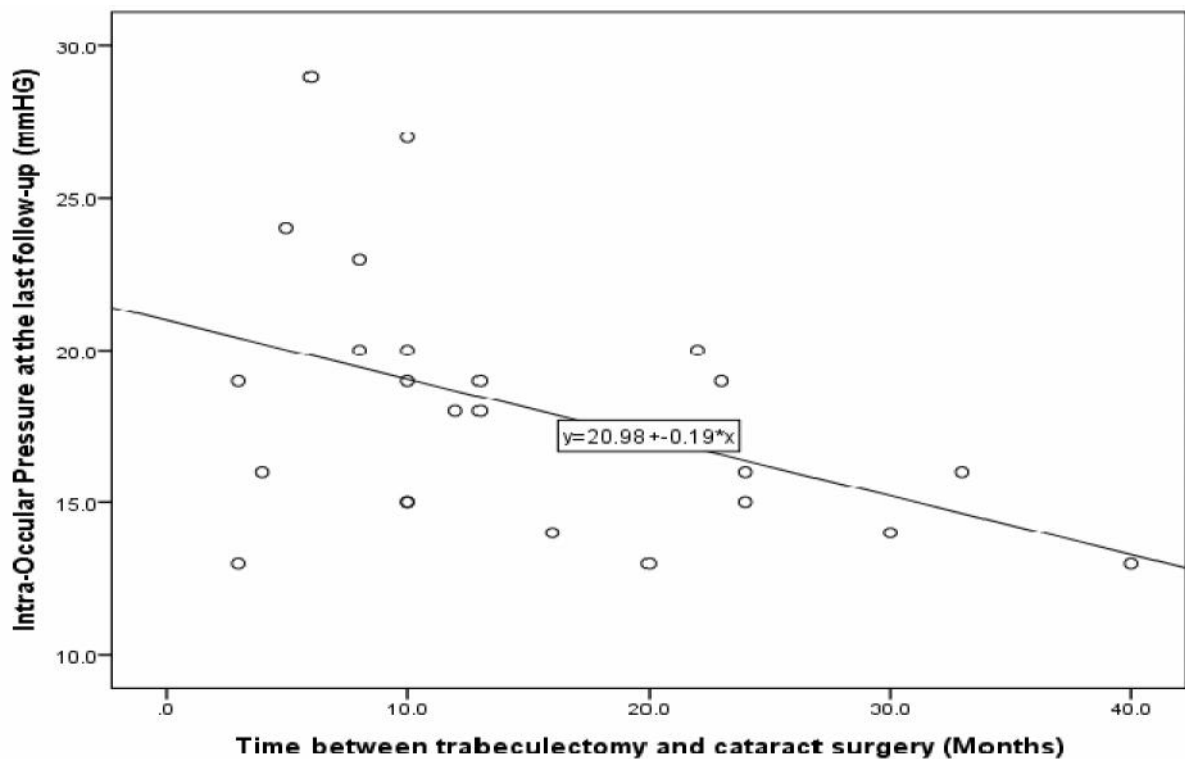
Fig.1 Small incision cataract surgery in trabeculectomized eye. A. limbal peritomy and corneo scleral tunnel, B end of the procedure.



**Fig. 2** Pres operative and post operative visual acuity.



**Fig. 3** Pres operative and post operative IOP



**Fig. 4** Relationship between Post-operative IOP and the time between trabeculectomy and cataract surgery

### Discussion

Small incision cataract surgery was carried out in twenty five patients who developed lens opacity after a successful trabeculectomy for primary open angle glaucoma. Patients included in our study are relative young (mean age was  $48.36 \pm 13.75$  years) to develop senile cataract. This suggests that trabeculectomy was the main risk factor for cataract formation. Reasons for male preponderance were unclear. Results of our study reveal that the median time between the trabeculectomy and the cataract surgery was 15.08 months (ranged 2 to 40). This was slightly similar to (14.4 months) reported by<sup>6</sup>, however shorter than 21.7 months reported by Husain et al who reported that shorter time was a risk factor of bleed failure<sup>7</sup>. Twenty one (84%) patients showed increased post-operative UCVA of one line or more. The mean visual acuity increased significantly from log MAR  $1.15 \pm 0.20$  preoperatively to log MAR  $0.53 \pm 0.32$  at the last follow up visit. Glaucoma damages were more likely to be the reason why in tree of our patients did not improve in visual acuity. It has been demonstrated that cataract surgery lowers IOP in eyes with POAG<sup>8</sup>. In reverse order cataract surgery may lead to poor outcomes particularly in

terms of the trabeculectomy failure. Mechanisms of bleb failure and IOP elevation after cataract surgery are not fully understood. However, It has been suggested that cataract surgery may lead to increased permeability of the blood-aqueous barrier, thereby facilitating the passage of inflammatory mediators that cause bleb fibrosis.<sup>9</sup> In this study, the mean IOP increased significantly ( $P=001$ ) from  $14.68 \pm 2.91$  mmHg to  $18.08 \pm 4.49$  at the last follow up visit. 72% achieved an absolute success (POI 20 without the need of anti glaucomatous drugs). This success can first be attributed to our technique (SICS) where the sclera cornea tunnel is done far from the bleb and secondly to our population who consisted of patients with controlled glaucoma. Our study reveals four cases (16%) of bleed failures. This finding is lower compared to 20, 58% reported by Manoj B et al<sup>5</sup> who evaluated the effect of classic ECCE on the IOP in trabeculotomized eyes. Risk factors of the loss of IOP control included: IOP higher than 15 mm Hg before cataract surgery<sup>10</sup>, the time frame between trabeculectomy and cataract surgery<sup>7</sup> and technique of cataract surgery. In patients subjected to phacoemulsification after previous

trabeculectomy bleed failure rate was very low<sup>11</sup> or did not happen at all<sup>10</sup>. Phacoemulsification can be considered as the best surgical technique when managing cataract in trabeculectomized eyes. Although cataract surgery with functioning blebs is challenging, a serious complication that occurred in our series was the posterior capsular rupture in one patient. This complication was the reason of no changing in visual acuity and uncontrolled IOP in one of our patient.

## Conclusion

The results of this retrospective study indicate that small incision cataract surgery (SICS) have little effect on mean IOP of patient with good functional bleb. SICS significantly improve visual acuity of this group of patient. Practitioner's ability to follow up glaucoma may also be improved. Therefore in the absence of phacoemulsification, SICS must be the technique of choice to manage cataract in patients with previous successful trabeculectomy. However a long term study is needed to ascertain these findings.

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