

Trabeculectomy Outcome in 56 Eyes of Primary Open Angle Glaucoma at Takeo Eye Hospital, Cambodia

Sophal HENG¹, Chheng Y HAM²

¹Khmer-Soviet Friendship Hospital, Cambodia
Email: dr.sophal[at]gmail.com

²University of Health Sciences, Cambodia
Email: dr.chhengy[at]gmail.com

Abstract: ***Purpose:** This study aims to find out the outcome of trabeculectomy in Primary Open Angle Glaucoma (POAG) in at least 6 months follow-up in terms of intraocular pressure reduction at Takeo Eye Hospital from January 1, 2013 to December 31, 2016. **Methods:** A retrospective study on 56 eyes (56 patients) with Primary Open Angle Glaucoma (POAG) which underwent trabeculectomy in patients who are over 40 years old were selected. Post-operative complete success was defined as IOP ≤ 21 mmHg without any antiglaucoma drug, qualified success was described as IOP ≤ 21 mmHg with medication, while failure was termed when IOP > 21 mmHg with medication. **Results:** There were 56 eyes (56 patients) were selected and came to the data analysis. Among 56 patients, there were 39 (69.64 %) female and 19 (30.36 %) males. Of the study population, the age ranges from 41 to 69 and we noticed that the group of patients who were in 51 to 60 years of age represented the biggest number 26 eyes (46.43 %). In total 56 patients, the greatest number of patients came from Takeo province (42.86 %) and the provinces or city nearby. At final visit, the study showed complete success rate was obtained in 25 eyes (44.64 %), qualified success achieved in 14 eyes (25 %), while other 17 eyes (30.36 %) failed. **Conclusion:** This retrospective study indicates a moderate success rate (44.64%) for trabeculectomy in terms of IOP outcome. Considering the potential for improved outcomes, combining antimetabolites into trabeculectomy protocols is recommended to improve surgical efficacy and enhance the quality of life of glaucoma patients in our country.*

Keywords: primary open-angle glaucoma, trabeculectomy, intraocular pressure

1. Introduction

Glaucoma is the second most common cause of blindness worldwide, and is the leading cause of irreversible blindness in the world. Primary open angle glaucoma (POAG) is the most prevalent type of glaucoma in the United States and affects about 2 % of individuals over age 40 [1, 2]. Blindness due to glaucoma in the US is estimated to cost over \$1.5 billion annually, and the problem is expected to increase as the population ages [3].

Glaucoma is a chronic, progressive optic neuropathy characterized by thinning of the neuroretinal rim of the optic disc [4]. It results in a characteristic appearance of the optic nerve head called cupping, and a corresponding loss of visual field. Importantly, the early symptoms of glaucoma can be quite subtle, and over half of individuals affected are not aware that they have the disease. Early recognition is important because the prognosis can be good if patients are diagnosed and treated appropriately early on in the disease process, but if left untreated it can progress to irreversible blindness [2].

Since the first description of trabeculectomy in 1968 by Carins and Watson from Addenbrooke's Hospital in Cambridge, United Kingdom, it has become the most widely used procedure in the surgical management of glaucoma [5, 6, 7].

In our study, the intention is to evaluate the outcome in terms of intraocular pressure reduction of trabeculectomy without antimetabolite in Primary Open Angle Glaucoma (POAG)

eyes at Takeo Eye Hospital, a rural eye hospital in the southwest of Cambodia where there are hundreds of patients come to find the low cost or free of charge eye examination and treatment services. Even Takeo Eye Hospital is a big NGO eye hospital that provides a huge number of surgeries, yet this hospital is still lack of some resources of modern or expensive medications such as antimetabolites which is a useful adjunctive medication for various ocular surgeries, especially trabeculectomy in glaucoma treatment. Based on the aforementioned reasons, our study named trabeculectomy outcome in primary open angle glaucoma at Takeo eye hospital from January 1, 2013 to December 31, 2016 was conducted.

2. Methods and materials

A retrospective study was conducted on eyes diagnosed with Primary Open Angle Glaucoma in patients older than 40 years who underwent trabeculectomy at Takeo Eye Hospital in Takeo Province, Cambodia, from January 1, 2013, to December 31, 2016. Takeo Eye Hospital, a prominent eye hospital and training center for ophthalmic professionals, facilitated the study. The subjects selected were Cambodian patients at least 40 years of age with Primary Open Angle Glaucoma who underwent trabeculectomy due to inadequate intraocular pressure reduction with anti-glaucoma medications. Within this period, a total of 56 eyes (56 patients) diagnosed with primary open angle glaucoma underwent trabeculectomy surgery at Takeo Eye Hospital in Takeo Province, Cambodia.

Volume 13 Issue 5, May 2024

Fully Refereed | Open Access | Double Blind Peer Reviewed Journal

www.ijsr.net

2.1 Inclusion criteria

- Cambodian patients with Primary Open Angle Glaucoma who are failed to reduce IOP with antiglaucoma drugs.
- Age > 40 years' old.
- Patient had undergone trabeculectomy by experienced surgeons at Takeo Eye Hospital

2.2 Exclusion criteria

- Secondary glaucoma.
- Bilateral trabeculectomy surgery
- History of eye injury or trauma.
- Necessity for a combined cataract procedure.
- Necessity for post-operative trabeculectomy revision in the period of follow up.
- Patients who were not able to follow-up up to 6 months.

2.3 Sampling technique

Within the study period, there were 87 trabeculectomy surgical cases done by two experienced surgeons at Takeo eye hospital identified from hospital database. We finally used convenience-sampling selection, which allowed us to select 56 patients (56 eyes) for this study.

2.4 Postoperative regimen and follow up

The postoperative regimen included topical atropine two times per day for the first week time, antibiotic and steroid were given up to 6 to 8 weeks and being tapered depending on degree of inflammation. After surgery, patients were visited at least 3 times during the first month, and monthly until at least 6 months. At each visit, intraocular pressure must had been obligatorily taken.

2.5 Postoperative success criteria

The postoperative success criteria of our study were graded into three types:

- Complete success: IOP \leq 21 mmHg without any antiglaucoma drugs.
- Qualified success: IOP \leq 21 mmHg with at least one antiglaucoma drug.
- Failure: IOP >21 mmHg with at least one antiglaucoma drug.

3. Results

Initially, there were 87 eyes (87 patients) with primary open angle had been undergone trabeculectomy by experienced surgeons identified from Takeo Eye Hospital database during this 4 year period. After reviewing those 87 patient files, we found only 56 eyes (56 patients) with complete data and these form the sample size of our study. Among 56 patients, there were 39 (69.64 %) female and 19 (30.36 %) males (Figure 01).

In the study population, the age ranges from 41 to 69 and we noticed that the group of patients who were in 51 to 60 years of age represent the biggest number 26 eyes (46.43 %), while

there were 14 eyes (25 %) and 16 eyes (28.57 %) in group of patients who were 40-50 and 61-70 years old, respectively (Figure 02).

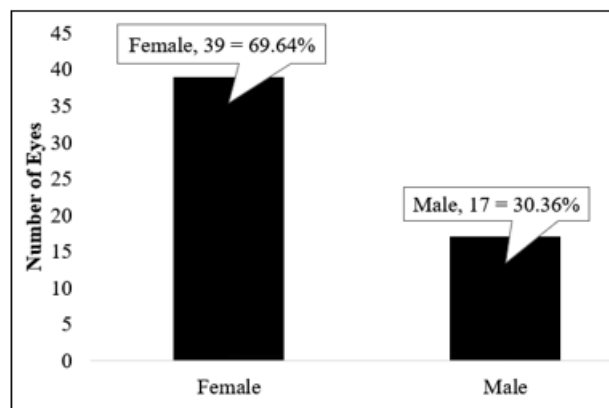


Figure 1: Gender distribution

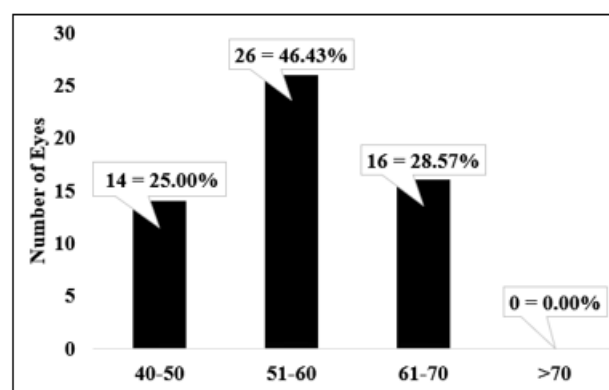


Figure 2: Age distribution

In total 56 patients, the greatest number of patients came from Takeo province and the provinces or city nearby such as Kampot, Phnom Penh, Kompong Speu and Kandal while the further provinces represented the smaller amount (Figure 03).

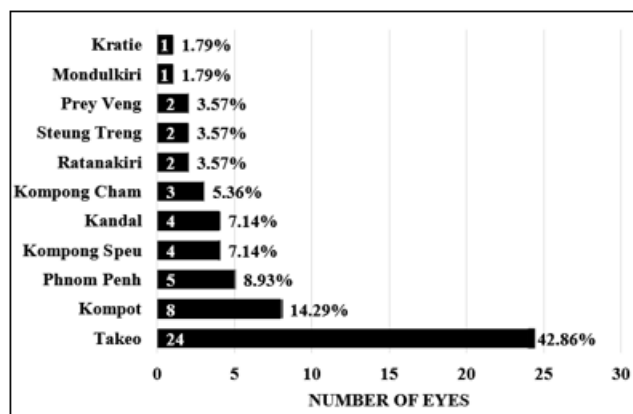


Figure 3: Geographic distribution

The study results revealed complete success rate was obtained in 25 eyes (44.64 %), qualified success was achieved in 14 eyes (25 %), and other 17 eyes (30.36 %) were failed (Figure 04).

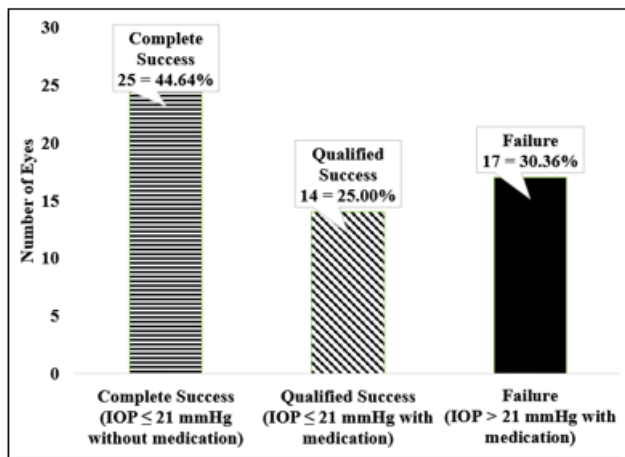


Figure 4: Trabeculectomy outcome by IOP

4. Discussion

Our study found there were 39 eyes (69.64 %) females and 17 eyes (30.36 %) males who received trabeculectomy without antimetabolite at Takeo Eye Hospital in the period of study. There is evidence that showed a greater number of women (55 %) than men are affected secondary to their greater longevity [8]. It is predicted that 2.79 million people will have primary open angle glaucoma in the United States in 2010. We only know the proportion of patients between the two genders from data of POAG patients who received trabeculectomy at Takeo Eye Hospital, yet the real percentage of population who live with POAG in Cambodia remains unknown due to study deficiency. There should be further study to find out the real number (Table 01).

Table 1: Gender proportion

References	Gender Proportion	
	Women	Men
Our Study	69.64%	30.36%
Quigley HA, Broman AT [18]	55%	45%

Trabeculectomy is the most commonly performed operation for the surgical treatment of glaucoma. During the last two decades, numerous studies have demonstrated this procedure to be relatively safe and effective for short- and long-term control of IOP [9-17]. It is associated with less early and late postoperative complications than is full-thickness filtering surgery, although it results in higher postoperative IOP [18-20]. Medically treated patients do not constitute a proper control population, because eyes undergoing surgery are generally eyes that have had previous medical treatment that failed to control the disease. There is evidence that with treatment, glaucoma progression is less likely to occur [21-24]. Long-term tonometry efficacy of trabeculectomy varies from 71 % to 98 %, depending on duration of follow-up and the criterion used for defining IOP control. Most authors have defined success as maintenance of the IOP below 21 or 22 mmHg.

The study results revealed complete success rate was obtained in 25 eyes (44.64 %), qualified success was achieved in 14 eyes (25 %), and other 17 eyes (30.36 %) were failed. There are numerous of studies showed similar success rate to ours while some had higher success rate (Table 02).

Törnqvist & Drolsum (1991) reported that the number of eyes controlled without further therapy 5 years into follow-up was 43 % in their POAG group [25]. For instance, not much far different results found in another study done by Mietz et al. (1999) reported complete success rates of trabeculectomy in POAG was 53 % [26]. Furthermore, another retrospective study recorded the successful intraocular pressure control after single operation was 48 % and 40 % at 3 and 5 years, respectively [27]. Additionally, Babel and Steiner reported long-term success of this operation without need of further therapy in 55 % of cases [28]. Sophon Nilkumhang, M.D (Thai) performed trabeculectomy in 17 eyes found 12 (70.59 %) eyes had complete success, 4 (23.53 %) eyes qualified success and the other 1 (5.88 %) failure [29]. Another group of studies from West Africa reported slightly different results. Chatterjee and Ansari (Ghana) demonstrated success rate up to 79 % [30]. Kietzman (Nigeria) reported 74 % of IOP control <21 mmHg without any anti-glaucoma drug [31]. Sanford-Smith (Nigeria) showed 65 % of success rate [32]. Thommy and Bhar (Nigeria) had 95.4 % success rate [33]. Verrey et al (Ghana) had 84 % of success rate [34]. Although the variation of success rate in each study was not clearly know, yet in a study conducted in Ghana in 2006 which had 88.46 % success rate, the authors believed that the differences in success rate in the same population were more likely to be due to surgical techniques rather than a gene pool phenomenon [35].

Table 2: Success rate of trabeculectomy without antimetabolite

Authors	Places	Follow-up	Success criteria	Success rate
Törnqvist & Drolsum	Sweden	5 years	IOP ≤ 21 mmHg	43 %
Mietz et al.	Germany	6-62 months	IOP ≤ 21 mmHg	53 %
Nouri-Mahdavi K et al	USA	3 years	IOP ≤ 20 mmHg	48 %
Babel and Steiner	Switzerland	1 year	IOP < 21 mmHg	55 %
Sophon Nilkumhang	Thailand	3 years	IOP < 21 mmHg	70.59 %
Chatterjee and Ansari	Ghana	1-12 months	IOP < 21 mmHg	79 %
Kietzman	Nigeria	>4 months	IOP < 21 mmHg	74 %
Sanford-Smith	Nigeria	?	IOP < 21 mmHg	65 %
Thommy and Bhar	Nigeria	6-19 months	IOP < 20 mmHg	95 %
Verrey et al	Ghana	6 months	IOP < 22 mmHg	84 %
M.E. GYASI, W.MK et al	Ghana	6 months	IOP < 22 mmHg	88.46 %
Our Study	Cambodia	6 months	IOP ≤ 21 mmHg	44.64 %

Even different success rate has been described from different studies, yet the exact reason for this problem remains unclear. Some authors believed the variation of success are more likely due to surgical technique [35], yet there are studies comparing limbal-based and fornix-based trabeculectomy found that there are no significant differences in the outcome of the surgeries [36]. On the other hand, limbus-based trabeculectomy appears to be more likely to develop bleb complications such as cystic bleb formation, hypotony and ocular infection [37].

Limitation of the study

Our study was limited by the following points:

- Sampling technique: convenient sampling.
- The missing of gonioscopy at baseline examination.
- IOP measurement was not taken by the Goldmann Applanation Tonometry which is the gold standard for IOP measurement in glaucoma.

- Pre and post-operative visual field and structural optic nerve damage were not evaluated.
- Small sample size (56 eyes)

Despite some limitations, our study also contains some strong points for the following reasons:

- The first study on outcome of trabeculectomy without antimetabolite in Cambodia.
- The technique was done by experienced surgeons that may not lead to a bias or inaccuracy in success rate.
- The study was conducted at Takeo Eye Hospital which is a big eye hospital among national eye hospitals in the country that performs the most eye surgeries for patients from all parts of the country.

5. Conclusion

This study revealed that trabeculectomy without antimetabolite had a moderate success rate which accounted for 44.64 % of our patients who underwent this surgical procedure at Takeo Eye Hospital archived the intraocular control without any medication a least 6 months follow up which is a comparable success rate to other studies internationally and to some studies in the region. Even the procedure without metabolite contributes a medium efficacy and safety in terms of IOP control, but the adjunction of antimetabolite during surgery is still a better way to improve the triumph based on various studies.

Even the trabeculectomy in our study was performed by experienced surgeon, but the success rate remains moderate (44.64 %). So, we would like to recommend all surgeons to improve the surgical technique such as adjunction of laser suture lysis or needle suture lysis post-operatively that lead to a higher success rate of trabeculectomy without antimetabolite.

Based on the results of our study compared to various studies conducted on trabeculectomy with antimetabolite proved the higher efficacy of antimetabolite adjunction, we highly recommend the eye hospitals should officially include the antimetabolite in their trabeculectomy procedure for a better result which is a main factor to improve the quality of life of glaucoma patients in our country.

References

- [1] American Academy of Ophthalmology (AAO). Primary Open-Angle Glaucoma PPP – 2015 AAO PPP Glaucoma Panel, Hoskins Center for Quality Eye Care. San Francisco, CA: American Academy of Ophthalmology; [updated NOV 2015, cited 2016 May 15].
- [2] Alward WL. Medical management of glaucoma. *N Engl J Med.* 1998; 339(18):1298-307.
- [3] Weinreb RN, Khaw PT. Primary open-angle glaucoma. *Lancet.* 2004 May 22; 363(9422):1711-20.
- [4] Kwon YH, Fingert JH, Kuehn MH, Alward WLM. Primary open-angle glaucoma. *N Engl J Med.* 2009 Mar 12; 360:1113-24.
- [5] Friedman DS, Wolfs RC, O'Colmain BJ, Klein BE, Taylor HR, West S, Leske MC, et al. Prevalence of open-angle glaucoma among adults in the United States. *Arch Ophthalmol.* 2004 Apr; 122(4):532-38.
- [6] Cairns JE. Trabeculectomy: preliminary report of a new method. *Am J Ophthalmol.* 1968; 66:673-9.
- [7] Watson PG. Trabeculectomy. A modified Ab. Externo technique. *Ann Ophthalmol.* 1970;2; 199-206.
- [8] Quigley HA, Broman AT. The number of people with glaucoma worldwide in 2010 and 2020. *Br J Ophthalmol.* 2006; 90:262-7.
- [9] Freedman J, Shen E, Ahrens M. Trabeculectomy in a black American glaucoma population. *Br J Ophthalmol.* 1976; 60:573-4.
- [10] David R, Freedman J, Luntz MH. Comparative study of Watson's and Cairns's trabeculectomies in a black population with open angle glaucoma. *Br J Ophthalmol.* 1977; 61:117-9.
- [11] Jerndal T, Lundstrom M. 330 consecutive trabeculectomies - a follow-up study through 1/2-3 years. *Acta Ophthalmol.* 1977; 55:52-62.
- [12] Wilson P. Trabeculectomy: long-term follow-up. *Br J Ophthalmol.* 1977; 61:535-538.
- [13] D'Ermo F, Bonomi L, Doro D. A critical analysis of the long-term results of trabeculectomy. *Am J Ophthalmol.* 1979; 88:829-35.
- [14] Thommy CP, Bhar IS. Trabeculectomy in Nigerian patients with open-angle glaucoma. *Br J Ophthalmol.* 1979; 63:636-42.
- [15] Mills KB. Trabeculectomy: a retrospective long-term follow up of 444 cases. *Br J Ophthalmol.* 1981; 65:790-5.
- [16] Inaba Z. Long-term results of trabeculectomy in the Japanese: an analysis by life-table method. *Jpn J Ophthalmol.* 1982; 26:361-73.
- [17] Watson PG, Grierson I. The place of trabeculectomy in the treatment of glaucoma. *Ophthalmology.* 1981; 88:175-96.
- [18] Lewis RA, Phelps CD. Trabeculectomy vs thermosclerostomy: a five-year follow-up. *Arch Ophthalmol.* 1984; 102:533-6.
- [19] Blondeau P, Phelps CD. Trabeculectomy vs thermosclerostomy: a randomized prospective clinical trial. *Arch Ophthalmol.* 1981; 99:810-6.
- [20] Spaeth GL, Poryzees E. A comparison between peripheral iridectomy with thermal sclerostomy and trabeculectomy: a controlled study. *Br J Ophthalmol.* 1981; 65:783-9.
- [21] Kolker AE. Visual prognosis in advanced glaucoma: a comparison of medical and surgical therapy for retention of vision in 101 eyes with advanced glaucoma. *Tr Am Ophthalmol Soc.* 1977; 75:539-55.
- [22] Quigley HA, Maumenee AE. Long-term follow-up oftreated open-angle glaucoma. *Am J Ophthalmol.* 1979; 87:519-25.
- [23] Odberg T. Visual field prognosis in advanced glaucoma. *Acta Ophthalmol Suppl.* 1987; 182:27-9.
- [24] Mao LK, Stewart WC, Shields MB. Correlation between intraocular pressure control and progressive glaucomatous damage in primary open-angle glaucoma. *Am J Ophthalmol.* 1991; 111:51-5.
- [25] Törnqvist G & Drolsum LK. Trabeculectomies. A long term study. *Acta Ophthalmol.* 1991; 69:450-4.

- [26] Mietz H, Raschka B, Kriegelstein GK. Risk factors for failures of trabeculectomies performed without antimetabolites. *Br J Ophthalmol.* 1999; 83: 814-21.
- [27] Nouri-Mahdavi K, Brigatti L, Weitzman M, Caprioli J. Outcomes of trabeculectomy for primary open-angle glaucoma. *Ophthalmology.* 1995; 102(12):1760-9.
- [28] Babel J, Steiner J. Six ans d'experience de l'iridectomie filtrante. *Ophthalmologica.* 1975; 170(2-3):146-9.
- [29] Sophon Nilkumhang. Comparison of trabeculectomy with and without mitomycin c in primary glaucoma. *Thai J Ophthalmol.* 2010; 24(1):1-9.
- [30] Chatteree S, Ansari MW. Microsurgical trabeculectomy in Ghana. *Br J Ophthalmol.* 1972; 56:783-7.
- [31] Kietzman B. Glaucoma surgery in Nigerian eyes: a five-year study. *Ophthalmic Surg.* 1976; 7:52-8.
- [32] Sandford-Smith JH. The surgical treatment of open-angle glaucoma in Nigerians. *Br J Ophthalmol.* 1978; 62:283-6.
- [33] Thommy CP, Bhar IS. Trabeculectomy in Nigerian patients with open-angle glaucoma. *Br J Ophthalmol.* 1979; 63:636-42.
- [34] Verry JD, Foster A, Wormald R, Akuamoah C. Chronic glaucoma in Northern Ghana: a retrospective study of 397 patients. *Eye.* 1990; 4:115-20.
- [35] Gyasi M, Amoaku W. Outcome of trabeculectomies without adjunctive antimetabolites. *Ghana Medical Journal.* 2006;40(2):39-44.
- [36] Shingleton BJ, Chaudhry IM, O'Domghue MW, Bayliss SL, King RJ, Chaudhry MB. Phacotrabeculectomy: limbus-based versus fornix-based conjunctival flap in fellow eyes. *Ophthalmology.* 1999; 106:1152-5.
- [37] Kohl DA, Cordeiro MF, Bunce C, Khaw PT. Cystic bleb formation and related complications in limbus-versus fornix-based conjunctival flap in pediatric and young adult trabeculectomy with mitomycin C. *Ophthalmology.* 2003; 110:2192-7.