

## Success Rate of Trabeculectomy in Primary Glaucoma at Cicendo Eye Hospital on January–December 2013

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### Abstract

**Background:** Trabeculectomy is a surgical therapy for glaucoma to preserve visual function by lowering intraocular pressure (IOP). In some studies, the success of trabeculectomy in lowering IOP is greater than medication. Success is defined by IOP <21 mmHg, with or without glaucoma medication. Primary glaucoma based on the mechanism of aqueous humor outflow is divided into primary open-angle glaucoma (POAG) and primary angle-closure glaucoma (PACG). This study aimed to know the success rate of trabeculectomy in POAG and PACG.

**Methods:** This study was a descriptive study conducted at Cicendo Eye Hospital using medical record of POAG and PACG patients who underwent trabeculectomy surgery on January–December 2013 with minimal one month follow-up. Data collection was conducted during September 2014. Data processed in this study were 100 eyes from 76 patients with diagnosis POAG and PACG.

**Results:** The success rate for trabeculectomy in POAG was 79% and PACG was 86%, failure (IOP ≥ 21 mmHg) 21% in POAG, and 14% in PACG for period 2013 at Cicendo Eye Hospital.

**Conclusions:** The success rate of trabeculectomy at Cicendo Eye Hospital is good in one month, with or without glaucoma medication after surgery. [AMJ.2016;3(1):110-4]

**Keywords:** Primary angle-closure glaucoma, primary open-angle glaucoma, trabeculectomy

### Introduction

Glaucoma is the second most leading cause of blindness in the world after cataract.<sup>1</sup> Glaucoma still become the global concern because early diagnosis is difficult to make and can cause permanent visual impairment. Most common type of glaucoma is primary open-angle glaucoma (POAG) and primary angle-closure glaucoma (PACG).<sup>2</sup> In 2013, 64.3 millions cases of glaucoma were estimated and 60% were in Asia, with POAG cases 54.3% and PACG 74.7%.<sup>3</sup>

The goal of glaucoma treatment is to preserve visual function by lowering intraocular pressure below a level that is likely to produce further damage to the optic nerve.<sup>4</sup> The most common surgical therapy for glaucoma is trabeculectomy. As increasing prevalence of glaucoma, trabeculectomy is needed to help reduce the number of blindness in the world. In some studies, the success of

trabeculectomy in lowering IOP is greater than medication.<sup>5</sup> Success is defined by IOP <21 mmHg with/or decrease of >30% IOP with or without glaucoma medication.<sup>6</sup> Success rate of trabeculectomy in POAG in England is 80% without medication.<sup>7</sup> In Indonesia, success rate of trabeculectomy in PACG at Cipto Mangunkusumo Hospital is 18.8% for success without medication and 68.8% for success with medication.<sup>8</sup> At Cicendo Eye Hospital, as a referral hospital, there has not been a recent study about the success of trabeculectomy, therefore, this research aimed to evaluate the success rate of trabeculectomy in POAG and PACG at Cicendo Eye Hospital in 2013.

### Methods

This was a descriptive retrospective study, using medical record from patients with POAG and PACG, who underwent trabeculectomy

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**Table 1 Characteristic of Respondents**

Characteristics	POAG	PACG	Total
Sex			
Male	16 (67%)	15 (29%)	31 (41%)
Female	8 (33%)	37 (71%)	45 (59%)
Age (years)			
Mean±SD	61±10	60±10	
Range	43-85	40-82	
Median	60	58	
Address			
Bandung	10 (42%)	16 (31%)	26 (34%)
Other Cities	14(58%)	36 (69%)	50 (66%)
Total	24 (100%)	52 (100%)	76 (100%)

Note: \* POAG: Primary Open-Angle Glaucoma; PACG: Primary Angle-Closure Glaucoma; SD: Standard Deviation

surgery from January to December 2013 at Cicendo Eye Hospital, Bandung, West Java, Indonesia. Data collection was conducted during September 2014 after permitted by Health Research Ethics Committee Faculty of Medicine Universitas Padjadjaran. Of 89 medical records, 76 patients (24 POAG and 52 PACG) were met in inclusion criteria which had minimal follow up for one month. The rests were excluded because incomplete follow up and the medical record cannot be accessed when collecting data. Of 76 patients, 100 eyes underwent trabeculectomy surgery (34 POAG and 66 PACG).

Data collected from medical record were sex; age; address; diagnosis; pre-operative

visual acuity; pre-operative IOP; one week, one month, three months post-operative IOP; and also the numbers of medication given after trabeculectomy surgery. The success rate was defined by IOP that is lower than 21mmHg with or without medication in one month after surgery. Failure was defined by IOP that is higher than 21 mmHg one month after surgery. Data were processed using Microsoft Excel and analyzed using statistical analysis program.

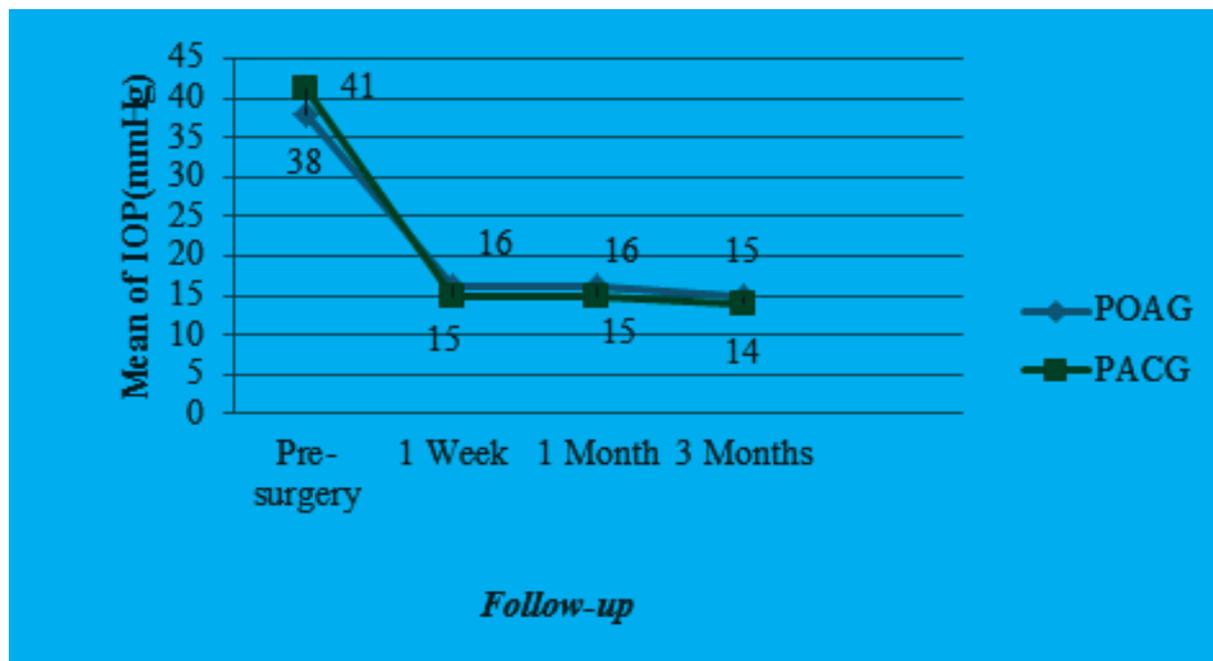
### Results

The characteristics in this research were sex, age, and address. Patients' characteristics

**Table 2 Subjects' Clinical Characteristics**

Characteristics	POAG	PACG	Total
Pre-operative Visual Acuity			
Normal ( 6/6–6/18)	10 (29%)	21 (32%)	31 (31%)
Visual impairment(<6/18–6/60)	6 (18%)	7 (11%)	13 (13%)
Severe visual impairment (<6/603/60)	0 (0%)	4 (6%)	4 (4%)
Blind (<3/60)	18 (53%)	34 (52%)	52 (52%)
Pre-operative IOP(mmHg)			
Mean ±SD	38±18	41±12	
Laterality			
OD	16 (47%)	36 (55%)	52 (52%)
OS	18 (53%)	30 (46%)	48 (48%)
Total	34 (100%)	66 (100%)	100 (100%)

Note: \* IOP: Intraocular Pressure; OD: Oculus Dextra(Right Eye); OS: Oculus Sinistra (Left Eye)



**Figure 1** Graphic of TIO from pre-surgery, 1 week after surgery, 1 month after surgery, 3 months after surgery

showed that males were more common in POAG and females were more common in PACG. Minimum age for patient was 40 years old with the mean age of 61 years old in POAG and 60 years old in PACG. The origin of patients were commonly from other cities than Bandung (Table 1).

Patients' characteristics of pre-operative visual acuity were mostly categorized as blind. Pre-operative IOP was higher in PACG with mean IOP 41 mmHg than POAG with mean IOP 38 mmHg (Table 2).

Figure 1 showed the decrease of IOP after trabeculectomy. The mean of IOP after surgery in PACG was slightly lower than POAG in one week, one month, and three months after surgery.

This study showed the success rate of trabeculectomy in POAG and PACG at Cicendo Eye Hospital in 2013 that was 79% and 86% (Table 3), yet, the success still needed glaucoma medication to control the IOP

after surgery (Table 4), mostly one item of medication (Table 5).

## Discussion

Primary glaucoma based on aqueous humor drainage mechanism was divided into primary open-angle glaucoma and primary angle-closure glaucoma; the ratio in Asia was higher in PACG than POAG, as mentioned in the study by Tham et al.<sup>3</sup> In this study, males were common in POAG and females were common in PACG.<sup>4,6,9</sup> The distribution of sex in some studies showed that there is no significant difference, but according to American Academy of Ophthalmology (AAO), females were more common in PACG, probably because of the shallow anterior chamber in female compared to male. Some studies also mentioned that males are common in POAG.<sup>6,10,11</sup> The distribution of POAG and PACG based on theory

**Table 3** Success Rate of Trabeculectomy (One month post-trabeculectomy)

IOP (mmHg)	POAG	PACG	Total
<21	27 (79%)	57 (86%)	84 (84%)
≥21	7 (21%)	9 (14%)	16 (16%)
Total	34 (100%)	66 (100%)	100 (100%)

**Table 4 Success Rate of Trabeculectomy With or Without Glaucoma Medication**

Success Rate	POAG	PACG	Total
Success without medication	4 (12%)	10 (15%)	14 (14%)
Success with medication	23 (67%)	47 (71%)	70 (70%)
Failure	7 (21%)	9 (14%)	16 (16%)
Total	34 (100%)	66 (100%)	100 (100%)

will increase with age, meanwhile, the mean of age in this study was 60 years old, same as the results in some studies in Asia that showed the mean age of glaucoma patients which above 50 years old.<sup>12</sup> Patients mostly came from other cities than Bandung to Cicendo Eye Hospital as National Eye Center. It can be one of the reasons to undergo trabeculectomy surgery for patients who live far from health facility to ease the accommodation and to get the best IOP result, to control the visual function. The same consideration was also mentioned in a study at Cipto Mangunkusumo Hospital.<sup>8</sup>

POAG and PACG patients who came to Cicendo Eye Hospital were categorized as blind (<3/60), based on WHO classification for blindness. In a study in Nigeria conducted by Adegbehingbe et al.<sup>13</sup> pre-operative visual acuity below 6/18 is 93%, and did not show any significant changes in follow up after surgery. The high blindness prevalence caused by glaucoma definitely will increase number of blindness in the world so that glaucoma becomes the second most leading cause of blindness in the world.<sup>1</sup> The mean of IOP in this study before surgery in POAG and PACG was 38 mmHg and 41 mmHg, high enough compared to other studies. A study in Singapore showed that the mean IOP is higher in PACG than in POAG (26 mmHg and 24 mmHg).<sup>14</sup> At Cipto Mangunkusumo Hospital, the mean of pre-operative IOP is 29 mmHg.<sup>8</sup> The higher IOP in PACG may be caused by shallow anterior chamber.<sup>4</sup> Based on Kanski, usually the pre-operative IOP in PACG patients will be higher

than POAG between 50–100 mmHg.<sup>15</sup> Post surgery mean IOP in this study was slightly lower in PACG, as mentioned by Mahar that mean IOP in PACG is 12.17±7.23 and in POAG is 12.83±5.71.<sup>16</sup> In a study by Tabassum et al., the decrease of mean IOP after surgery is 15.78 mmHg and effective to control IOP in one year.<sup>17</sup>

In this study, the success rate of trabeculectomy in POAG and PACG was 79% and 86%, but it still needed glaucoma medication to control IOP. The success rate in POAG with medication was 67%, without medication was 12%, and success rate in PACG with medication was 71%, without medication was 15%. In Indonesia, a study conducted at Cipto Mangunkusumo Hospital showed that success rate of trabeculectomy in PACG with medication is 68.8% and without medication is 18.8%.<sup>8</sup> In Malaysia, success rate for trabeculectomy (6 months post trabeculectomy) in POAG with medication is 12.2%, without medication is 85.1%, and in PACG, success rate with medication is 22.2%, without medication is 72.2%.<sup>18</sup> Success rate of trabeculectomy in England without medication is 80%.<sup>7</sup> Failure of trabeculectomy can be caused by the length of use of glaucoma medication before surgery and also by extensive scar in conjunctiva and thin sclera, because it might increase fibroblast and inflammatory cells which cause scar after surgery.<sup>19,20</sup>

In conclusion, the success rate of trabeculectomy in POAG and PACG at Cicendo

**Table 5 Medication Given to POAG and PACG Patients after Surgery**

Number of Medication	POAG	PACG	Total
Without medication	5 (15%)	10 (15%)	15 (15%)
1 item	17 (50%)	29 (44%)	46 (46%)
2 items	12 (35%)	25 (38%)	37 (37%)
3 items	0 (0%)	2 (3%)	2 (2%)
Total	34 (100%)	66 (100%)	100 (100%)

Eye Hospital from January to December 2013 is good in one month follow up. Limitation in this study is the limited time to collect data. Suggestions for further studies, it will be better if the length of follow up is longer to evaluate the long term success rate of trabeculectomy and to increase the numbers of data collection by increasing the duration of study.

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