



Intraocular Pressure Profile After Trabeculectomy Surgery at Waled General Hospital 2022

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Abstract: This study aims to describe the intraocular pressure profile after trabeculectomy surgery at RSUD Waled during the period from January 1 to December 31, 2022. This study used an observational research design with a retrospective descriptive approach and a total sampling technique. Univariate data analysis was used to describe distribution of the results. A total of 66 patients underwent trabeculectomy surgery. The most common age group was early elderly (46-55 years) with 26 patients (39,4%). The majority were female (59,1%), and the most common diagnosis was primary open-angle glaucoma (POAG) with 30 patients (45,4%). The IOP profile after trabeculectomy showed that the majority achieved qualified success (IOP \leq 21 mmHg with medication) in 48 patients (72,7%), followed by failure (IOP $>$ 21 mmHg) in 10 patients (15,2%), and complete success (IOP \leq 21 mmHg without medication) in 8 patients (12,1%). Trabeculectomy surgery patients at Waled Hospital in 2022 based on type of glaucoma were found mostly POAG (primary open angle glaucoma with the most intraocular pressure achieving qualified success (IOP \leq 21 mmHg with medication).

Keywords: Intraocular Pressure (IOP), Glaucoma, Trabeculectomy, RSUD Waled.

Introduction

Glaucoma is an optic neuropathy characterized by degeneration of retinal ganglion cells and the retinal nerve fiber layer (Budiono et al, 2013). This degeneration causes narrowing of the optic disc, thereby limiting the field of vision and causing vision loss that can progress to blindness (Lee et al, 2020). Globally, glaucoma is the second leading cause of blindness after cataracts. According to the (Kementarian Kesehatan Republik Indonesia, 2019) in the Ministry of Health's Data and Information Center on the Situation of Glaucoma in Indonesia, it is predicted that 76 million people will suffer from glaucoma in 2020, and that number is expected to increase to 111.8 million by 2040. In Indonesia alone, there were 80,548 new cases of glaucoma in 2017, with 10% experiencing bilateral blindness (Switania, 2019). Data from the Rapid Assessment of Avoidable Blindness (RAAB) for 2014-2017 in (Rif'Ati et al, 2021) shows that West Java Province ranks second in Indonesia with 180,666 people experiencing blindness. A study (Primanagara & Tyas, 2016) mentions the

prevalence of glaucoma according to RISKESDAS, which shows that Cirebon ranks second in West Java with a prevalence of 13.5%.

Trabeculectomy is the gold standard surgical therapy for glaucoma that is not controlled by medical treatment (Adiningsih & Setyoningsih, 2023). This procedure is performed to reduce intraocular pressure (IOP) because it is the only modifiable risk factor (Guzman & Roy, 2023). The 11th World Glaucoma Association Consensus on Glaucoma Surgery (Robert et al, 2019) states that trabeculectomy outcomes can be categorized as: (1) Complete success if IOP ≤ 21 mmHg without medication; (2) Qualified success if IOP ≤ 21 mmHg with medication; and (3) Failure if IOP > 21 mmHg despite maximal tolerated medical therapy and requires further surgery. Trabeculectomy performed at Melaka Hospital in Malaysia according to (Hah et al, 2012) resulted in significant success in reducing IOP in glaucoma patients. A study conducted at Dr. M. Djamil General Hospital in Padang by (Syauqie & Ilahi, 2018) reported a fairly good success rate for trabeculectomy, with the following details: IOP ≤ 21 mmHg without treatment was 43.8%, IOP ≤ 21 mmHg with treatment was 41.9%, and IOP > 21 mmHg was 14.3%.

A study on the characteristics of increased intraocular pressure at Waled General Hospital in 2022 by (Sutanto et al, 2023) found that the number of glaucoma patients was quite significant, with types of glaucoma including primary open-angle glaucoma (POAG) in 118 patients (57%), followed by primary angle-closure glaucoma (PACG) in 60 patients (29.1%), secondary glaucoma in 25 patients (26.1%), and other types of glaucoma in 3 patients (1.5%). Due to the high prevalence of glaucoma in Cirebon, this study was conducted to provide local data on the results of trabeculectomy at Waled Regional General Hospital and to provide insight into the results of intraocular pressure management with trabeculectomy so that it can be used as a reference for clinical practice in glaucoma.

Methodology

This study was conducted from June to July 2024. It was designed using an observational design with a retrospective descriptive approach. Data were obtained from research instruments in the form of patient medical records at the Waled Regional General Hospital Eye Clinic from January 1 to December 31, 2022, using total sampling. The inclusion criteria for this study were glaucoma patients who underwent trabeculectomy at Waled Regional General Hospital in 2022 and had medical records with IOP control 1 month after trabeculectomy. The exclusion criteria for this study were patients with trabeculectomy complications such as open trauma, corneal ulcer, corneal abrasion, astigmatism, and pterygium. Univariate analysis was performed in this study to determine the frequency distribution of sample characteristics, including age and gender, type of glaucoma, and intraocular pressure patterns after trabeculectomy surgery. This study has been declared ethically approved by the Waled General Hospital Ethics Committee through letter number 000.9.2/040/KEPK/V/2024.

Result and Discussion

There were 206 glaucoma patients, 69 of whom underwent trabeculectomy surgery. All 69 patients met the inclusion criteria. However, 3 patients were excluded due to complications such as a history of eye trauma in one patient and pterygium in the other two patients. Therefore, the final sample for this study was 66 patients. The 66 patients underwent only one trabeculectomy surgery during the study period, so the operated eye was considered to represent each patient as a sample for this study.

Table 1. Sample Distribution Based on Age

Age	Frequency (n)	Percentage (%)
Early adulthood (26-35 yo)	Number 0	Number 0
Late Adulthood (36-45 yo)	4	6.1
Early Old Age (46-55 yo)	26	39.4
Middle Old Age (56-65 yo)	20	30.03
Old Age (>65 yo)	16	24.2
Total	66	100

Table 1 shows that patients who underwent trabeculectomy at Waled Regional General Hospital in 2022 were mostly in the early elderly group (46-55 years old) with 26 patients (39.4%), followed by the late elderly group (56-65 years old) with 20 patients (30.3%). The smallest number of patients was in the late adult group (36-45 years old), with only 4 patients (6.1%). The youngest patient was 42 years old, while the oldest was 76 years old. The average age of patients at the time of surgery was 58-59 years old (age range 56-65 years old).

Table 2. Sample Distribution Based on Gender

Gender	Frequency (n)	Percentage (%)
Male	27	40.9
Female	39	59.1
Total	66	100

Table 2 shows that among patients who underwent trabeculectomy at Waled General Hospital in 2022, there were more female patients, namely 39 patients (59.1%), than male patients, namely 27 patients (40.9%).

Table 3. Sample Distribution Based on Glaucoma Type

Glaucoma Type	Frequency (n)	Percentage (%)
POAG	30	45.4
PACG	24	36.4
Glaukoma Sekunder	12	18.2
Total	66	100

Table 3 shows that of the 66 patients, Primary Open Angle Glaucoma (POAG) was the most common with 30 patients (45.4%), followed by Primary Angle Closure Glaucoma (PACG) with 24 patients (36.4%), and the least common type was secondary glaucoma with 12 patients (18.2%).

Table 4. Overview of IOP After Trabeculectomy Surgery

IOP Overview	Frequency (n)	Percentage (%)
Complete Success (IOP \leq 21 mmHg without medication)	8	12.1
Controlled Success (IOP \leq 21 mmHg with medication)	48	72.7
Failure (IOP \leq 21 mmHg without medication)	10	15.2
Total	66	100

Table 4 provides an overview of intraocular pressure after trabeculectomy surgery. The most common outcome was qualified success (IOP \leq 21 mmHg with treatment) in 48 patients (72.7%), followed by failure (IOP $>$ 21 mmHg) in 10 patients (15.2%), and the least common was total success (IOP \leq 21 mmHg without medication) in 8 patients (12.1%). The lowest intraocular pressure one month after trabeculectomy surgery was 13.7 mmHg, while the highest was 31.3 mmHg.

Discussion

Based on Table 1, the largest number of patients were in the early elderly age group (46-55 years) with 26 patients (39.4%), followed by the late elderly age group (56-65 years) with 20 patients (30.3%), the elderly age group (56-65 years) with 16 patients (24.2%), and the fewest in the late middle-aged group (36-45 years) with 4 patients (6.1%). These findings are consistent with the (Asia Pacific Glaucoma Society, 2016), which states that increasing age is a consistent risk factor for glaucoma requiring trabeculectomy, regardless of whether it is primary open-angle glaucoma (POAG), primary angle-closure glaucoma (PACG), or secondary glaucoma. Radilia et al (2023) reported similar findings with an average age of 58 years and a median age of 59 years, with an age range of 40 to 82 years. Gustianty et al (2016) obtained similar results in their study on conventional trabeculectomy, with the average age at surgery ranging from 61 to 62 years, similar to this study. Christine et al (2021) reported consistent findings, with an average age of 58.3 years among glaucoma patients undergoing trabeculectomy. At this age range, the risk of glaucoma increases because the angle of the anterior chamber narrows due to lens thickening, which can potentially cause aqueous humor accumulation (Chiu et al, 2022). Additionally, (Wirayudha et al, 2019) explained that aging can cause a decrease in endothelial cells in the trabecular meshwork, disrupting the outflow of aqueous humor and potentially increasing intraocular pressure, thereby contributing to the development of glaucoma.

Based on Table 2, females were the most common gender, with 39 patients (59.1%), while males numbered 27 patients (40.9%). This is consistent with a study by (Wirayudha et al, 2019), which reported that 54% of glaucoma patients undergoing trabeculectomy were female. Research by (McMonnies, 2017) shows that women have a higher incidence of glaucoma than men, possibly due to their longer lifespan. Radilia et al (2023) found that women have a predisposition to a shallower anterior chamber compared to men, which can cause angle closure and increased intraocular pressure. Additionally, (Vajaranant et al, 2010) explained that changes in sex hormones in women may contribute to increased intraocular pressure and vascular resistance, leading to glaucoma.

Based on Table 3, primary open-angle glaucoma (POAG) was the most common diagnosis with 30 patients (45.4%), followed by primary angle-closure glaucoma (PACG) with 24 patients (36.4%), and the least common was secondary glaucoma with 12 patients (18.2%). In their study, (Ichsan et al, 2018) reported similar findings where the most common diagnosis besides POAG was PACG in patients requiring trabeculectomy. The distribution of trabeculectomy surgery with primary glaucoma as the most common diagnosis, followed by secondary glaucoma, is consistent with the prevalence of each type of glaucoma (Dewi et al, 2023).

Table 4 shows that most patients achieved controlled success (IOP \leq 21 mmHg with medication) with 48 patients (72.7%), followed by failure (IOP $>$ 21 mmHg) with 10 patients (15.2%), and the least common was complete success (IOP \leq 21 mmHg without medication) with 8 patients (12.1%). These results are consistent with (Pristiawati & Rahmi, 2020), who reported the success rate of trabeculectomy at Dr. Kariadi General Hospital in Semarang in 2020. Different results come from (Syauqie & Ilahi, 2018) with a higher percentage of complete success, with TIO \leq 21 mmHg without medication at 43.8%, TIO \leq 21 mmHg with medication at 41.9%, and TIO $>$ 21 mmHg at 14.3%.

Trabeculectomy remains one of the most reliable procedures in glaucoma management (Vastardis et al, 2021). Even the study by (Maulida et al, 2021) emphasizes that trabeculectomy is still capable of significantly reducing intraocular pressure in cases of glaucoma with complications.

Conclusion

In a study of 66 patients who underwent trabeculectomy at Waled General Hospital in 2022, the majority of patients were in the early elderly group (46-55 years) and late elderly group (56-65 years) with females being the most common gender, and POAG being the most common type of glaucoma. The most common outcome was controlled success (TIO \leq 21 mmHg with treatment). These findings reinforce the role of trabeculectomy as an effective treatment option when medical therapy is inadequate. This study has several limitations because it is descriptive approach and therefore cannot establish causal associations. It also relies on retrospective medical records which may introduce bias due to incomplete or inaccurate documentation. Further studies are needed to identify specific risk factors that contributes to a decreased intraocular pressure after trabeculectomy.

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