

ORIGINAL ARTICLE

Outcomes and Complications of Ahmed Glaucoma Valve Implantation at Dr. Yap Eye Hospital

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ABSTRACT

Introduction and Objectives: Glaucoma drainage device is widely used in glaucoma surgery. Ahmed Glaucoma Valve (AGV) implant is one of the most used glaucoma drainages with a low incidence of complication. This study aimed to evaluate the outcomes and complication of Ahmed Glaucoma valve implantation in patients with refractory glaucoma at Dr Yap Eye Hospital

Methods: Medical records of 30 patients (30 eyes) who had AGV implant surgery at Dr Yap Eye Hospital from January 2014 to October 2016 were reviewed. Pre-operative data include age, gender, eye laterality, type of glaucoma, visual acuity, and intraocular pressure and. The IOP, visual acuity (VA), and complications were measured at day 2, day 7, 1 month, 3 months, and 6 months. The postoperative complications were documented.

Results: The mean IOP at baseline was 45.78 ± 13.04 mmHg, decreased after the operation to 14.41 ± 9.86 mmHg at day- 2 and 17.6 ± 14.6 mmHg at 6 months follow up. The mean initial VA was 2.47 ± 0.56 and unchanged 2.4 ± 0.74 , at last, follow up. Early postoperative complications (0-3mos) were flat anterior chamber (4 eyes, 13%), hyphema (4 eyes, 13%), and tube exposure (4 eyes, 13%). The late postoperative complication (after 3 mos) was tube exposure (1 eye, 3%), bullous keratopathy (1 eye, 3.3%), and dislocation of the implant (1 eye, 3.3%). The rang of tube exposure onset was 49-235 days (mean 99.5 ± 90.54 days) after implantation. Flat anterior chamber and hyphema could be successfully managed conservatively while tube exposure needed surgical repair. Three cases of tube exposure required explantation. Endophthalmitis was detected in one case of tube exposure.

Conclusion: AGV implantation appears to be a safe and effective surgical option in patients with refractory glaucoma.

Keywords : *Ahmed glaucoma valve, refractory glaucoma, visual acuity, postoperative complications*

Glaucoma is one of the causes of irreversible blindness throughout the world. World Health Organization (WHO) estimated the number

of glaucoma disease is 60.7 million people in 2010 and will rise to 79.4 million people in 2020.¹ In 1996, Indonesian Ministry of Health conducted eye health survey and

found that glaucoma was the second biggest cause of blindness after cataract with a prevalence of 0.20%.

Neovascular glaucoma, uveitic, angle recession, and another secondary glaucoma, defined as refractory glaucoma, usually they are unresponsive to medical treatment or conventional glaucoma surgical procedures.³ Various surgical approaches have been proposed for refractory glaucoma such as trabeculectomy with adjunctive anti-metabolites, cyclodestructive procedures, and glaucoma drainage devices.⁴

Glaucoma Drainage Devices have proven to be more efficacious in reducing intraocular pressure (IOP) in refractory glaucoma.⁵ The development of drainage implants allows the reduction (or avoidance) of complications.⁶ There are 4 major devices available: the Molteno, Baerveldt, Krupin, and Ahmed. The Molteno and Baerveldt are non-valved implants, while the Krupin and Ahmed are valved.⁷

The Baerveldt Glaucoma Implant and the Ahmed glaucoma valve are the most common types of devices used worldwide.⁸ Ahmed Glaucoma Valve is a venturi-based, flow-restrictive valve designed to reduced postoperative hypotony and its complications. However, there have been reports of high rates of encapsulation and ocular hypertension associated with this device, as well as an increased requirement for postoperative glaucoma medications.⁹ This study aimed is to evaluate the outcomes and complications of Ahmed Glaucoma valve implantation in patients with refractory glaucoma at Dr Yap Eye Hospital.

SUBJECT AND METHODS

This is a retrospective observational study. Medical records of 30 patients who have performed 184 mm² single plate Ahmed glaucoma valve implant surgery at Dr Yap Eye Hospital, Yogyakarta, from January 2014 to October 2016 were retrospectively

reviewed. Patients of all ages and both genders with refractory glaucoma, unresponsive to conventional medical and surgical therapy were included. The study was approved by the hospital's institutional review board.

Pre-operative data include age, gender, eye laterality, type of glaucoma, visual acuity using Snellen chart converted to logMAR, and intraocular pressure were evaluated. Type of glaucoma included was neovascular, open-angle, steroid-induced, and uveitis glaucoma. The IOP, visual acuity and complications were documented at 2 days, 1 week, 1 month, 3 months, and 6 months. Management of the complication either conservatively or surgically was also recorded

All surgeries were performed by three glaucoma subspecialist surgeons at Dr Yap Eye Hospital, Yogyakarta, Indonesia. The operation was done under general anaesthesia. A fornix based conjunctival flap was created in the superotemporal or superonasal quadrant. A 4x4 mm² scleral flap was created and topical Mitomycin C 0.04% was applied for 2 – 3 minutes. Ahmed implant (new world Medical, Rancho Cucamonga, CA, USA) was implanted and the plate of the implant was placed under the conjunctival flap 8 mm from limbus and fixed to the sclera with 10-0 nylon sutures. The tube was shortened to the desired length with its sharp bevel facing anteriorly to allow 2 – 3 mm of the tube in the anterior chamber and then the tube was inserted to the anterior chamber through sclerostomy made with 23 gauge needle under the scleral flap. The scleral flap and the conjunctival flap then sutured with 10-0 nylon sutures. Post-operatively, all patients received topical antibiotic and steroid.

RESULT

The baseline characteristic of the patients in this study was summarized in Table 1.

The pre-operative diagnoses of the patients were neovascular glaucoma

(NVG), primary open-angle glaucoma, steroid-induced glaucoma and uveitic glaucoma. The mean initial IOP was 45.78 ± 13.04 mmHg and decrease into 14.41 ± 9.86 mmHg at the second postoperative day and 17.6 ± 14.6 at 6 months follow up. The mean visual acuity was at baseline 2.47 ± 0.56 logMAR and was unchanged 2.4 ± 0.74 logMAR, at last, follow up. The changes of IOP changes were shown in Figure 1 and changes of visual acuity were shown in Figure 2

Table 1. Baseline characteristic (n=30)

Characteristics	n	%
Gender		
• Male	6	20
• Female	24	80
Age		
• Mean	46.55	
• Range	9-70	
Literality		
• Right	19	63
• Left	11	36
Preoperative		
• Intraocular pressure	45.78 ± 13.04	
• Visual Acuity	2.47 ± 2.56	

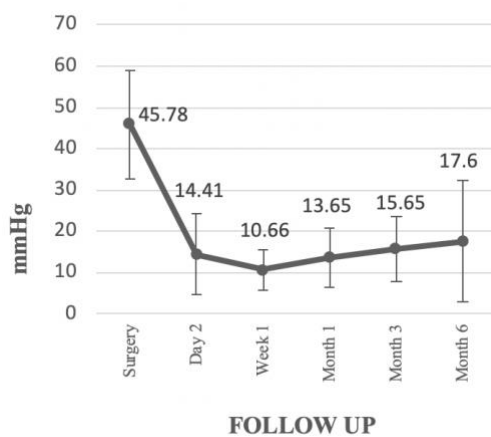


Fig 1. Intraocular pressure changes during follow up

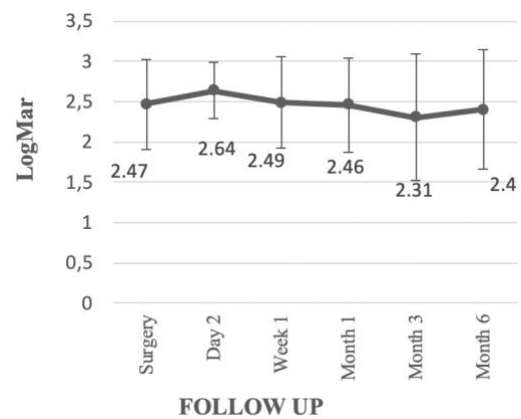


Fig 2. Visual acuity changes during follow up

Postoperative complications were shown in Table 2. Early postoperative complication (0-3mos) was flat anterior chamber (4 eyes, 13%), hyphema (4 eyes, 13%), and tube exposure (4 eyes, 13%). The late postoperative complication (after 3 mos) was tube exposure (1 eye, 3%), bullous keratopathy (1 eye, 3%), and dislocation of the implant (1 eye, 3%). Tube exposure onset ranging from 49-235 days (mean 99.5 ± 90.54 days) after implantation.

Table 2. Postoperative Complication

Complication	Frequency	%
Early post operative complication (≤ 3 months)		
• Flat anterior chamber	4	13
• Hyphema	4	13
• Tube Exposure	4	13
• Tube Obstruction	3	10
• Ecchymosis	1	3
• Tube Corneal Touch	1	3
Late post operative complication (> 3 months)		
• Tube obstruction	1	3
• Tube Exposure	1	3
• Dislocation	1	3
• Keratopathy	1	3

Our study showed that AGV is safe and effective in managing of refractory glaucoma. The mean reduction IOP at 3 months follow up was 61%, but the mean visual acuity remained unchanged. The most common early postoperative complication encountered was a flat anterior chamber (FAC). It was

documented 4 patients with neovascular glaucoma. Incidence of grade III FAC after glaucoma filtration surgery in previously reported surgery is 4.18%¹⁰. In this study only 1 patient (3 %) with grade III FAC.

The other common complication occurred were low-grade hyphema and tube exposure. Hyphema was found in 4 patients with neovascular glaucoma (13.3%). NVG is a severe complication of ocular ischemia diseases. Vascular Endothelial Growth Factor (VEGF) concentration in NVG patients is elevated in both the aqueous humour and vitreous humour.¹¹ The previous study showed preoperative anti-VEGF (Bevacizumab) injection reduced iris neovascularization, decreased hyphema, and led to higher surgical success rates. Therefore, pre-operative intravitreal Bevacizumab may be an effective adjunct to AGV implantation in the management of NVG.¹¹

Tube exposure is a well-known complication of glaucoma drainage implants.¹² Frequency of tube exposure varies from 5% to 14.3% of cases. Tube exposure represents a major risk factor for the development of late endophthalmitis, as the exposed tube provides a way for microorganisms to migrate into the eye from ocular surface and conjunctiva.¹² In this study, we found 4 cases (13.3%) of tube exposure after implantation of AGV, 3 cases on NVG patients and 1 case on steroid-induced glaucoma patient who had trabeculectomy surgery before, 3 cases of tube exposure required explantation. Endophthalmitis was found in one case of tube exposure. Flat anterior chamber and hyphema could be successfully managed conservatively while tube exposure needed surgical repair.

CONCLUSION

Ahmad glaucoma implant placement appears to be a safe and effective surgical

option in patients with refractory glaucoma. Flat anterior chamber, tube exposure and hyphema are the most frequent complications following Ahmed Glaucoma valve implantation.

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