ORIGINAL RESEARCH

Canaloplasty versus trabeculectomy with mitomycin C in patients of glaucoma

Dr. Azher Ahmed Khan Lodhi

Assistant Professor, Department of Ophthalmology, K M Medical College & Hospital, Mathura, Uttar Pradesh, India

Corresponding Author
Dr. Azher Ahmed Khan Lodhi
Assistant Professor, Department of Ophthalmology, K M Medical College & Hospital, Mathura, Uttar Pradesh, India

Received: 13 May, 2022 Accepted: 18 June, 2022

ABSTRACT

Background: Glaucoma is a group of eye conditions that damage the optic nerve, which is the nerve that connects the eye to the brain. The present study compared canaloplasty and trabeculectomy with mitomycin C in patients of glaucoma. **Materials & Methods:** 80 patients with primary open-angle glaucoma (POAG) of both genders were divided into 2 groups of 40 each. Group I patients underwent canaloplasty and 34 underwent trabeculectomy with mitomycin C (MMC). Parameters such as change in IOP, visual acuity (VA), glaucoma medications and complication rates at 24 months were recorded. **Results:** Group I had 20 males and 20 females and group II had 26 males and 14 females. Pseudophakic IOP (mm Hg) pre- operatively IOP was 19.4 and 24.5, at 1 year was 13.2 and 13.6 and at 2 years was 14.2 and 12.4 in group I and II respectively. Log MAR acuity pre- operatively was 0.34 and 0.21, at 1 year was 0.22 and 0.19 and at 2 years was 0.19 and 0.32 in group I and II respectively. Number of medications was 3, 1 and 2 in group I and 3, 1 and 0 pre- operatively, at 1 year and 2 years respectively. The difference was significant (P< 0.05). **Conclusion:** Both canaloplasty and trabeculectomy found to be equally effective in reduction in intraocular pressure in patients with open glaucoma.

Key words: Trabeculectomy, Canaloplasty, Glaucoma

INTRODUCTION

Glaucoma is a group of eye conditions that damage the optic nerve, which is the nerve that connects the eye to the brain. It is often associated with increased pressure inside the eye, known as intraocular pressure (IOP), but it can also occur when the pressure is within the normal range. There are several types of glaucoma, including primary open-angle glaucoma, angle-closure glaucoma, and normal-tension glaucoma. Symptoms can vary depending on the type of glaucoma, but may include blurred vision, loss of peripheral vision, and halos around lights. However, in many cases, glaucoma may not cause any symptoms until it has already caused significant damage to the optic nerve.[1]

Canaloplasty is a procedure that involves viscodilation of the Schlemm's canal with placement of an intracanalicular tension suture with the purpose of facilitating trabeculo-canalicular aqueous outflow. When canaloplasty is performed correctly, there is no bleb formation.[2] Trabeculectomy is considered the gold standard of glaucoma surgery, and although effective, it requires the presence of a filtering bleb that can be associated with problems including infection, dysesthesia, and poor cosmesis. Trabeculectomy, the gold standard in glaucoma surgery, drains the aqueous humor from the anterior chamber to the subconjunctival space but is associated with a high rate of complications, that is, hypotony, hyphema, choroidal detachment, suprachoroidal hemorrhage, blebitis, and bleb-associated endophthalmitis.[3]The present study was conducted to compare canaloplasty and trabeculectomy with mitomycin C in patients of glaucoma.

MATERIALS & METHODS

The present study comprised of 80 patients with primary open-angle glaucoma (POAG) of both genders. All were informed regarding the study and their written consent was obtained.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups. Each group comprised of 40 patients. Group I patients underwent canaloplasty and 34 underwent trabeculectomy with mitomycin C (MMC). Parameters such as change in IOP, visual acuity (VA), glaucoma medications, and complication rates at 24 months were analyzed. Result thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I	Group II
Method	Canaloplasty	Trabeculectomy with mitomycin C
M:F	20:20	26:14

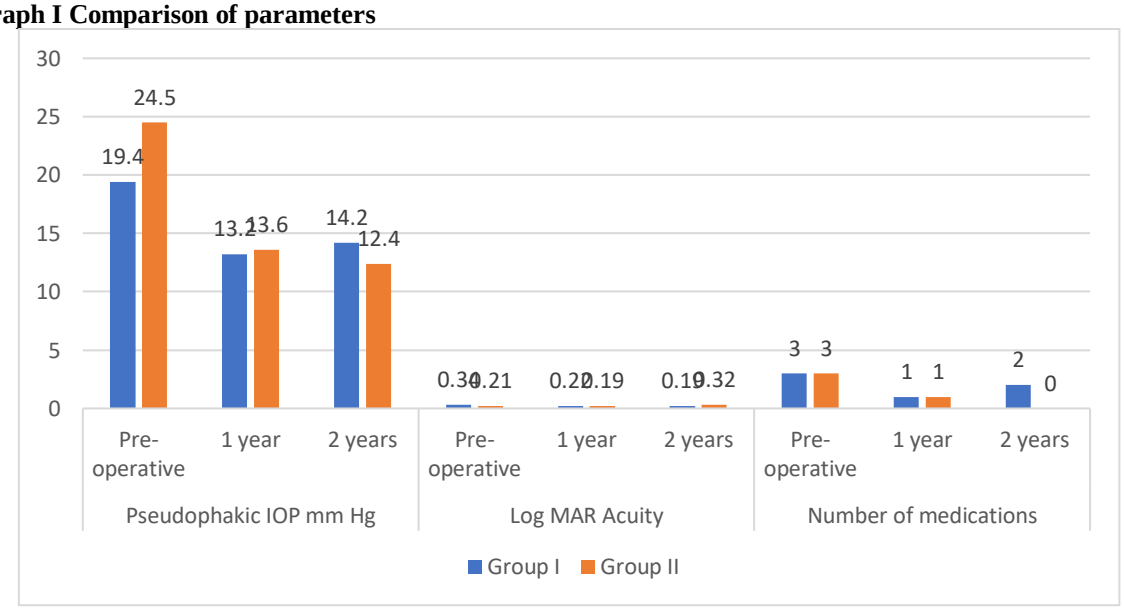
Table I shows that group I had 20 males and 20 females and group II had 26 males and 14 females.

Table II Comparison of parameters

Parameters	Period	Group I	Group II	P value
Pseudophakic IOP mm Hg	Pre- operative	19.4	24.5	0.05
	1 year	13.2	13.6	0.82
	2 years	14.2	12.4	0.01
Log MAR Acuity	Pre- operative	0.34	0.21	0.01
	1 year	0.22	0.19	0.81
	2 years	0.19	0.32	0.05
Number of medications	Pre- operative	3	3	1
	1 year	1	1	1
	2 years	2	0	0.02

Table II, graph I shows that Pseudophakic IOP (mm Hg) pre- operatively IOP was 19.4 and 24.5, at 1 year was 13.2 and 13.6 and at 2 years was 14.2 and 12.4 in group I and II respectively. Log MAR acuity pre-operatively was 0.34 and 0.21, at 1 year was 0.22 and 0.19 and at 2 years was 0.19 and 0.32 in group I and II respectively. Number of medications was 3, 1 and 2 in group I and 3, 1 and 0 pre- operatively, at 1 year and 2 years respectively. The difference was significant (P< 0.05).

Graph I Comparison of parameters



DISCUSSION

Glaucoma is a chronic neurodegenerative disorder of the optic nerve, if untreated, resulting in irreversible loss of sight.[1] It is estimated that the number of people with glaucoma worldwide will increase to 111.8 million by the year 2040. Among different subtypes of glaucoma, open angle glaucoma (OAG) is the most popular form of the disease. Glaucoma should not only be regarded as a medical problem but also as a socioeconomic burden.[4]

Several studies demonstrated that, lowering intraocular pressure (IOP), the principal risk factor for glaucoma progression reduced the progression rate and efficiently preserved sight. Standard glaucoma treatment is drug therapy followed by surgery when optimal disease control is not obtained.[5]Trabeculectomy is the most popular and effective treatment for patients with medically uncontrolled glaucoma, and therefore plays an important role in the management of this blinding disease.[6] Filtering blebs most often fail due to the process of wound healing and subsequent scarring in the conjunctiva and episclera.[7] A variety of anti-fibrotic agents have been widely used and significantly improved the outcome. Unfortunately, due to their nonspecific mechanism of action, they are far from ideal and can be associated with an increased incidence of sight-threatening complications including wound leak, hypotony, and endophthalmitis. The shortcomings have spurred interest in new alternative

surgical methods to increase the success rate of glaucoma surgery.[8] Canaloplasty, a new interventional nonpenetrating surgical technique, has become an appealing alternative to traditional incisional glaucoma therapies.[9] The procedure intends to enhance the outflow of aqueous humor by using a flexible microcatheter to enlarge the Schlemm's canal and stretch out the trabecular meshwork (TM), thus relieving intraocular pressure (IOP).[10] The present study was conducted to compare canaloplasty and trabeculectomy with mitomycin C in patients of glaucoma.

In present study, group I had 20 males and 20 females and group II had 26 males and 14 females. Lin et al[11] included four qualified studies incorporating a total of 215 eyes for quantitative synthesis. The weighted mean difference (WMD) of IOPR between canaloplasty and trabeculectomy from baseline to 12 months was -2.33. There was not significant improvement in the complete or qualified success rate. Similarly, no statistically significance was observed in anti -glaucoma mediations reduction. Sensitivity analysis of the primary outcome estimate confirmed the stability of the Meta-analysis result.

We found that Pseudophakic IOP (mm Hg) pre-operatively IOP was 19.4 and 24.5, at 1 year was 13.2 and 13.6 and at 2 years was 14.2 and 12.4 in group I and II respectively. Log MAR acuity pre- operatively was 0.34 and 0.21, at 1 year was 0.22 and 0.19 and at 2 years was 0.19 and 0.32 in group I and II respectively. Number of medications was 3, 1 and 2 in group I and 3, 1 and 0 pre- operatively, at 1 year and 2 years respectively. Garris et al[12] included 31 eyes of 31 patients with primary open-angle glaucoma (POAG) who underwent canaloplasty and 37 eyes of 37 patients with POAG who underwent trabeculectomy with MMC with 24 months of postoperative follow-up. Caucasians made up to half of the patients included in this study (58% vs. 43%) while the rest where either African Americans (32% vs. 43%) or Hispanic (10% vs. 14%) patients between the canaloplasty and trabeculectomy group. Both groups showed significant reduction in IOP from baseline at 24 months. Trabeculectomy patients had a greater mean reduction of IOP compared to canaloplasty patients (12.2 ± 12 vs. 4.7 ± 7.5, P = 0.003) and also achieved lower IOP at 24 months (12.2 ± 4.1 vs. 14.9 ± 6.0, P = 0.03). Postoperative glaucoma medication use was less in the trabeculectomy group (n = 0, interquartile range [IQR] 0–2) compared to those in whom canaloplasty was performed (n = 2, IQR 0–3, P = 0.02). VA showed no statistical change in either group over 2 years. Overall failure rates at 2 years were comparable between the two groups: 32% for trabeculectomy and 26% for canaloplasty (P = 0.6). Subgroup analysis revealed a lower failure rate in Caucasions (15%) when compared to Blacks (42%) and Hispanics/others.

CONCLUSION

Authors found that both canaloplasty and trabeculectomy found to be equally effective in reduction in intraocular pressure in patients with open glaucoma.

REFERENCES

1. Matlach J, Freiberg FJ, Leippi S, Grehn F, Klink T. Comparison of phacotrabeculectomy versus phacocanaloplasty in the treatment of patients with concomitant cataract and glaucoma. BMC Ophthalmol 2013;13:1.
2. Matlach J, Dhillon C, Hain J, Schlunck G, Grehn F, Klink T, et al. Trabeculectomy versus canaloplasty (TVC study) in the treatment of patients with open-angle glaucoma: A prospective randomized clinical trial. Acta Ophthalmol 2015;93:753-61.
3. Brusini P, Caramello G, Benedetti S, Tosoni C. Canaloplasty in open-angle glaucoma: Mid-term results from a multicenter study. J Glaucoma 2016;25:403-7.
4. Cox DR, Oakes D. Analysis of Survival Data. London: Chapman & Hall; 1984. p. 48-61.
5. Broadway DC, Chang LP. Trabeculectomy, risk factors for failure and the preoperative state of the conjunctiva. J Glaucoma 2001;10:237-49.
6. Ayyala RS, Chaudhry AL, Okogbaa CB, Zurakowski D. Comparison of surgical outcomes between canaloplasty and trabeculectomy at 12 months' follow-up. Ophthalmology 2011;118:2427-33.
7. Schoenberg ED, ChaudhryAL, Chod R, Zurakowski D, Ayyala RS. Comparison of surgical outcomes between phacocanoloplasty and phacotrabeculectomy at 12 months' follow-up: A longitudinal cohort study. J Glaucoma 2015;24:543-9.
8. Brüggemann A, Despouy JT, WegentA, Müller M. Intraindividual comparison of canaloplasty versus trabeculectomy with Mitomycin C in a single-surgeon series. J Glaucoma 2013;22:577-83.
9. Lewis RA, von Wolff K, Tetz M, Korber N, Kearney JR, Shingleton B, et al. Canaloplasty: Circumferential viscodilation and tensioning of Schlemm's canal using a flexible microcatheter for the treatment of open-angle glaucoma in adults: Interim clinical study analysis. J Cataract Refract Surg 2007;33:1217-26.
10. Sethi P, Patel RN, Goldhardt R, Ayyala RS. Conjunctival advancement with subconjunctival amniotic membrane draping technique for leaking cystic blebs. J Glaucoma 2015;93:753-61.
11. Lin ZJ, Xu S, Huang SY, Zhang XB, Zhong YS. Comparison of canaloplasty and trabeculectomy for open angle glaucoma: a Meta-analysis. International journal of ophthalmology. 2016;9(12):1814.
12. Garris WJ, Le C, Zurakowski D, Ayyala RS. Comparison of surgical outcomes between canaloplasty and trabeculectomy with mitomycin C at 2-year follow-up: A longitudinal cohort study. Indian J Ophthalmol 2018;66:66-70.