Vol. 15, No. 4
ORIGINAL PAPER

OPHTHALMOLOGY

MEDICAL CHANNEL
OCTOBER - DECEMBER 2009

TRABECULECTOMY WITH MITOMYCIN-C (MMC) AS PRIMARY SURGERY IN CONGENITAL GLAUCOMA

1. **MUHAMMAD AFZAL PECHUHO**
DOMS, FCPS
2. **SHAHID JAMAL SIDDIQUI**
DOMS, FCPS
3. **SYED IMTIAZ ALI SHAH**
FCPS
4. **RAJ KUMAR**
DO

1. ***Assistant Professor***
Department of Ophthalmology
CHANDKA MEDICAL COLLEGE & HOSPITAL LARKANA SINDH.
2. ***Associate Professor***
Department of Ophthalmology
CHANDKA MEDICAL COLLEGE & HOSPITAL LARKANA SINDH.
3. ***Professor of Ophthalmology***
CHANDKA MEDICAL COLLEGE & HOSPITAL LARKANA SINDH.
4. **Department of Ophthalmology**
CHANDKA MEDICAL COLLEGE & HOSPITAL LARKANA SINDH.

Address for Correspondence:
DR. MUHAMMAD AFZAL PECHUHO
Assistant Professor of Ophthalmology
BANGLOW# 01 TYPE II,
CMC STAFF COLONY
LARKANA.
CELL# 0300-3423761

ABSTRACT

PURPOSE: *To evaluate trabeculectomy with Mitomycin – C as primary surgery in congenital glaucoma.*
DESIGN: *Prospective , non randomized hospital based descriptive study, review of all cases of congenital glaucoma that underwent trabeculectomy with Mitomyicin-C as primary surgery between 2006 to 2008.*
PATIENTS AND METHODS: *A total number of 40 eyes of 30 patient with congenital glaucoma, who underwent primary trabeculectomy with MMC were included. Preoperative and postoperative intraocular pressures (IOP), corneal clarity, diameter, axial length, successful outcomes for survival analysis were measured. IOP<21mmHg with one topical medication and complications were evaluated in this study.*
RESULT: *Patients age at surgery ranged from 15 days to 10 years, the mean age was 56.37 months. Mean preoperative IOP was 33.26 ± 7.28mmHg and mean postoperative IOP was 17.1mmHg, pre and post operative IOP differences were significant at all examination periods (P<0.001). The mean follow-up was 1-36 months complete success was achieved in 22 eyes (55.0%) and qualified success was in 11 eyes (27.5%). Complications included hypotony, wound leak and hyphaema.*
CONCLUSIONS: *Antimetabolite augmentation of filtration surgery appear to give favorable out comes in the treatment of primary congenital glaucomas. There were no major or sight-threatening complications in our series.*

KEY WORDS: Trabeculectomy, Mitomycin-C, Congenital Glaucoma.

INTRODUCTION

Primary congenital glaucoma " PCG" is the most frequent childhood glaucoma and is an important cause of blindness in children world wide, affecting 1 in 10,000 births[1,2]. Primary congenital glaucoma essentially is a surgical disease. Unlike adult glaucoma, where drugs are the first – line of treatment, the management of children with PCG is primarily surgical with trabeculotomy, goniotomy being the procedures of first choice in the majority of cases[3,4]. In young children, Intraocular Pressure (IOP) rise results in severe visual morbidity due to corneal opacification, induced myopia, amblyopia and of course, glaucomatous optic atrophy. Hence, timely reduction of IOP and stabilization of refractive error are essential to avoid these sequelae and procedures such as goniotomy, trabeculotomy, trabeculectomy, valve implant or combined procedures are the various surgical options. When the cornea is clear enough to enable confident viewing of the filtration angle, goniosurgery is the first – line surgical treatment for children with PCG. Congenital glaucoma essentially is a surgical disease. A goniotomy or trabeculotomy ab-externo remains the standard as primary surgical therapy. Both procedures a reported to be equally effective as initial surgical procedures with more than 77% success rate[5,8]. Goniotomy is successful in 90% of the cases and trabeculotomy is effective with success rates of 51 % - 92.5%[6,7]. PCG is a hereditary condition, resulting from abnormality of the trabecular meshwork, possibly due to a developmental arrest, causing increased resistance to aqueous outflow. However, an abnormally stretched anatomy of limbus in congenital glaucoma often makes it difficult to locate Schlemm's canal and effectively cannulate it. Results of trabeculectomy with adjunctive use of mitomycin C (MMC) in children has been encouraging 67% - 94.75%[8,9], but the long term risk of MMC use in children is not yet known and hence has not found favor with most pediatric glaucoma specialists as the primary surgical option. The dosage and duration of application has also not been optimized

in pediatric glaucoma surgery. We evaluated the safety and efficacy of MMC augmented trabeculectomy as a primary procedure in children with congenital glaucoma.

Patients and Methods

After taking a detailed ophthalmic history including significant medical history, and performing a complete ophthalmic examination which included visual acuity (if recordable), tonometry, anterior segment examination. Diagnosis of primary congenital glaucoma was always established by an examination under general anesthesia of 40 eyes of 30 children who underwent trabeculectomy with MMC as a primary surgical procedure.

A written consent was taken, explaining about the anesthesia, surgical procedure and topical application of mitomycin – C intraoperatively. The surgery was performed using a standardized technique similar to that described by Cairns.

Trabeculectomy was performed with limbal-based conjunctival flap raised 8-9mm posterior to the limbus and with the application of MMC (0.4mg/ml for 3 minutes) under the conjunctivo-tenon membrane on the surface of the sclera before the formation of a scleral flap. The procedure was completed by excision of 2mm x 1.5mm trabecular tissue, peripheral iridectomy, and then suturing the scleral and conjectivo-tenon flap. The lamellar scleral flap was sutured with three 10/0 interrupted sutures, tenon with three 10/0 interrupted sutures, and conjunctiva with continuous 10/0 sutures.

Postoperative medications included dexamethasone eye drops 4 times a day, chloramphenicol eye drops 4 times a day and atropine eye drops twice a day. These were continued for four to five weeks except for atropine eye drops which were usually discontinued after two weeks, depending upon the anterior chamber reaction during the postoperative period. All patients were followed up on day 1 and 2, at week 2 and 4, and 3 monthly intervals thereafter, if stable.

Complete success o f surgery was defined as intraocular pressure (IOP) <18mmHg under anesthesia or <21mmHg in waking child measured by tonometry, (schiotz, applanation) without any drug with stable horizontal corneal diameters. Qualified success was defined as a post operative IOP of < 18mmHg under anesthesia or <21 mmHg in waking child was maintained on a single topical anti-glaucoma medication.

The records were analyzed for demographic data, pre operative features of presence of Haab's stria, corneal diameter, intraocular pressure, corneal clarity and fundus evaluation for glaucomatous optic neuropathy and percentile change in these following surgery and complications noted with surgical procedure. The surgical success was correlated with age, pre operative corneal clarity and intraocular pressure as factors influencing the outcome of surgery. Statistical analysis performed using chi-square test and the statistical significance set at P is less than 0.05.

Table 1.

Mean Postoperative Intraocular Pressure

	Time (mos)					
Exposure	1	3	6	12	24	36
3 mins	12.3	14.2	12.8	12.7	11.7	11.3

RESULTS

A total number of 40 eyes of 30 patients with congenital glaucoma were included in this study. Patients age at surgery ranged from 15 days to 10 years, mean age at the time of surgery in 30 children undergoing trabeculectomy with MMC was 56.37 months (15 days to 10 years). Twenty one children (70%) were male and nine children (30%) female. Fourteen children (46.66%) had bilateral affection. There were 4 children with family history of congenital glaucoma. The mean preoperative intraocular pressure was 33.16 ± 7.28mmHg (23-50mmHg) & mean postoperative IOP was 17.1mmHg (6-26mmHg). Duration of followup was 1-36 months. The mean IOP at 1, 3, 6, 12, 24 & 36 months postoperatively is shown in Table-1.

Although the IOP at 3 months postoperative visit was higher. Pre & postoperative IOP differences were statiscally significant at all examination periods (P<0.001). The mean horizontal corneal diameter at the time of surgery was 13mm (10.5-16mm). However, there was no significant change in number of eyes with clear cornea and the mean horizontal diameters. Though the number of eyes with clear corneas remained same. Twenty-three eyes had pre-operative clear corneas (54.76%) and the optic nerve head could be evaluated in 30 eyes (70%). Though the number of eyes with clear corneas remained same, fundus evaluation could be done in significantly higher number of eyes (92.55% after surgery against 78.57% before surgery) (p=0.022). Complete success was observed in 22 eyes (55%) and qualified success was observed in 11 eyes (27.5%) following trabeculectomy with MMC at the last follow up on analysis, age at the time of surgery (p=0.154), preoperative corneal clarity (p=0.7804) and preoperative IOP (p=0.854) did not show significant influence on success of surgery. Complications were seen early postoperative hypotony in three cases, requiring anterior chamber re-formation (mean age 7 months) at the time of surgery, two cases of wound leak and three eyes had hyphema. None of the eyes had suprachoroidal effusions, hemorrhage. In late postoperative 2 eyes (4.76%) underwent early cataract surgery. Bleb revision (Including needling) & / or suturlysis were not performed in any case. No case of bleb leaks, blebitis, endophthalmitis were observed at the last follow up. It was seen that 40% of the buphthalmic eyes had - 4Dsph or more as the refractive error and 60% of these had refractive error more than -1DSph. Postoperatively, it was seen that 4 eyes had BCVA of >6/12; 33% (8 eyes) had BCVA >6/36; 40% (8 eyes) eyes had BCVA 6/36-3/ 60 while 10% (3 eyes) had <3/60.

DISCUSSION

Childhood glaucoma is disease that typically requires surgery as early as possible. The management of congenital glaucoma is primarily surgical goniotomy and trabeculotomy are the surgical procedures of first choice , both are safe and have low incidence of complications[10,11]. Unlike adult glaucoma, where drugs are the first line of treatment, Children with PCG should considered for surgery first, with drugs as a last resort. "Medications" typically don't work and tend to have more side effects in children because their enzyme-metabolizing systems are not as well developed," said Dr. Pickering. When the IOP is not controlled after primary surgery, trabeculectomy is the usual course of action. The surgery was performed using a standardized technique similar to that described by Cairns. Beauchamp and Parks[12] reported an over all success rate of 50% in controlling IOP in children with primary infantile glaucoma. In

pediatric patients (patients less than 18 years of age), it has been reported that trabeculectomy without adjunctive antimetabolites achieves a successful out come in 30% to 50% of cases. The highest success rate (50%) with a short follow up and low success rate of 30% to 35% in longer follow up. Sussaan R et al[8] as achieved an overall success rate of 67% with a mean follow up of 17 months in series of 56 patients, 79 eyes with primary congenital glaucoma treated by trabeculectomy with MMC as a primary procedure. Junior JG et al[13] the best success rate (65.22%) was achieved in the 61 to 120 month age group. Though without a statistically significant difference when compared with the other age groups (P=O.7 Chi = Square). Low S et al[14] reported Antimetabolite and releasable augmentation of filtration surgery appear to give favourable outcomes in the treatment of refractory primary pediatric glaucomas. Non of the trabeculectomies in our study were performed in an inferior location or were associated with contact lens use. In our study complete success was observed in 22 eyes (55.0%) and qualified success was observed in 11 eyes (27.5%) following trabeculectomy with MMC at the last follow up on analysis and following trabeculectomy with MMC at the last follow up.

REFERENCES

1. Jatoi S M, Clinical Ophthalmology Glaucoma, 4th edition 2006; Chapter 11, P; 163.
2. Jaafar MS. Care of infantile glaucoma patient. Ophthalmology annual. New York: Raven Press. 1988; 7: 15 - 37.
3. Shaffer RN. Progosis of goniotomy in primary infantile glaucoma (trabeculodysgenesis). Trans Am Ophthalmol Soc 1982;80:321-5.
4. Luntz MH, Livingston DG. Trabeculotomy ab-externo and trabeculectomy in congenital and adult onset glaucoma. Am J Ophthalmol 1977; 83: 174-9.
5. Shaffer RN. Prognosis of goniotomy in primary infantile glaucoma (trabeculodysgenesis). Trans Am Ophthalmol Soc 1982; 80: 321-5.
6. Elder MJ. Congenital glaucoma in The West Bank and Gaza strip. Br J Ophthalmol, 1993; 7:413-16.
7. Akimoto M, Tanihara H, Negi A, Nagata M. Surgical results of Trabeculotomy Ab Externo for developmental glaucoma. Arch Ophthal, 1994; 112: 1540-44.
8. Sussaan R, Oltrogge EW, Carani JCE, Nicole MT. Mitomycin as adjunct chemotherapy with trabeculectomy in congenital and developmental glaucoma. J Glaucoma 1995; 4:151-7.
9. Mandal AK, Waton DS, John T, Jayagandan A. Mitomycin C- augmented Trabeculectomy in refractory congenital glaucoma. Ophthalmology 1997; 104: 996-1001.
10. Anderson DR. Trabeculotomy compared to goniotomy for glaucoma in children. Ophthalmology. 1983; 90: 805-6.
11. McPherson SD Jr, Berry DP. Goniotomy vs. external trabeculotomy for developmental glaucoma. Am J Ophthalmol. 1983; 95: 427-31.
12. Beauchamp GR, Parks MM. Filtering surgery in children barriers to success. Ophthalmology. 1979; 86: 170-80.
13. Junior JG; Giampani ASB; Carani JCE; Junior RS et al. Efficacy and safety of trabeculectomy with mitomycin C for childhood glaucoma: a study of results with long-term follow-up. Clinic 2008. 63: 421-26. ISSN 1807-5932.
14. Low S, Hamada S, Nischal K.K, et al. Antimetabolite and releasable suture augmented filtration surgery in refractory pediatric glaucomas. Journal of AAPOS 2008. Vol 12, Issue 2, Pages 166-172.