

A STUDY OF TRABECULECTOMY WITH INTRAOPERATIVE MITOMYCIN - C IN PRIMARY OPEN ANGLE GLAUCOMA

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ABSTRACT

BACKGROUND

To study the efficacy and safety of intraoperative Mitomycin – C with trabeculectomy in management of Primary open angle glaucoma. To compare the results between trabeculectomy alone and trabeculectomy with intraoperative Mitomycin in terms of control of IOP, arrest of visual field loss, visual acuity and optic nerve head changes.

MATERIALS AND METHODS

The patients were selected from the outpatient department of Ophthalmology, Nalanda Medical College, Patna. In the present study 60 eyes of 45 patients having primary open angle glaucoma were selected from the patients of attending Ophthalmology outpatient department. In all cases trabeculectomy was done. Cases were divided into two groups, group A and B. In group A 30 eyes were selected randomly for trabeculectomy with intraoperative Mitomycin C In group B 30 eyes were selected randomly for Trabeculectomy alone. Both eyes were operated in 15 cases. Definition of efficacy: Complete effectiveness \leq 21 mmHg. Qualified effectiveness: IOP \leq 21 mmHg with single glaucoma medication. Qualified failure : IOP $>$ 21 mmHg with or without glaucoma medication. Complete failure: When an eye requires a further glaucoma drainage operation.

RESULTS

At 3 months follow up overall success rate in study group was 100%. Complete success in 27(90%) cases, 3(10%) qualified. In control group complete success was 11(33%) and 7(23.44%) was qualified success.

CONCLUSION

From the present study with a very short follow up period it can be concluded that the use of intraoperative Mitomycin –C in trabeculectomy has a better pressure lowering effect than trabeculectomy alone and it improves the success rate in high risk cases of primary open angle glaucoma (p 0.02943 Chi – square test).

KEYWORDS

POAG, Trabeculectomy, Mitomycin –c.

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BACKGROUND

The Hippocratic aphorisms include the term glaucoma, which was used to describe blindness coming in advanced years, associated with a glazed, 'SEA- coloured' appearance of the pupil.¹

Primary open angle glaucoma can be considered a chronic, progressive, anterior optic neuropathy that is accompanied by a characteristic cupping and atrophy of the optic disc, visual field loss, open angles, an intraocular pressure too high for the continued health of the eye, i.e more than 21 mmHg recorded by schiotz tonometer on

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at least few occasions, and no obvious causative ocular or systemic conditions.²

Recently population based study have shed light on the prevalence of glaucoma in India. The prevalence in POAG has been shown by these surveys to be similar to those in the Caucasian population.

Successful trabeculectomy is generally characterised by the formation of filtering bleb, which is sub conjunctival accumulation of the aqueous. It is normally accepted that success with this procedure is approximately 80-90% in uncomplicated cases. However there is a linear decrease over time and at the end of 5 years it is around 30-50%.³⁻⁵

Factors associated with bleb failure include youth, aphakia, previous ocular surgery, previous failed filtering/non filtering glaucoma surgery, anterior segment neovascularisation, inflammation, trauma, long term use of glaucoma medication and black/ dark races. The success of trabeculectomy in the presence of such factors varies from 30-60%.³⁻⁷

Mitomycin-C is an antibiotic isolated from Streptomyces caespitosus by Wakki and associates in 1956. After

intracellular enzymatic reduction of the Quinone and loss of methoxy group, mitomycin becomes a bi-functional or tri-functional alkylating agent.^{5,8}

After topical administration of mitomycin 0.4 mg/ml for five minutes, it results prolong inhibition of fibroblast growth. The effect on tissue fibroblast is localised to the treated area. The inhibitory effect is dose and time dependent. Jempel et al conducted a study on cultured cells on human tenon's capsule. They found that toxicity of Mitomycin – c depends on two factors, dose and duration of exposure. Dose up to 0.04 mg % is antiproliferative at the site of application for 36 days. Above this mitomycin c is cytotoxic.⁹

Inclusion Criteria

1. Diagnosed cases of POAG having uncontrollable IOP on topical medication
2. New cases coming to the Ophthalmology out patient department having;
 - Glaucomatous cupping of optic disc.
 - Glaucomatous field change.
 - Intraocular tension above 22 mmHg.
 - Open angle on gonioscopy.

Exclusion Criteria

- Congenital glaucoma.
- Normotensive glaucoma.
- Angle closure glaucoma.

Surgical Steps

1. The conjunctival Flap: Limbal based flap.
2. Outline of superficial scleral flap is made with a tip of punctum dilator and incision made to 2/3rd thickness
3. Intraoperative mitomycin C after haemostasis of episclera. 0.2 mg/ml applied between sclera and Tenon's capsule for 2 minutes with a sterile cotton piece. After 2 min the cotton piece was removed and area was irrigated with 15 ml of balanced salt solution.
4. Paracentesis was performed with a thin bladed knife, blessing the incision the upper temporal peripheral cornea.
5. Deep sclerotomy which may contain scleral spur, Schlemm's canal, trabeculum, Schwalbe line and peripheral cornea.
6. Peripheral iridectomy was performed to prevent blockage of the internal opening by the peripheral iris.
7. Superficial flap was sutured by 10-0 ethilon suture and balanced salt solution injected into the anterior chamber through the paracentesis by a cannula.
8. Conjunctiva was closed by continuous running suture.

Post-operative Complications and Management

All patients were monitored for IOP, bleb characteristics, AC depth, hyphaema, sign of infection, uveitis and corneal abnormalities, hypotony, choroidal effusion, scleral necrosis etc. post operatively.

After discharge- follow up check-up was conducted on 7th day, and at 3 months. Patients were examined for;

1. IOP
2. Visual acuity
3. Gonioscopy
4. Visual field charting
5. Fundoscopy.

RESULTS AND OBSERVATIONS

At 3 months follow up overall success rate in study group was 100%. Complete success in 27 (90%) cases, 3 (10%) qualified.

In control group complete success was 11 (36.33%) and 7 (23.34%) was qualified success. Failure rate in control group was 14 cases, 8 qualified and 6 complete failure.

In 96.70% cases Mitomycin – C was found to be safe in conventional trabeculectomy it was 100% safe.

There was no occurrence of endophthalmitis, scleral necrosis, cataract formation or any other serious complications.

Persistent hypotony occurred in one case of Mitomycin C group and vision deteriorated from 6/24 to 6/36 due to hypotonous maculopathy which was rectified at 3 months by additional suturing of the scleral flap. Now he is maintaining stable vision and IOP of 15.9mmHg.

Success rate in Mitomycin C group were 90% complete and 10% qualified success. In control group it was 36.67% and 23.34% at 3 month follow up. Failure rates were 26.70% (qualified) and 20% (complete) failure.

VA remained stable in 93.33% and 80.00% in study and control group respectively.

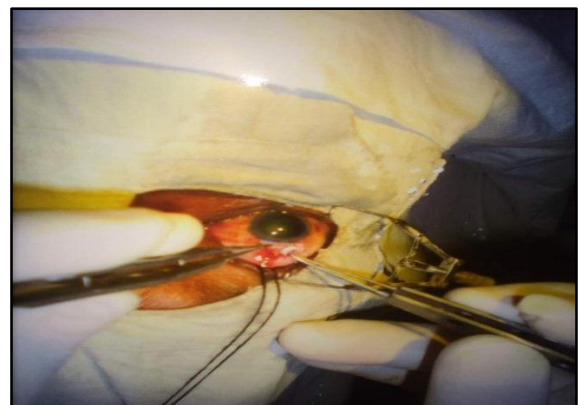


Figure 1. Mitomycin – C Applied With Cotton Pledget



Figure 2. Mitomycin – C Used During Trabeculectomy

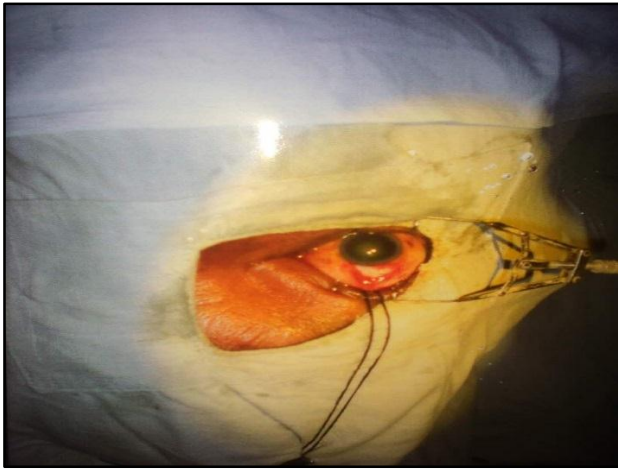


Figure 3. Conjunctival Flap During Trabeculectomy

DISCUSSION

Trabeculectomy is one of the commonly practised filtering surgeries for primary open angle glaucoma. This is a simple, safe and successful operation. The success rate is highly satisfactory. The most common cause of failure of trabeculectomy is scarring at episcleral– conjunctival interface secondary to fibroblast proliferation, synthesis of extracellular matrix and subsequent fibrosis. In 90% of cases fibrosis accounts for failure of trabeculectomy.

The concept of pharmacological modulation of wound healing to prevent filtering bleb failure is based on the use of various agents, which have been found to be inhibitory to fibroblast and endothelial cell proliferation.

They are as follows- 1) Corticosteroid. 2) Anti metabolites and 3) inhibitor of collagen cross linkage. Among these agents, antimetabolites play a dominant role in the glaucoma filtration surgery. The present study is carried out to establish scientifically the effectiveness of Mitomycin-C in preventing episcleral fibrosis after trabeculectomy.

Mitomycin –C is an antibiotic isolated from *Streptomyces caespitosus* by Wakki and associates in 1956. The fact that brief exposure of Mitomycin – C is inhibitory to proliferation of cultured human Tenon’s capsule fibroblasts, this was proved by Jampel et al. In this study dose is 0.2 mg/ml for 2 minutes on the sclerostomy site. Mitomycin – c soaked sponge is used. The sponge was placed over the sclerostomy

site for 2 minutes. After desired time sponge was removed and surgical site was copiously irrigated with 20ml of balanced salt solution/ Ringers lactate.

CONCLUSION

From the present study with a very short follow up period it can be concluded that the use of intraoperative Mitomycin – C in trabeculectomy has a better pressure lowering effect than trabeculectomy alone and it improves the success rate in high risk cases of primary open angle glaucoma (p 0.02943 Chi – square test).

In this study Mitomycin – C was found to be effective and safe at a dose of 0.2mg/ml for 2 minutes on sclerotomy site in comparison to the control group without any significant occurrence of serious complications and significant deterioration of visual acuity (< 2 lines).

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