

# Needle Revision of Failed Drainage Blebs with Mitomycin-C

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**Purpose:** To assess the outcome of needle revision of failed drainage blebs with regard to decrease in Intraocular pressure (IOP) of < 20 mmHg over mean follow up of 1 year and to observe the complication associated with the procedure.

**Material and Methods:** This non-comparative, interventional case series of 46 eyes (46 patients) with IOP of > 25 mmHg after trabeculectomy were subjected to needle revision with mitomycin-C (MMC) from January 2007 to December 2010. Thirty four patients were male and 12 were female with age ranging from 47 to 72 years.

**Results:** Twenty six patients (26 eyes) out of 46 patients (46 eyes) showed improvement in IOP of < 20 mmHg, achieving success at 57%. The pre-operative mean IOP of our patients was  $26.7 \pm 6$  mmHg (95% Confidence Interval 25.16 – 28.23), while post-operative mean IOP was  $13.5 \pm 4$  mmHg (95% Confidence Interval 12.47 – 14.5) at the mean follow up of 1 year.

Transient hyphema was noticed in 1 patient (2.17%) and 2 patients (4.34%) went into hypotony with IOP of < 6 mmHg. All these eyes resolved spontaneously with no additional treatment.

**Conclusion:** Needle revision of drainage blebs with MMC revived failed filtration procedure in 57% of our patients at the mean follow up of 1 year with minimal complications.

The partial thickness trabeculectomy (trab) was first described by Cairns<sup>1</sup> in 1968 and still remains the gold standard in the patients who fail to have their intraocular pressure (IOP) controlled on maximal medical therapy. Although success of trab has increased with the use of topical mitomycin-C (MMC) as an adjunctive therapy since its first use by Chen et al,<sup>2</sup> its failure rate is still significant ranging from 20 – 50% with long standing followup.<sup>3-6</sup> The primary reason for long term failure is due to episcleral fibrosis or conjunctival thickening overlying the area of filtration. This process of wound healing and tissue remodeling continues to occur indefinitely after the initial surgery. The failure of trab with flat filtration bleb and raised IOP therefore requires several options such as addition of medical therapy, repeat trab, drainage implants, revision of existing bleb and cyclo-destructive procedures.

Needle revision of failing drainage bleb is performed to separate and lyse the fibrous tissue bands in the scleral flap and inconjunctival bleb, to increase the surface area for filtration. It was first described by Mardelliet al<sup>7</sup> in 1996 and is subsequently popularized by other workers.<sup>8-11</sup> The procedure can be performed at the slit lamp or in the operating theatre. The technique involves external revision, internal revision via anterior chamber (AC), with or without anti-fibrotic agents.

We performed needle revision of failed filtering blebs with adjunctive use of MMC in cohort of patients who presented in glaucoma clinic with IOP of >25 mmHg. The purpose of our study was to assess the outcome of needle revision with regard to decrease in IOP of < 20 mmHg with mean follow up of one year and to observe the complications associated with the procedure.

## MATERIAL AND METHODS

This study is retrospective, non-comparative, interventional case series of 46 eyes (46 patients), who presented with IOP of >25 mmHg after going under Trab at Isra Postgraduate Institute of Ophthalmology and Aga Khan University Hospital, Karachi, due to initial diagnosis of Primary open angle glaucoma (POAG) or Primary angle closure glaucoma (PACG). All surgeries were performed earlier with the adjunctive use of MMC. A total of 61 eyes of 61 patients had needle revision from January 2007 to December 2010. All needle revisions were performed from 2 weeks to 1 year post trabeculectomy. All patients had argon laser suture lysis before needle revision and were naïve to any anti-glaucoma medication. Patients with repeated Trab and other glaucoma procedures were excluded from the study. Fifteen patients were lost to the follow up or had follow up of < 6 months which were not included in the study. Gender distribution showed 34 male and 12 female patients. Patient's age ranged between 47 to 72 years with median age of 58 years.

### Technique

Conjunctiva was anesthetized with several drops of Proparacaine 0.5% (Alcaine - Alcon, Belgium), followed by one drop of 5% Povidone-iodine. Two percent Lignocaine (0.1ml) and MMC in concentration of 0.2mg/ml (0.1ml) was drawn into tuberculin syringe with 27 gauge needle and was given subconjunctivally in the superior fornix above the bleb (Fig. 1 and 2). Closed eye massage was done to diffuse the given solution (Fig. 3). Patient was positioned on the slit lamp and wired speculum was placed to open the eye lids. A tuberculin syringe with 27 gauge was introduced under the conjunctiva as far away as possible from bleb and advanced to the scleral flap. With slow motion all the adhesions between conjunctiva and episclera were separated. The needle was further introduced under the scleral flap and with side motions episcleral adhesions are broken down (Fig. 4). In the pseudophakic patients, needle was advanced through the internal osteum into the anterior chamber. Once the bleb is reformed, needle was gently removed (Fig. 5).

The IOP was rechecked postoperatively and patients were commenced on topical Moxifloxacin 0.5% (Vigamox - Alcon, Belgium), 1 drop 4 times a day for 1 week and Dexamethasone 0.1% (Maxidex - Alcon, Belgium), 1 drop 4 times a day for 4 weeks.

Patients were followed at day 1, 1 week, 1 month and at 3 months subsequently. Mean follow up of all patients was up to 13 months (range 6 - 18 months).

The successful outcome of the needle revision was defined as IOP between 6 mmHg to 20 mmHg without any anti-glaucoma medication. All immediate and post-operative complications were recorded.

The data analysis was carried out on SPSS for windows version 17. A p-value of < 0.05 was considered statistically significant. The base line and follow up IOPs were compared with paired sample T test.

## RESULTS

Twenty six patients (26 eyes) out of 46 patients (46 eyes) showed improvement in IOP of < 20 mmHg, achieving success at 57%. The pre-operative mean IOP of our patients was  $26.7 \pm 6$  mmHg (95% Confidence Interval 25.16 - 28.23), while post-operative mean IOP was  $13.5 \pm 4$  mmHg (95% Confidence Interval 12.47 - 14.5) at the mean follow up of 1 year.

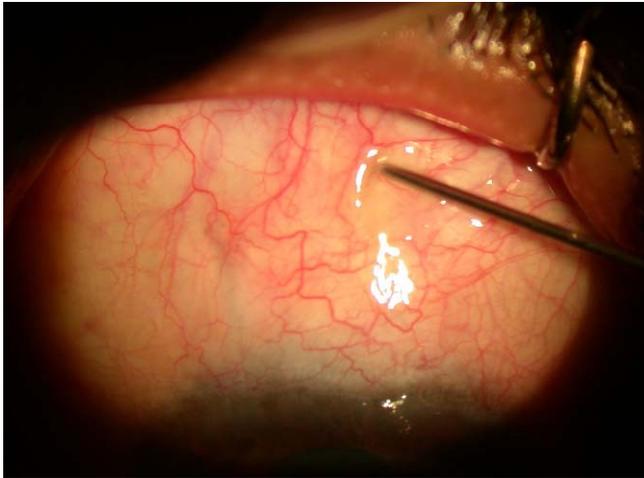
All patients had small areas of subconjunctival hemorrhage at the point of entry of needle. Transient hyphema was noticed in 1 (2.17%) patient and 2 (4.34%) patients went into hypotony with IOP of < 6 mmHg. All these eyes resolved spontaneously with no additional treatment.

The risk factors for failure to achieve IOP of < 20 mmHg in our series was pseudophakia, female gender and needle revision carried out within one month of trabeculectomy.

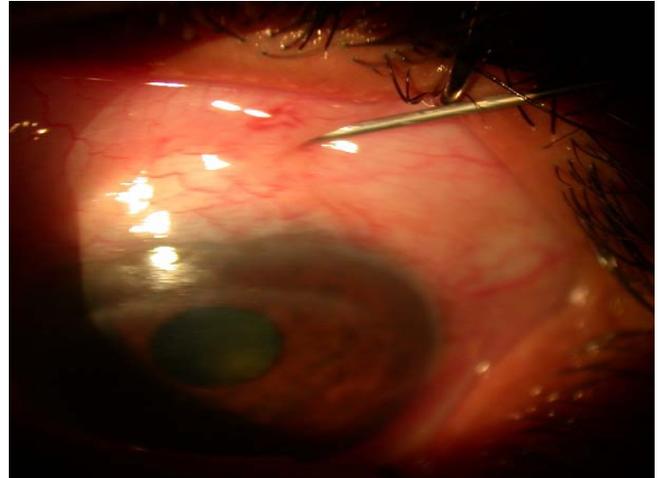
## DISCUSSION

Needle revision of the failed drainage bleb after trabeculectomy, offers several advantages over repeat trab or insertion of setons. It is a simple technique, which can be performed on the slit lamp in the examination room on outpatient basis. It spares conjunctiva from any trauma to make it suitable for any repeat procedure and it also reduces the cost of the Operating theatre.

The success rate of this procedure in our series of 46 patients was at 57%, reducing IOP to <20 mmHg in 23 patients. One of our patients developed hyphema (2.17%) and two (4.34%) went into hypotony post-operatively. In Mardelli's series published in 1996, 62 eyes were reported for bleb needle revision. Although he achieved 75.8% success in reducing IOP of < 18 mmHg, there were averagely 2 needling procedures



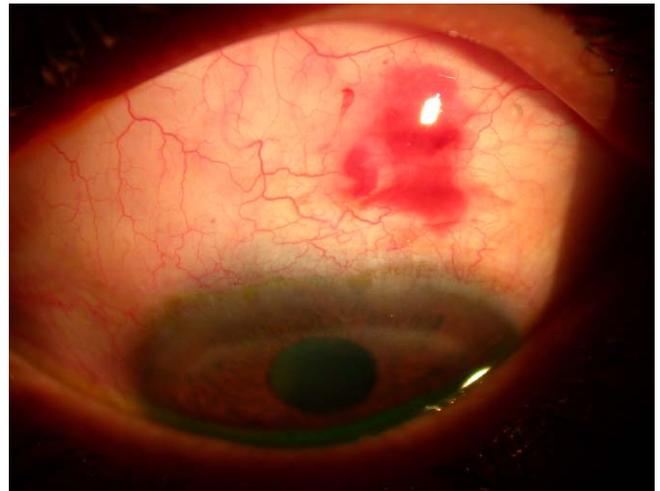
**Fig. 1:** Entry of needle subconjunctivally



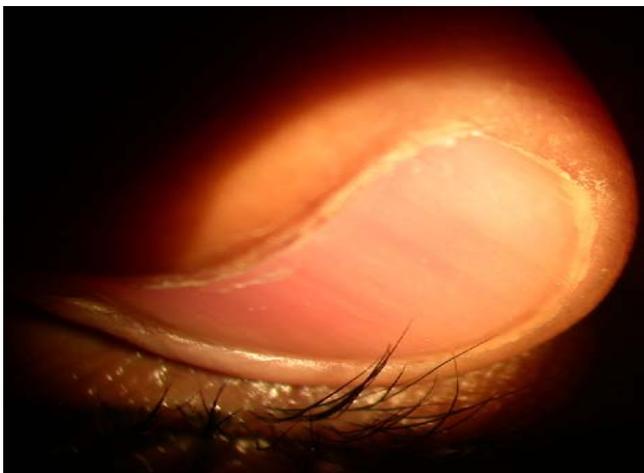
**Fig. 4:** Cutting of adhesions



**Fig. 2:** Injection of lignocaine with MMC



**Fig. 5:** Formation of bleb



**Fig. 3:** Closed lid massage

performed per patient. He also used 0.03ml of mixture of 0.004mg of MMC mixed with bupivacaine 0.75% with epinephrine. Ten eyes developed choroidal detachment, one eye had suprachoroidal hemorrhage, 5 eyes had bleb leaks and 2 eyes developed hyphema. Shetty and coworkers<sup>11</sup> carried out similar procedure in 44 patients and reported 64% of their patients achieving IOP between 4 to 22 mmHg. However they also included patients in their successful outcome who either had repeated needling or required anti glaucoma medication. They also used MMC at higher concentration of 0.4 mg/ml. The complications in their study included hypotony (2 eyes), hyphema (5 eyes) and bleb leak (1 eye), all resolving within couple of weeks. Pasternack<sup>12</sup> in consecutive bleb revision of 77 eyes, reported 52% patients achieving IOP of  $11.3 \pm 3$

mmHg at the mean follow up of  $29.6 \pm 14.4$  months. However, subconjunctival 5 - fluorouracil (5FU) was used as an antifibrotic agent. Only 2 eyes developed suprachoroidal hemorrhage and 1 eye developed kissing choroidals requiring surgical drainage in their series. The risk factors for failure in their patients included previous argon laser trabeculoplasty (ALT), number of previous surgeries, previous combined phaco-trab and previous use of MMC. Shin et al<sup>13</sup> using 5-FU with needle revision reported 45% success rate at the end of 1 year in cohort of 64 patients. Their study suggested that, use of MMC in initial trab increased the success rate in revision. Greenfield et al<sup>14</sup> reported outcome of needle revision in 63 eyes with MMC. They also injected 5-FU subconjunctivally in inferior fornix with number of injections, depending upon the degree of inflammation. The overall success rate was achieved at 78% (IOP < 22 mmHg) with or without anti-glaucoma medication at 12 months.

The direct comparison of various studies on needle revision, reported in literature is difficult, given the different demographics, type of glaucoma, severity of glaucoma, timing of needle revision, varying quantity and concentration of MMC and type of anti-fibrotic agent used.

There is limitation of our study due to its retrospective nature, lack of control and a small sample size. Fifteen of our patients had inadequate follow up or were lost to the follow up, which may have influenced the final outcome. With the remaining 46 patients, fulfilling our criteria of inclusion, it has been showed that by carrying out a simple procedure, we can achieve an IOP of < 20 mmHg in more than 50% of patients, avoiding any further surgery.

## CONCLUSION

Needle revision of drainage blebs with MMC can revive failed filtration procedure in at least half of the cases, avoiding invasive repeat surgery or commencing patients again on anti-glaucoma therapy.

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