Ocular Digital Massage for the Management of Post-Trabeculectomy Underfiltering Blebs

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INTRODUCTION

Glaucoma ranks as the second leading cause of blindness worldwide, after cataract. Treatment modalities for glaucoma can broadly be categorized into medical therapy, lasers and surgeries. Surgical techniques mostly aim to increase aqueous drainage from eye and thus lower intraocular pressure (IOP). However, risks are associated with these procedures which include infection, cataract, bleeding, and hypotony. Recently non-penetrating glaucoma surgery has become popular because of reduced incidence of postoperative overfiltration, hypotony and its potential sequelae. However, IOP reduction with these techniques is less than that achieved by trabeculectomy. Hence trabeculectomy is still the most useful approach for reduction of IOP, when the target IOP is in the low range.1,2

The key to success in trabeculectomy is a good surgical technique and a careful postoperative management. After conventional postoperative care, only about 40% of patients reach target IOP in the long-term without topical medication. Intensified postoperative care (IPC) increases the success rate by 25% after 5 years. A much higher proportion of filtering blebs can reach target IOP without medication if measures of IPC are consistently used by a glaucoma specialist when necessary.3,4

With the change in dynamics of aqueous outflow in the early postoperative period, the equilibrium may sometimes swing to one extreme or the other resulting from an over or under filtering bleb. The management of overfiltering bleb has to be done urgently to prevent the complications of ocular hypotony and flat anterior chamber, however, underfiltering blebs can initially be managed conservatively.5,6 Approach to the management of underfiltering blebs depend on the IOP, bleb appearance, anterior chamber depth, and the time since surgery. Treatment modalities include simple wait and watch, ocular digital massage (ODM), focal pressure with cotton tipped applicator, laser suture lysis, releasable suture technique, needling of bleb, subconjunctival injection of 5 Fluorouracil (5FU), YAG goniotomometry, reinstating medical therapy or re-operation.7-11

IOP can be used as one of the indices of success in the early postoperative period.12 Proper postoperative management of the trabeculectomy patient requires an understanding of possible events that alter IOP and knowledge of the treatments to control IOP.13

ABSTRACT

Objective: To evaluate the efficacy and safety of ocular digital massage (ODM) in the management of underfiltering blebs after trabeculectomy.
Study Design: Quasi experimental study.
Place and Duration of Study: Glaucoma Clinic of Al-Shifa Trust Eye Hospital, Rawalpindi, from January 2007 to November 2008.
Methodology: ODM was performed 3-4 times daily in 20 eyes having intraocular pressure (IOP) above the target level after trabeculectomy. Equal number of eyes with satisfactory IOP after trabeculectomy were taken as controls. Both groups were evaluated at 1 week, 3 weeks, 6 weeks, 3 months, 6 months and 9 months. Mean IOP, frequency of complications and required number of IOP lowering medicines in both groups were compared using t test.
Results: Massage group had a significantly higher mean IOP than the control group before the initiation of massage (p < 0.001). After initiating ODM, there were no significant differences in the mean IOP of two groups at 1 week (p = 0.421), 3 weeks (p = 0.073), 6 weeks (p = 0.575), 3 months (p = 0.071), 6 months (p = 0.085) and 9 months (p = 0.369). The difference in terms of required number of IOP lowering medicines (p = 0.075) and complication rates (p = 0.411) was also not significant.
Conclusion: ODM is an effective method for controlling IOP after trabeculectomy, and thus contributes to long-term surgical success with an acceptable risk / benefit ratio.

Key words: Digital massage. Trabeculectomy. Underfiltering blebs.
The purpose of ODM is to improve aqueous flow through the surgical site thus enlarging the filtration bleb, reducing IOP and inhibiting scar formation from obstructing the filtration. Although an easy technique with no requirement of devices, some serious complications have been documented in the literature regarding this technique in various case reports. Efficacy and safety of this technique has not been proven by enough number of clinical trials and thus concerns are present in the minds of many ophthalmologists in this regard.

The aim of this study was to evaluate the efficacy and safety of ODM in the management of raised IOP during early postoperative period after trabeculectomy.

**METHODOLOGY**

This quasi experimental study was conducted at Glaucoma Clinic of Al-Shifa Trust Eye Hospital, Rawalpindi, from January 2007 to November 2008. An approval of study design was taken from the Hospital Ethical Committee before the start of study. Patients were divided into two groups, each comprising of 20 eyes of 20 patients. Massage group included the eyes that had IOP above target level in the first 6 weeks postoperatively, while the control group included eyes that had a well controlled IOP after trabeculectomy and did not require any further intervention. Patients with corneal ectasias or staphylomas, history of keratoplasty or retinal detachment surgery, high myopes and those who underwent repeat trabeculectomy were excluded.

ODM was initially performed by the ophthalmologist through the lower eyelid. The technique was then thoroughly demonstrated to the patients and their attendants. Massage technique instructions were that patients should stand in front of a mirror, place a finger on lower lid and elevate the lid so that it covered the lower part of the globe. Pressure was applied on the globe with enough force but not so much as to cause discomfort or pain. Pressure was supposed to be steady and firm and had to be applied in the patterns of 10 seconds of pressure, 5 seconds of rest, and 10 seconds of pressure. Patients were advised to perform massage 3-4 times daily.

All the patients were followed-up at 1 week, 3 weeks, 6 weeks, 3 months, 6 months and 9 months. On each follow-up visit slit lamp examination was performed to note the configuration of bleb and to evaluate for any anterior or posterior segment complications related to ODM. IOP measurement was done with Goldman applanation tonometer. Patients were randomly asked to demonstrate the technique at some follow-up visit to see whether they were performing it correctly or not.

All findings were documented on proformas and statistical analysis of results was done using Statistical Package for Social Sciences (SPSS version 13.0). Main outcome measures were mean IOP, frequency of complications and required number of IOP lowering medications in the follow-up period. Differences between the means of two groups were analyzed using t-test while p-value of less than 0.05 was considered significant.

**RESULTS**

Mean age of the patients in massage and control groups were 60.00 ± 10.36 and 56.70 ± 12.16 years respectively (t=-0.651, p=0.519). Gender wise distribution of the two groups is shown in Table I. The mean pre-operative IOP without medical treatment was 36.00 ± 7.45 mm of Hg in the massage group and 37.90 ± 10.351 mm of Hg in the control group (t=0.666, p=0.509). Mean pre-operative IOP with medical treatment was 25.20 ± 9.892 mm of Hg in massage group vs. 20.70 ± 8.850 in controls (t=1.516, p=0.138). Postoperative mean IOP of massage group before the initiation of ODM was 21.25 ± 5.571 mm of Hg, which was significantly higher than mean postoperative IOP of 7.20 ± 2.526 mm of Hg in the control group (t=10.272, p=0.000). Mean period of starting ODM after surgery was 19 ± 6 days.

Table II shows comparison of mean IOPs between massage and control groups after the initiation of ODM. The difference in the mean IOP of the two groups was not statistically significant till 9 months follow-up. There was a reduction of almost 33% in the mean IOP of massage group from 21.25 ± 5.57 mm of Hg to 13.35 ± 2.94 mm of Hg at 9 months follow-up. Mean IOPs of the two groups in the follow-up period are graphically compared in Figure 1.

Transient shallow anterior chamber was noted initially in some cases of massage group however, anterior chamber was spontaneously reformed in 15-20 minutes. Complications related to ODM were bleb leakage in 1 eye (5%) and iris incarceration in sclerostomy in 1 eye (5%). Both of these cases did not require any surgical intervention for the management. Bleb leakage was managed by placing a bandage contact lens while incarcerated iris was released from the sclerostomy site by instilling pilocarpine. No case of hyphema, permanently shallow AC, traumatic cataract, endophthalmitis or posterior segment complications were noted. In the control group, bleb leakage was also noted in 01 eye (5%) which was also managed conservatively with a bandage contact lens. The difference in mean values of complications in massage and control group were not significant (t=-0.831, p=0.411).

Table III shows comparison of two groups in terms of required number of IOP lowering medications. A single drug was required in 3 cases (15%) of massage group. These also included the 2 eyes (10%) that had complications of bleb leakage and iris incarceration. In the rest of 18 eyes (90%), only one eye (5%) required a single medicine.
Sac massage for congenital nasolacrimal duct obstruction, eyelid massage after overcorrected blepharoptosis and digital massage for underfiltering blebs are a few simple techniques that still have their role in the management of various ocular problems.11,14,15 Efficacy of ODM in the control of IOP after trabeculectomy has not been proven by clinical trials in the past. In fact only a few clinical trials have previously been conducted in this regard.16,17 To the best of authors knowledge, this is the first study conducted in Asia to evaluate the role of digital massage in enhancing the bleb function.

A significant reduction in IOP with digital massage was noted in the current study (21.25 mm of Hg initially vs. 13.35 mm of Hg at 9 months, 33% reduction). McIlraith et al. also reported a significant reduction in IOP after ocular massage in eyes with Ahmads Glaucoma valve (AGV) implant. The IOP was immediately reduced by 40% from 19.2 mm Hg to 11.6 mm Hg (p < 0.001) and there was no significant difference regarding the final absolute IOP reduction between the massage and control group, (p = 0.8).16 Gouws et al. compared the results of digital massage with a calibrated massage device on IOP reduction in filtered eyes and found that IOP after 3 months was statistically similar in both groups. In both groups ocular massage significantly lowered IOP compared with pre-massage (p=0.001). In the finger massage group there was a mean IOP change of 8.9 mm of Hg.17

The current study evaluated the results of ODM in the early postoperative period only. There have been conflicting reports regarding the efficacy of ODM, if ODM is started at a later stage after surgery. Henderer et al. reported little to no success in the long-term management of increased IOP if ocular compression was done in the late postoperative period.18 On the other hand Kane et al. reported a substantial, transient decrease of IOP after ODM in glaucomatous eyes 3 months to 6 years after initial successful filtering surgery.19 Ophir and Ticho also reported control of IOP with the help of topical steroids, hypotensive medications, and digital massage in 2 patients who developed encapsulated filtering blebs with increased IOP many months after trabeculectomy.20

Potential complications of ocular massage reported in the literature include corneal ectasia, corneal abrasion, dehiscence of keratoplasty wound, shallow/flat anterior chamber, hyphema, iris incarceration in sclerostomy, cataract formation, endophthalmitis secondary to bleb rupture, sub-retinal hemorrhage hypotony, and rupture of Bruch's membrane.21-25 However, difference between the two groups in terms of complications was not significant in the current study. This can be explained by the fact that most of the complications related to ODM have previously been documented in case reports instead of clinical trials. As case reports do not have any
inclusion or exclusion criteria, the complications in these reports most likely occurred in predisposed eyes. The current study did not include the cases with corneal ectasias, corneal grafting, retinal detachment surgery and high myopes in this study and found that ocular massage was a safe technique in carefully selected patients. Similarly, McIlraith et al. reported no complications due to ocular massage in cases of AGV implant.\(^{16}\) Gouws \textit{et al.} reported 3 cases of wound leaks in the finger massage group and one case in calibrated device massage group.\(^ {17}\) In the current study, ODM was initiated after a mean postoperative period of 19 days and by this time the wound had sufficiently healed, minimizing the chances of bleb leakage. The technique of massage was thoroughly explained to the patients and this also helped to prevent any complications related to wrong technique.

In the current study, 3 eyes of massage group required one medicine each for the control of IOP. This could be argued as a bias for equivalence in mean IOP between the groups during the follow-up period. However, the difference between two groups in terms of required numbers of IOP lowering medication was not significant. Similarly, in the study by McIlraith \textit{et al.}, although massage group was receiving more medications than the control group at 3 months and 6 months, there was no difference between the two groups at the end of one year.\(^ {16}\)

Although a simple technique, yet ODM demands a degree of dexterity on the part of patient and lacks standardization of force applied. Insufficient pressure will negate purpose of massage while excessive force can lead to complications. To combat these problems various calibrated massage devices have been introduced recently. However, in countries like Pakistan where cost effectiveness is an important issue regarding compliance of the patients, ODM has an advantage of causing no financial burden to patients.

**CONCLUSION**

ODM is an effective method of controlling the IOP after trabeculectomy, and thus contributes to long-term surgical success with an acceptable risk / benefit ratio. It should be considered before more aggressive surgical interventions and additional medical therapy are initiated.

**REFERENCES**


