**ORIGINAL ARTICLE**

# Trabeculectomy under Topical Anesthesia

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## ABSTRACT

**Purpose of study:** To evaluate the efficacy of topical anesthesia as a method of choice for trabeculectomy procedure, in terms of pain during surgery and patient's satisfaction and comfort.
**Patients and methods:** Twenty patients undergoing trabeculectomy were included in the study. Trabeculectomy was performed. No sedation was used. No superior rectus muscle suture or corneal suture for exposure of surgical area was used. The degree of pain experienced during the operation was assessed by asking the patients to score on a numerical scale (0-10), having a written grades of pain as well (no pain=0, mild discomfort=2.5, moderate pain=5, severe pain=7.5, and unbearable pain=10). Surgeon (Hye.A) also graded the patient's overall cooperation during surgical procedure, the grades being 10=excellent, 7.5=good, 5=fair 2.5=poor and extremely poor=0.
**Results:** There were no intra-operative complications except sub-conjunctival hemorrhage during sub-conjunctival anesthesia. The overall cooperation as assessed by surgeon was excellent in majority i.e. 70% of the patients and good in the remaining 30%.The overall score showed a mean of 9.25. Patient's assessment of pain during delivery of first dose of topical anesthesia, during surgery and in the post operative period, on written and numerical pain scale, was almost similar, the mean score of 0.3, 0.425,and 0.35 respectively. No supplementary topical or injectable anesthesia and intravenous sedation was required. Squeezing of eyes and inadvertent eye movements were observed only in 20% i.e. 4 patients and these did not significantly interfere with the surgery.
**Conclusion**: The topical anesthesia is safe and effective method in providing a painless surgical procedure in patients undergoing trabeculectomy. This method has an additional advantage of avoiding serious complications related to other methods.
**Key words**: Trabeculectomy, local anaesthesia,

## INTRODUCTION

Cataract and glaucoma surgery are the most common elective procedures in the United Kingdom (and probably in the Pakistan as well), and about 200,000 performed annually[1]. A survey conducted by Royal College of Ophthalmologists has shown that local anesthesia is the anesthetic technique of choice for intra-ocular surgery in adults[2]. The expansion of the day case facilities has encouraged the use of local anesthesia and development of better surgical skills and facilities has rendered general anesthesia largely unnecessary.[3] Retro-bulbar[4, 5], peri-bulbar[6] and sub-Tenon's infiltration[2, 5, 7, 8] are commonly practiced. While providing excellent conditions for operating on the eye these techniques are associated with serious but uncommon side effects. The most dangerous is the respiratory arrest as a result of brain stem anesthesia.[9, 10] The sub-conjunctival and topical application of local anesthesia[11]may provide an excellent method of anesthesia for most of the surgical procedures, and are devoid of such serious risk like respiratory arrest but these fail to provide adequate akinesia and post-operative analgesia. The topical anesthesia is being used more frequently for intra-ocular procedures like cataract extraction with phaco-emulsification method[12,13,14] but less frequently for filtration procedures[15,16].

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## PURPOSE OF STUDY

The purpose of this prospective study was to evaluate the efficacy of topical anesthesia as a method of choice for trabeculectomy procedure, in terms of pain during surgery and patient's satisfaction and comfort.

## PATIENTS AND METHODS

After taking a detailed ophthalmic history including significant medical history and performing a complete ophthalmologic examination, twenty patients undergoing trabeculectomy were included in the study. A written consent was taken, explaining about the anesthesia and surgical procedure. Exclusion criteria included patients with communication difficulties, mental instability, exaggerated anxiety state, anticipated low cooperative ability of the patient, and age less than 15 years. Adequate control of diabetes and hypertension, and treatment of

ischemic heart disease prior to surgery were confirmed.

All patients received total of five doses of two drops each, of a 50% mixture of 2% Xylocain and Bupivicain injections just before and during the surgery. After complete sterile draping and proper exposure, 0.3ml of 2% Xylocain was injected at the proposed site of sclerotomy to raise a conjunctival bleb.

Trabeculectomy was performed with fornix-based conjunctival flap, formation of a 3x4mm lamellar scleral flap, excision of 1.5mm x 1.5 mm trabecular tissue, peripheral iridectomy, and the suturing of scleral and conjuntivo-Tenon flaps. The lamellar scleral flap, Tenon's capsule and conjunctiva were sutured with 10/0 interrupted sutures separately. No sedation was used. No sub-conjunctival injection was given. No superior rectus muscle suture or corneal suture for exposure of surgical area was used.

The degree of pain experienced during the operation was assessed by asking the patients to score on a numerical scale (0-10), having a written grades of pain as well (no pain=0, mild discomfort=2.5, moderate pain=5, severe pain=7.5, and unbearable pain=10). The scale was explained to the patients who were not able to see or understand the scale due to illiteracy and the answered responses were recorded. Surgeon (Hye.A) also graded the patient's overall cooperation during surgical procedure, graded as 10=excellent, 7.5=good, 5=fair 2.5=poor and extremely poor=0.

Postoperative medications included a combination of dexamethasone and tobramycin eye drops 4 times a day, and atropine eye drops twice a day only in those patients in which Mitomycin-C was as adjuvant. 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.

## RESULTS

Operative conditions and complications are given in the table-2. There were no intra-operative complications except sub-conjunctival hemorrhage during sub-conjunctival anesthesia. The overall cooperation as assessed by surgeon was excellent in majority i.e. 70% of the patients and good in the remaining 30%. No patient was rated as fair or poor in cooperation. The overall score showed a mean of 9.25. Patient's assessment of pain during delivery of first dose of topical anesthesia, on written and numerical pain scale, was 0 in 14 patients (70%), and < 2.5 in the remaining 30% patients giving a mean score of 0.3.The mean score on the same scale during surgery was 0.425, sixteen patients (i.e. 80%) reported no pain, the remaining patients reported mild pain only, 3 patients reporting 2.5 score and one patient reporting score of 1.0 only. Similar pain score was reported by the patients in the post operative period, having a mean score of 0.35. Sixteen patients reported no pain (score 0), 3 patients reported score of 2.0 and 1 patient reported score of 1.0.

No supplementary topical or injectable anesthesia and intravenous sedation was required. Squeezing of eyes and inadvertent eye movements were observed only in 20% i.e. 4 patients and these did not significantly interfere with the surgery.

Table 1: Topical anesthetics[18, 19]:

| | Concen-tration% | Onset (second) | Duration (minutes) | Toxicity |
|---|---|---|---|---|
| Cocain | 0.5-4.0 | 15-30 | 20-30 | Moderate To high |
| Proparacain | 0.5 | 15 | 15-30 | Low |
| Lidocain | 2.0 | 15-30 | 15-20 | Low |
| Bupivicain | 0.75 | 15-30 | 15-75 | Low |

Table 2: Operative conditions and complications during trabeculectomy under topical anesthesia:

| **Condition/ Complications:** | **=n%** |
|---|---|
| Supplementary inject able anesthesia | NIL |
| Supplementary topical anesthesia | NIL |
| Intra-venous sedation | NIL |
| Squeezing of eyes | 4/20 (20%) |
| Inadvertent eye movements | 4/20 (20%) |
| Sub-conjunctival hemorrhage | 3/20 (15%) |
| Patient's cooperation:<br>Excellent<br>Good<br>Poor | <br>14/20 (70%)<br>6/20 (30%)<br>NIL |
| Intra-operative complications | NIL |

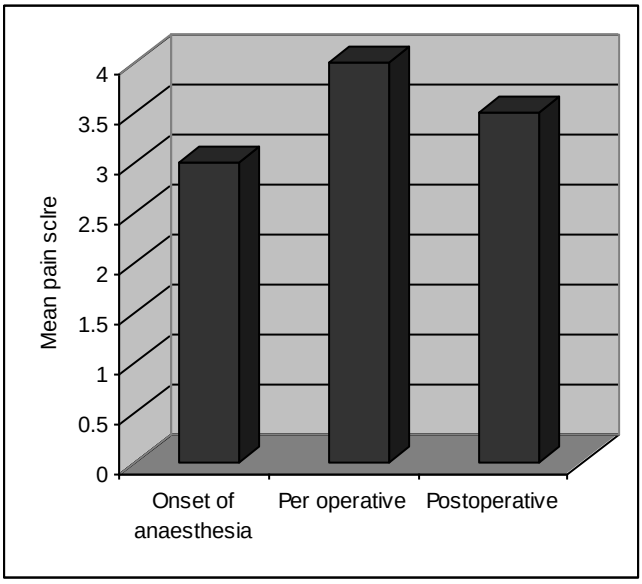
Fig.1 Written and numerical pain scale for patients

| | |
|---|---|
| Unbearable pain | 10 |
| | 9 |
| | 8 |
| Severe pain | 7 |
| | 6 |
| Moderate pain | 4 |
| | 4 |
| | 3 |
| Mild pain | 2 |
| | 1 |
| No pain | 0 |

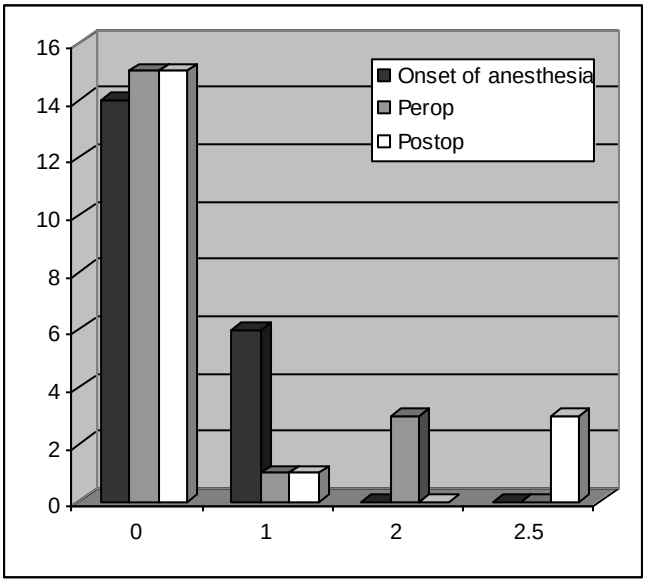
Fig.2: Written and numerical scale of patients cooperation surgeons assessent

| | |
|---|---|
| Excellent | 10 |
| | 9 |
| | 8 |
| Good | 7 |
| | 6 |
| Fair | 5 |
| | 4 |
| | 3 |
| Poor | 2 |
| | 1 |
| Very poor | 0 |

Mean pain score as recorded by written and numerical scale




Pain score at onset of anesthesia during surgery and post operatively




Operative conditions surgeons assessment of patients ooperation

## DISCUSSION

Different methods of local anesthesia used for eye surgery are either retro- bulbar[4, 5], peri-bulbar[6], sub-Tenon's infiltration[2, 5, 7, 8], sub-conjunctival and topical application[11,17]of anesthesia, either in the form of eye drops or ocular jelly. Because the cataract surgery is being largely performed under topical anesthesia[12,13,14], this may be considered as an attractive alternate method of anesthesia for operation of trabeculectomy as well. In addition to the fact that topical anesthesia avoids serious complications of retro-bulbar anesthesia[9, 10] it has other advantages as well. These includes, no patching in post-operative period, rapid recovery, being a pain free method and cost effective[23]. Further it may also avoid optic nerve damage due to pressure affects of retro-bulbar anesthetic or retro-bulbar hemorrhage[25].

Ritch and Liebmann[24] reported the efficacy of sub-Tenon anesthesia for trabeculectomy, indicating that the retrobulbar anesthesia is not essential for this purpose. Buys YM, and Trope GE[22] in their prospective study of sub-Tenon's versus retrobulbar anesthesia for trabeculectomy, further strengthened the idea of avoiding retrobulbar method. Carrillo and Buys[26], in a prospective study, comparing topical anesthesia with sub-Tenon injection, concluded that the topical anesthesia is equally effective. In another retrospective study by Vicary D and others[20], 38 patients undergoing combined phaco-trabeculectomy under topical plus sub-conjunctival anesthesia, were followed for three years. They reported no discomfort intra-operatively or post-operatively. In another prospective study of 22 consecutive patients undergoing combined phaco-trabeculectomy, Lai and Tham[17] shown that the topical 2% lignocain jelly alone without the use of sedation was able to achieve adequate analgesia. Similarly Ahmed IIK, Zabriskie NA, and others[20] demonstrated the effectiveness of topical anesthesia for combined cataract and trabeculectomy surgery.

In another study, G. Sauder and Jonas J B[28] evaluated the efficacy of topical anesthesia in comparison with retrobulbar method, and concluded it to be a better option due to its clinical feasibility and minimally invasive character. Zabriskie N A, Ahmed I I K, and others[16], compared the safety and efficacy of topical versus retrobulbar anesthesia in terms of operating conditions, patients comfort and surgical outcome, for trabeculectomy. They reported topical anesthesia as a safe and effective alternative to retrobulbar anesthesia for primary trabeculectomy.

In the present study, the efficacy of topical anesthesia was studied in terms of surgeon's assessment of patient's cooperation, and by patient's comfort indicated by a written and numerical scale. The overall results of the present study are similar to the reported studies. The topical anesthesia was previously considered in-affective in providing adequate anesthesia required for application of cautry to limbus and for performing iridectomy, and also is in-affective to cause adequate akinesia. The topical anesthesia is able to penetrate intra-ocularly, providing adequate aqueous levels (mean=23.21+/-8.87ug/ml) after 5-6 applications.[28]This study, by Roberto Bellucci and others, shows that the patients whose aqueous levels anesthesia are 12ug/ml or

above feels less or no pain. The intra-ocular penetration of local anesthetic agent through cornea and sclera allowed painless application of cautry and to perform peripheral iridectomy without pain, although the 4 patients in the present study, who had squeezing of eyes and inadvertent ocular movements did these because of mild pain during application of cautry and during peripheral iridectomy. There are no serious complications during surgery or during application of anesthesia, it may be considered as safe method not only in routine trabeculectomy but also in cases of advanced glaucomatous optic nerve damage and in only eye patients under going trabeculectomy.

## CONCLUSION

The topical anesthesia is safe and effective method in providing a painless surgical procedure in patients undergoing trabeculectomy. This method has an additional advantage of avoiding serious complications related to other methods.

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