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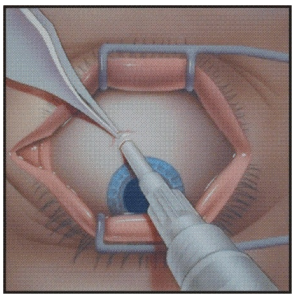

SUB-TENON ANAESTHESIA;
AN EFFICIENT AND SAFE TECHNIQUE FOR CATARACT SURGERY

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ABSTRACT ... soufiafarrukh@hotmail.com **Objective:** To describe a method that seeks to improve the administration of local anaesthesia for cataract surgery avoiding the risk of potential complications associated with other methods using sharp needles. **Design:** Prospective study. **Setting:** Eye unit, Bahawal Victoria Hospital Bahawalpur. **Period:** Twelve months. **Patients and method:** The safety and efficacy of this method was demonstrated in 100 consective cases. This technique consists of small, blunt dissection of the conjunctiva, tenon's capsule and inter-muscular septum in the inferior nasal quadrant, followed by the insertion of the curved cannula that is guided to the retro bulbar space, where 2.0 to 2.5 ml of anaesthesia is injected. **Results:** All of the patients (100%) felt that this procedure was comfortable and painless. The operative procedure was graded with a median of no pain or discomfort for both ECCE and phaco. Akinesia, analgesia and operating conditions were assessed on a point scale. **Conclusion:** Sub-Tenon Anaesthesia proved to be a safe and efficient technique that offers excellent anaesthesia and akinesia and avoids a sharp needle being passed into the orbit.

Key Words: Anaesthesia, sub-tenon's block, cataract extraction.

INTRODUCTION

The properties of an ideal local anaesthetic technique for ophthalmic surgery include globe anaesthesia, akinesia, absence of external pressure on the globe, minimal injectate volume and absence of serious complications.

Today various methods of local anaesthesia are in use for cataract extraction including retro bulbar[1], peribulbar[2], subconjunctival[3], and sub-tenon's[4] application of local anaesthetic solution. The retro bulbar technique is associated with several uncommon but potentially serious complications such as scleral perforation[5], retro bulbar haemorrhage[6], brainstem anaesthesia[7] and optic nerve damage[8]. The peri-bulbar technique offers some advantages over retro bulbar block. A large injectate volume, however, is required and the risk of scleral perforation is still present[5].

These complications arise because of trauma produced by passing a sharp needle blindly into the retro bulbar space .In 1992 Stevens[9] described the technique of passing a blunt probe into the subtenon's capsule by blunt dissection. Hausen et-al[4] had previously described a sub-tenon's block but this involved dissections in superior quadrants and may interfere with the surgical site. The technique involved in this series involved a

single quadrant infero-nasal approach described by Stevens which is away from the site of surgery.

MATERIALS AND METHODS

One hundred patients who were scheduled for cataract extraction with posterior chamber lens implantation under local anaesthesia were selected randomly for sub-tenon's block with a blunt cannula. This was done with appropriate institutional approval and the consent of the patients. The technique was then evaluated for its efficacy and safety.

SUB-TENON'S ANAESTHESIA CANNULA

A curved 19 gauge cannula manufactured by VISITEC was used in this study. Design specifications for the cannula are 1.10 by 25 mm (19 gauge by 1 inch). The cannula has rigid structure and a shaft with a gentle curve, specifically designed to follow the contour of the globe, with less tissue disturbance. The antero-posterior flattening of the smooth tip facilitates easy advancement of the cannula within the potential tenon's space tissue plane.

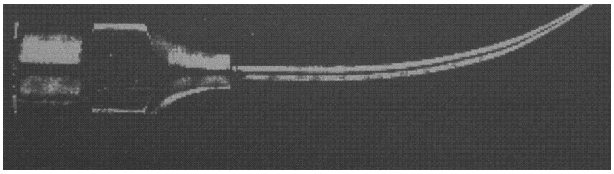

Figure-1. The reusable cannula is designed to follow the contour of the globe.

TECHNIQUE

The conjunctiva is anaesthetized by topical Proparocaine Hydrochloride 0.5%. The lid speculum is positioned and the patient is then requested to gaze upwards and laterally. The conjunctiva and anterior Tenon's capsule is picked up by the forceps at an inferonasal point about 5mm from the limbus midway between the insertions of the medial and inferior rectus muscles. A small cut of approximately 1 to 2 mm is made at the base of the picked up conjunctiva and Tenon's capsule. At this stage it is important to ensure that the cut includes both conjuctiva and Tenon's capsule layers and that bare sclera is visible. The Westcoth scissors are slid through this nick and blunt dissection is done to create a path in the tissue plane between sclera and tenon's capsule as well as the inter-muscular septal fascia. While still holding the conjuntiva and tenon's capsule with the forceps, the curved cannula, connected to a 5ml syringe, containing a 50/50 mixture of 2% lidocaine and 0.5% bupivocaine is passed down the channel until the tip lies well into the posterior sub-tenon's space. After delivery of approximately 1ml at this level, just posterior to the equator, the cannula is advanced further to a total distance of approximately 1.5 to2.0 cm, depending upon globe size, and further solution delivered to a total volume of 2.5 to 3.0 ml.

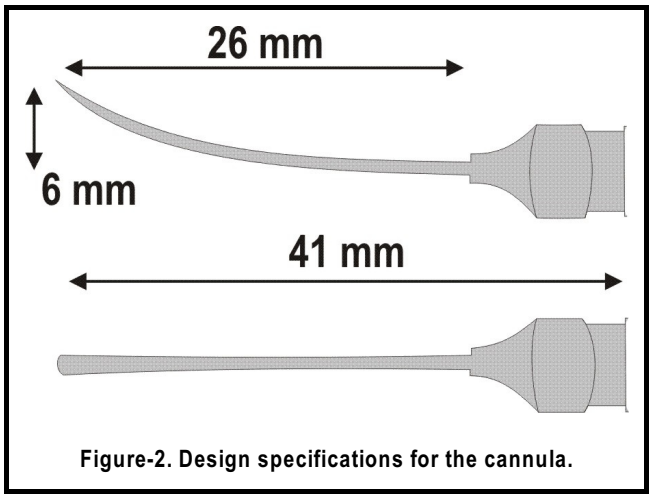

Figure-2. Design specifications for the cannula.

If care is not taken to deliver the solution to the posterior sub-tenon's potential space, then it is very easy to deliver the anaesthetic solution as an anterior sub-conjunctival application. Immediate conjunctival chemosis then results and this may be extensive if the whole volume is given anteriorly by mistake. It is important, therefore, for the volume to be given slowly and in gradual steps, so ensuring that the site of the delivery is that which was intended. With practice, the cannula position, with respect to the fascial layers, was judged accurately and the technique became quicker and easier. After giving the anaesthetic solution, at least 5 to 10 minutes were allowed for diffusion to occur before commencing surgery. Immediately prior to surgery, an evaluation of the block was made.

ASSESSMENT

The quantity of the block was assessed by the surgeon on the basis of akinesia, analgesia and operating conditions on a point scale.

Akinesia was assessed by a subjective scale graded as complete movement remaining, some movement remaining and no movement, and a point scale of 0,1 and 2 respectively. Postoperatively, the patient was asked about the discomfort of the block insertion and pain, if any, experienced during the surgery.

Analgesia was graded as poor, satisfactory and excellent and on a point scale 0, 1 and 2 respectively.

The overall quality of block was assessed by the surgeon at the end of the procedure. Any problem or complication was also noted.

RESULTS

Data from 100 consecutive sub-tenon's blocks performed over a period of twelve months were analyzed. 56% patients were male and 44% were female. Regarding age distribution, 6% patients were in the 4th decade, 15% in the 5th decade, 40% in the 6th decade, 21% in the 7th decade and 18% were in the 8th decade and above.

Table I Lid motility

Score	Full (0)	Some (1)	None (2)
% age of patients	0	26%	74%

Table II Ocular motility

Score	Full (0)	Some (1)	None (2)
% age of patients	0	8%	92%

Assessment of akinesia is summarized in table I and table II. The pain experienced by the patients during performance of the block and intra operative pain is summarized in table III.

Table III Analgesia

Score	Poor	Satisfactory	excellent
Mode of insertion	0	10%	90%
Intra-operative pain	0	20%	88%

92% of the patients had very adequate sub-tenon's anaesthesia and 8% had just adequate. None required supplemental block. All local anaesthesia blocks were performed by the author and no complication occurred which prevented surgery.

More than usual conjunctival chemosis occurred with peri-bulbar or retro bulbar anaesthesia and sub conjunctival hemorrhage is another common but not a serious complication.

DISCUSSION

The delivery of sub-tenon's anaesthetic, directly irrigating the immediate retro bulbar region, is effective and reliable in providing both analgesia and akinesia.

The sub-tenon's technique appears to get closer to the characteristics of an ideal block than with retro bulbar or peri-bulbar technique. It uses similar injectate volume and has speed of onset comparable to retro bulbar block, but should avoid many of the complications associated with the retro bulbar anaesthesia, namely scleral perforation, optic nerve trauma, brainstem anaesthesia and retro bulbar hemorrhage, because a blunt cannula rather than a sharp needle is used for the injection.

Another advantage of the sub-tenon's technique is that it is usually associated with only minor discomfort, which may explain the excellent degree of patient acceptability. All patients developed some degree of loss of orbicular is tone due to the local anaesthetic tracking sub-conjunctively into the lids and acting on branches of facial nerve at that point.

Possible problems associated with this infero-nasal technique of anaesthesia includes the requirement for the patient to elevate or abduct the eye to expose the

infero nasal quadrant and allow the cannula to pass backwards, though no patients during this study had any difficulty with this maneuver. Some preoperative chemosis is inherent with this technique and may be limited by ensuring posterior delivery of anaesthetic solution. Care should be taken in performing this block in high myopes owing to the possible but uncommon presence of a posterior staphyloma; however, other block techniques are also relatively contraindicated in these patients.

CONCLUSION

The sub-tenon's block is a highly effective anaesthetic technique for major ophthalmic surgery, which is relatively easy to perform and appears to avoid the major complications associated with retro bulbar and peri-bulbar techniques. After over 100 years of sharp instrument local anaesthesia, a direct sub-tenon irrigation approach could be viewed as a very safe and efficient modification of local anaesthetic techniques employed for ophthalmic surgery.

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