

Sub-Tenon Versus Peribulbar Anaesthesia for Cataract Surgery

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Purpose: The aim of this study is to compare the efficacy of sub-Tenon anaesthesia with peribulbar anaesthesia in terms of intraoperative pain and ocular movement during cataract surgery.

Design: Prospective, cohort study.

Methods: A total of 50 patients were enrolled in the study between 1st July 2002 until 31 December 2002. 25 patients were randomly assigned to peribulbar anaesthesia (group A) and 25 patients sub-Tenon anaesthesia (group B). The surgeon observed and recorded whether there was eye movement during surgery or not. The movement was graded as: no movement, slight movement, moderate movement and full range of movement. Postoperatively, patients were asked whether they felt pain during surgery or not. Pain perception was graded as: no pain, slight discomfort, slight pain, moderate pain, severe pain, excruciating pain and unbearable pain. The effect of the type of anaesthesia on eye movement and pain perception was measured. Pearson Chi square test was used to determine the statistical significance for pain perception and eye movement.

Results: Pain perception was similar in both groups. The effect of type of anaesthesia on ocular movement was better in the sub-Tenon group.

Conclusion: Sub-Tenon anaesthesia is more effective in terms of ocular movement than peribulbar anaesthesia. Considering this and the known complications associated with peribulbar anaesthesia, the author recommends the use of sub-Tenon anaesthesia for cataract surgery.

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Regional anaesthesia is commonly used for cataract surgery. Retrobulbar anaesthesia used to be performed for cataract surgery for many years. This was associated with some rare but serious complications such as: globe perforation, brain stem anaesthesia, post operative strabismus, retrobulbar haematoma and optic nerve injury. This has led to get this procedure replaced with peribulbar anaesthesia.¹ Although

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complications with peribulbar anaesthesia are much less compared with retrobulbar anaesthesia, serious complications were reported^{2,3,4}. Moreover, peribulbar anaesthesia has a high rate of imperfect blockade which necessitates supplemental injections in up to 50% in certain series⁵. Performing supplemental injections may theoretically increase the risk of complications.

Sub-Tenon's anaesthesia has become an accepted technique for eye surgery. It is a safe, quick and effective method of local anaesthesia^{6,7,8,9}.

This prospective study was undertaken to evaluate and compare sub-Tenon anaesthesia with peribulbar anaesthesia for cataract surgery.

METHOD

The patients were selected on alternate basis in theatre, for example, the first patient on the theatre list was assigned to group A (peribulbar group) and the following patient to group B (sub-Tenon group) and so on. A 50:50 mixture of lidocaine 2% and bupivacaine 0.5% was used in both techniques.

The peribulbar anaesthesia was performed using a sharp peribulbar needle ($\frac{3}{4}$ inch). Few drops of Amethocaine 1% were applied after which the needle was introduced in the lateral 1/3 of the orbit inferiorly just above the orbital rim. A total of 4-5 ml of the anaesthetic agent was infiltrated. For the sub-Tenon anaesthesia, after instilling few drops of topical amethocaine 1%, patients were instructed to look upward and laterally. A blunt Wescott (spring) scissors was used to open a small incision in the inferonasal quadrant approximately 5 mm from the limbus. An opening was created in the anterior Tenon's fascia down to bare sclera. Moorfields forceps was used to grip the conjunctival edge and a blunt cannula was used to deliver the local anaesthesia and glided along the contour of the globe. The cannula is advanced posterior to the equator of the globe. Slow delivery of approximately 4 ml of the anaesthetic agent was infiltrated. Honan balloon was used on the eye for 7 minutes to help distribute the anaesthetic agent in both techniques.

Both techniques were evaluated in terms of ocular movement during surgery and patients' pain perception during the surgical procedure. The surgeon evaluates and records patients' eye movements during the surgery. The surgeon fills a chart which grades eye movement in four grades: no movement, slight movement, moderate movement and full range of movement. Postoperative pain chart was devised to assess patients' pain perception during the surgical procedure. Patients were interviewed in the recovery, soon after completing the surgical procedure. Pain was graded as follows: no pain, slight discomfort, slight pain, light pain, moderate pain, severe pain, excruciating pain and unbearable pain. (See eye movement and pain perception chart) Each anaesthesia technique was tabulated with pain and eye movement. Pearson Chi square test was used to determine the statistical significance.

Eye movement & pain perception chart

Name.....

Date of surgery/.../...

CPR.....

Date of birth/.../...

Sex

Nationality

Type of anaesthesia:

1. peribulbar
2. sub-Tenon

Eye movement during surgery:

1. full range of movement
2. moderate
3. slight
4. no movement

Intra-operative pain perception assessed post operatively:

0. nothing
1. slight pain
2. light pain
3. moderate pain
4. severe pain
5. excruciating pain
6. unbearable pain

RESULTS

The majority of patients were Bahrainis (94%); 3 (6%) were non-Bahrainis. The mean age was 65 years. The age of the majority of patients was between 50 and 80, reaching a peak at 60 – 70 years of age. Figure 1 shows the age distribution of the study population.

Figure 1. Patients' age distribution. The majority of patients are between 60 and 80 years of age .

Figure 2: Frequency of different grades of pain perception. No difference was demonstrated between the two groups. ($P > 0.05$)

Figure 2 demonstrates pain perception in both sub-Tenon's and the peribulbar anaesthesia groups. The maximum grade of pain perception reported was moderate pain. None of the patients in the study had severe pain, excruciating pain or unbearable pain. Pain perception was similar in both groups with no significant difference ($P > 0.05$).

Figure 3. Frequency of different grades of intra-operative eye movement. Eye movement was more evident in the peribulbar anaesthesia group. ($P < 0.005$)

Eye movement during surgery is shown in figure 3. Intra-operative eye movement was more in the peribulbar anaesthesia group indicating less efficient akinesia compared with the sub-Tenon group ($P < 0.005$).

DISCUSSION

Various methods of local anaesthesia are in use for cataract surgery nowadays. This includes retrobulbar, peribulbar, subtenon's, subconjunctival and topical. Both retrobulbar and peribulbar anaesthesia involve blindly placing a sharp needle into the orbit to deliver the anaesthetic agent. The technique of peribulbar anaesthesia has been preferred to retrobulbar anaesthesia as it is associated with a smaller risk of globe perforation, retrobulbar haemorrhage, optic nerve damage, and injection of the anaesthetic solution into the subarachnoid space¹⁰. However, the peribulbar method itself is not absolutely safe. Some serious complications has been reported frequently^{2, 3, 4, 11, 12}. Subconjunctival anaesthesia is an effective and safer alternative; however, this technique provides no akinesia¹³. Topical anaesthesia has gained wide popularity particularly with the advent of phacoemulsification¹⁴. However, it does not provide akinesia. Lack of akinesia can pose significant difficulty particularly when dealing with uncooperative patients.

Sub-Tenon anaesthesia which was described by Stevens⁶ and Hansen⁷ has become popular. It eliminates the risks associated with retrobulbar and peribulbar blocks and provides both anaesthesia as well as akinesia. Problems encountered with the sub-

Tenon's approach include some degree of chemosis, which if significant, can impede the surgeons's view. This problem can be eliminated by ensuring that the anaesthetic solution is injected posteriorly. Posterior delivery not only prevents chemosis but also ensures that the block is truly delivered in the sub-Tenon's space and not inadvertently to the anterior subconjunctival space. The other problem associated with sub-Tenon's approach of local anaesthesia is subconjunctival haemorrhage. This is usually small, limited to a thin layer and does not extend to more than one quadrant. None of the study patients had significant chemosis which interfered with the section region. Moreover, no patient had sufficient subconjunctival haemorrhage to cause a problem.

CONCLUSION

Sub-Tenon's anaesthesia is an effective and safe technique for cataract surgery. Comparing this technique with peribulbar anaesthesia there was no significant difference in terms of pain perception during surgery.

Moreover, our results demonstrated that sub-Tenon anaesthesia was more effective than peribulbar anaesthesia in terms of intraoperative eye movement. This conforms with other studies^{8,9}.

In view of our results and the known risks associated with peribulbar anaesthesia, the author recommends the routine use of sub-Tenon Anaesthesia for cataract surgery.

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