Comparison of Peribulbar Anaesthesia with Topical Anaesthesia in Manual Small Incision Cataract surgery

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Abstract

PURPOSE: To compare the safety and efficacy of Peribulbar Anaesthesia with Topical Anaesthesia in Manual Small Incision Cataract Surgery using a Randomized Controlled Clinical Trial.

METHOD: 150 patients were randomized to Peribulbar and Topical groups with preset criteria after informed consent. All surgeries were performed by two surgeons. Pain during administration of anaesthetic, during surgery and 4 hours after surgery was graded and compared for both techniques. The surgeon also scored for surgical ease/discomfort in terms of unwanted ocular movements, patient cooperation and anterior chamber stability. The patients were followed for 1 month.

RESULTS: 66 patients of peribulbar group and 64 patients of topical group had no pain during surgery. 70 patients in peribulbar group had grade 0 pain while only 24 had grade 0 pain in Topical group. The surgeons experience was the same in both the groups. The average time taken for surgery was 7 min.

CONCLUSION: MSICS under Topical anaesthesia is safe, patient friendly and as effective as Peribulbar Anaesthesia.

Key Words: Manual Small Incision Cataract Surgery, Topical Anaesthesia, Peribulbar Anaesthesia.
**Introduction:**

MSICS (Manual small Incision Cataract Surgery) is a very suitable procedure for high volume surgeries in an unequally developed country like ours. It has been conventionally performed under peribulbar or retrobulbar anaesthesia, though at some centers, it is also done under subtenon or subconjunctival anaesthesia.

MSICS is the most cost-effective of all the surgical interventions in terms of quality of life restored.

The self-sealing incision of MSICS has shortened the duration of surgery considerably. This has resulted in the use of shorter acting anaesthetic agents with less invasive methods of administration.

Topical anaesthesia has been used in ECCE with IOL implantation (with subconjunctival supplementation) and also in clear corneal cataract surgeries. It has also been described along with intracameral Lignocaine 2% for MSICS. Peribulbar anaesthesia is a time-tested popular procedure, but it has a higher risk of injury to intraorbital structures and also a palpable fear of the “needle near the eye”. This can be completely avoided in topical anaesthesia.

We here describe a technique of using only topical Lignocaine 2% jelly in MSICS.

**Materials and Methods:**

All the patients opting for cataract surgery with PCIOL implantation were asked to participate in this trial. The first 150 who agreed to informed consent were randomized to either peribulbar or topical techniques of anaesthesia.

The exclusion criteria were:

1. Age <30 or >90 years.
2. Sensitivity to Xylocaine.
3. People who preferred Phacoemulsification.
4. Previous intraocular injury, inflammation or surgery.
5. Pupil <5mm in diameter.
6. Inability to understand the visual analog pain scale.
7. Inability to understand and comply with verbal commands (causes including deafness, dementia and aphasia).

They were operated upon by two surgeons of reasonably good experience (of 5 years and 1000 surgeries with the peribulbar technique and 100 surgeries with topical anaesthesia).

Assuming 90% power and 5% level of significance and assuming that there would be no pain in 40% and 60% of cases by either technique (difference of proportions), each arm should have a minimum of 58 patients. Assuming loss of 20% to follow up the study aimed to randomize 150 patients (although 144 would have been sufficient). Informed consent was obtained from all the participating patients.

The randomization schedule for each surgeon was obtained from a table of random numbers.

Each patient was randomly assigned a chit on entering the Block (preanaesthetic area) Room. The peribulbar anaesthesia was given by a senior postgraduate student. The topical anaesthesia was given by the nurse as 4% Lignocaine drops, 5 minutes before the surgery and by the surgeon on the table as 2% Lignocaine jelly after draping and insertion of the eye speculum.

The patient was asked to gauge for pain during surgery and 4 hours after surgery using the modified visual analog pain scale. After each surgery, the
surgeon evaluated her experience based on four parameters. Patient’s cooperation, difficulty due to ocular movements and anterior chamber stability were graded on a scale of 1 to 3, thus giving a cumulative range of 3-9 points. The fourth parameter was adverse results, which was mentioned as and when they happened.

The patients were followed on first postoperative day, first week and six weeks after surgery. The best-corrected visual acuity was noted.

**PERIBULBAR ANAESTHESIA:**

5ml of 2% Lignocaine with 1: 10,000 adrenaline was injected using a 24G needle at the junction of middle and outer third of lower orbital margin with the needle directed parallel to the floor of orbit. A supplementary injection of 1-2 ml was given at the supraorbital notch with needle directed parallel to the orbital roof, if necessary. The eyelid was closed and pressure applied for 5 minutes.

**SURGERY UNDER TOPICAL ANAESTHESIA:**

At the start of the surgery, the patients were instructed to hold the hand of paramedical staff and to squeeze the hand whenever they felt pain, which was recorded together with the surgical step during which they felt pain.

The instillation of the local anaesthetic was done as described above. The patients usually reported a stinging sensation. After about 1 minute, they were advised to look at the operating microscope light and the surgery was started. No superior rectus suture was taken. The sclera was exposed by making a fornix based conjunctival flap and cautering the bleeding vessels with a bipolar wet field cautery. The rest of the steps were the same as in routine MSICS.

**MODIFIED VISUAL ANALOG PAIN SCALE:**

<table>
<thead>
<tr>
<th>Grade</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No pain</td>
</tr>
<tr>
<td>1</td>
<td>Mild pain</td>
</tr>
<tr>
<td>2</td>
<td>Moderate pain</td>
</tr>
<tr>
<td>3</td>
<td>Severe pain</td>
</tr>
</tbody>
</table>

**Results:**

150 patients underwent MSICS between Feb 2009 and May 2009 and completed the 6 weeks follow up. They were operated by 2 surgeons. [Table 1]

<table>
<thead>
<tr>
<th>Surgeon</th>
<th>Peribulbar</th>
<th>Topical</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>43</td>
<td>35</td>
<td>78</td>
</tr>
<tr>
<td>B</td>
<td>35</td>
<td>37</td>
<td>72</td>
</tr>
</tbody>
</table>

93 patients were females, 50(64.10%) in peribulbar group and 43(59.72%) in topical group. Average age in the two groups was 67 and 65 years respectively. There was no statistically significant difference between the two groups w.r.t age (p=0.143) and sex (p=0.213).

Type of cataract according to morphology was nuclear in 52, nuclear and subcapsular in 76 and posterior subcapsular in the rest. Nuclear density ranged from Grade I to V and correlated with age.
That there is a significant difference in pain during administration of anaesthesia, between the two techniques, is entirely obvious. [Table 2] shows the various grades of pain during surgery in both the groups. Average for pain during surgery was 0.15 for peribulbar and 0.11 for topical in a range of 0-4. Most of the patients felt pain during prolapsing of the nucleus into the anterior chamber and during stretching of the wound while delivering the nucleus in the topical anaesthesia group.

Table 2: Pain during surgery

<table>
<thead>
<tr>
<th>Grade</th>
<th>Peribular</th>
<th>Topical</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>66</td>
<td>64</td>
</tr>
<tr>
<td>1</td>
<td>9</td>
<td>8</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

The 3 patients who felt Grade 2 pain in the peribulbar group had increased positive pressure.

[Table 3] describes pain 4 hours after surgery. 3 patients in peribulbar group (average for pain = 0.102) reported Grade 2 pain 4 hours after surgery compared to 70 patients in topical group (average for pain = 0.67) reporting up to Grade 1 pain and 2 patients reporting Grade 2 pain. There were 2 posterior capsular rents in the topical group and 1 in the peribulbar group. 3 patients in peribulbar group had increased positive pressure during surgery while none in the topical group had so. One person in each group had buttonholing of the scleral tunnel. The incidence of postoperative complications in each arm was similar.

Table 3: Pain 4 hours after surgery

<table>
<thead>
<tr>
<th>Grade</th>
<th>Peribular</th>
<th>Topical</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>70</td>
<td>24</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td>46</td>
</tr>
<tr>
<td>2</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

Table 4: Frequency distribution of surgeon’s score for surgical ease/discomfort during MSICS during peribulbar and topical anaesthesia.

Peribulbar Anaesthesia:

<table>
<thead>
<tr>
<th>Surgeon’s score</th>
<th>Patient cooperation</th>
<th>Unwanted ocular movements</th>
<th>Anterior chamber stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>74</td>
<td>57</td>
<td>72</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>7</td>
<td>5</td>
</tr>
</tbody>
</table>

Topical Anaesthesia:

<table>
<thead>
<tr>
<th>Surgeon’s score</th>
<th>Patient cooperation</th>
<th>Unwanted ocular movements</th>
<th>Anterior chamber stability</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>69</td>
<td>69</td>
<td>70</td>
</tr>
<tr>
<td>2</td>
<td>2</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

There was no significant difference in both groups with regards to uncorrected and corrected visual acuity postoperatively. 73/78 (93.58%) patients in peribulbar group and 67/72 (93.05%) patients of topical group had BCVA >6/9.
The average time taken for surgery from insertion of speculum to taking off the speculum after subconjunctival injection was 7 minutes.

**Discussion:**

At the time of anaesthetic administration, topical anaesthesia scores much higher than peribulbar anaesthesia. The risk of globe perforation, optic nerve injury, pain and fear perceived because of peribulbar anaesthesia are all eliminated with topical anaesthesia. Further benefits include non-interference with the visual function (risk of retrobulbar haemorrhage including), unlimited ocular movements and absence of increased intraorbital volume.

Patients under topical anaesthesia also had good analgesia intraoperatively, but the surgeon had to operate with incomplete akinesia, which some may find disconcerting. Surgeon’s evaluation of the technique indicates that the patient cooperation was very good in 96.5% cases. The importance of sticking to the selection criteria is hence emphasized. The incomplete akinesia is not exactly unwanted as the patient is able to follow the surgeon’s instructions very well. The anterior chamber stability is good in topical anaesthesia as there is no increase in intraorbital pressure. The slippery nature of the jelly along with the fact that surgery is done without a superior rectus support may lead to some discomfort to the surgeon.

The mean pain score of 0.11 (SD: range 0-4) is comparable to studies done on topical anaesthesia for phacoemulsification. The mean pain scores are similar to the studies for topical group but none of the patients in our study needed subtenon lignocaine supplementation as was required by some patients in all the mentioned studies. Similarly we did not have to resort to intracameral Lignocaine in any patient.

Fichman has found no major changes in pulse rate, blood pressure and respiration rate of patients during surgery under topical anaesthesia. There is also no significant change in plasma cortisol levels during surgery under topical anaesthesia. This shows that the patient is not under any undue stress when surgery is done under topical anaesthesia.

The relaxation of the ciliary body using Tropicamide (0.8%) with Phenylephrine (5%) prior to surgery is a very important tool to make the surgery pain free under topical anaesthesia.

The fact that the time taken for surgery is only <7 minutes is also contributory to the success of surgery under topical anaesthesia.

There have been no unwanted effects of Lignocaine gel 2% on extracapsular surgery and phacoemulsification.

The limitations of this study include the subjective nature of the modified visual analog pain scale and the fact that surgeries were done by only two surgeons.

**Conclusion:**

In MSICS, topical anaesthesia using Lignocaine 2% jelly is safe and as effective as peribulbar anaesthesia and is more comfortable to the patient at the time of administration.

**References:**


2. Parkar T, Gogate PM, Deshpande M, Adenwala A, Maske A, Verappa K. Comparison of subtenon anaesthesia with Peribulbar anaesthesia for


