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Efficacy and Safety of Subtenon's and PeribulbarAnaesthesia in Manual Small Incision Cataract Surgery

Narendra P Datti, Kanthamani Krishnappa, Guruprasad B S, Prashanth Krishnappa, Joyita Guha, Amol Bansal

Department of Ophthalmology, Sri Devaraj Urs Medical College, Kolar.

ABSTRACT

Objectives: *A single blinded prospective and randomized trial was carried out in our institute to evaluate efficacy and safety of subtenon's anaesthesia compared to peribulbar in manual small incision cataract surgery.*

Methods: *This study was conducted in the Department of Ophthalmology, R L Jalappa Hospital and Research Centre, Tamaka, Kolar attached to Sri Devaraj Urs Medical College between January 2008 and June 2011. A total of 500 patients attending eye camps, who underwent Manual Small Incision Cataract Surgery (MSICS) with rigid Polymethyl Methacrylate (PMMA), Intra Ocular Lens (IOL) implantation were included in this study. Patients were randomly assigned to subtenon's group (Group A, n=250) who received 2.5ml of lidocaine (2%) with adrenaline in subtenon's route in inferonasal quadrant after dissecting conjunctiva and peribulbar group (Group B, n=250), who received 6 ml of local anaesthetic (equal quantities of 2% xylocaine and 0.5% bupivacaine) in peribulbar region. All surgeries were performed by the same surgeon.*

Results: *Pain scores for administration of anaesthetic were significantly lower (P<0.001**) for subtenon's (mean=1.4) compared to peribulbar (mean=2.4). Peroperative pain scores were lower for subtenon's (mean=0.452) than peribulbar (mean= 1.16). Subtenon's produced good akinesia comparable to peribulbar. Subconjunctival haemorrhage (58.4%), chemosis (28%) were commonly noted in subtenon's while ptosis(5 cases) was noted in peribulbar. Moreover less anaesthetic solution and shorter interval from administration to surgery was required in subtenon's.*

Conclusion: *Subtenon's is a better alternative to peribulbar in manual small incision cataract surgery in eye camps*

Keywords: *Subtenon's, Peribulbar, Anaesthesia.*

Corresponding Author:

Dr. Narendra P. Datti,

Professor and Head,
Department of Ophthalmology
Sri Devaraj Urs Medical College,
Tamaka, Kolar - 563101, Karnataka, India.
Email:drnarendradatti@rediffmail.com
Mobile no: 9845526258

INTRODUCTION

The most commonly performed surgery in the National Health Service in today's world is the cataract surgery. Keeping pace with the law of nature, procedures of cataract surgery have also evolved with time. After Intra Capsular Cataract Extraction (ICCE), and Extra Capsular Cataract Extraction (ECCE), Manual Small Incision Cataract Surgery (MSICS) has in recent years become popular in developing countries like India owing to its affordability[1,2] and success in achieving good uncorrected vision post-operatively as compared to ECCE.[1,3]

Retro bulbar anaesthesia which was used for almost a century was associated with a number of potentially sight-threatening [4,5] and life threatening complications like hematoma, nerve damage, blindness and even very rarely brain stem anaesthesia. [6]Peri bulbar anaesthesia for cataract surgery was the most popular technique in the previous decade, [4,7] but it is also not completely free from complications.[4,8] Unfortunately this technique is also associated with complications such as hematoma and ocular peforation.[6] Attention has also shifted to shortening the duration of surgery and using less invasive methods of anesthesia. [1]

Subtenon'sanaesthesia[4,9,10,11] involves transconjunctival infiltration of local anaesthetic agent directly to the subtenon's space, after instillation of local anaesthetic drop in the conjunctiva which takes away the pain from the needle prick.[4]This technique has been successful for conventional ECCE with posterior chamber Intra Ocular Lens implantation (PCIOL).[4,11]

We conducted this prospective study to compare subtenon's anaesthesia as an effective alternative to peribulbar anaesthesia in manual small incision cataract surgery in eye camps.

MATERIALS AND METHODS

This is a prospective randomized trial comprising of 500 consecutive patients with age related cataract, who underwent elective manual small incision cataract surgery (MSICS) with posterior chamber intraocular lens (PCIOL) implantation at our institute after obtaining institutional ethical committee approval and written informed consent.

Five hundred patients, attending eye camps, organised by R L Jalappa Hospital and Research Centre, Tamaka, Kolar attached to Sri Devaraj Urs Medical College, with age related cataract fulfilling the criteria framed were selected and taken to the base hospital for MSICS under subtenon's and peribulbar anaesthesia between January 2008 and June 2011.

Patients were excluded from the study according to the following criteria:

1. Pseudoexfoliation.
2. Previous ocular surgery.
3. Co-existing ocular pathology (scleral diseases and high myopia)
4. Associated conditions that can make surgery difficult like extreme anxiety, mental retardation, chronic cough etc

All the patients were admitted one day prior to the surgery. All these patients underwent the following pre-operative evaluation and complete eye examination including a full history of any previous ocular disease or surgery, examination by both direct & indirect ophthalmoscopy, visual acuity recording by Snellens charts, applanation tonometry and detailed slit lamp examination. General physical and systemic examination including cardiovascular system and respiratory system examination, blood pressure recording and blood sugar evaluation were done.

All patients were on oral tab ciprofloxacin 500mg twice daily and ciprofloxacin 0.3% eye drops hourly one day before the surgery. Preoperatively pupils were dilated with tropicamide with phenylephrine 0.5% drops along with flurbiprofen 0.03% drops. Sensitivity to local anaesthetics were tested with lignocaine 2% test dose.

The patients were randomized to receive one of the two types of anesthesia viz.

Group A: MSICS under Subtenon's Anaesthesia (250 cases).

Group B: MSICS under Peribulbar Anaesthesia (250 cases).

For the subtenon's group (Group A=250), a small incision was made in a tent of conjunctiva raised about 5-7 mm from the limbus with a pair of ophthalmic scissors. A curved blunt irrigating cannula (19 G, 25 mm) was then inserted with the syringe of anaesthetic solution [2.5ml of lidocaine (2%) with adrenaline] and slow delivery of local anaesthetic was then performed.

The peribulbar group (Group B=250) received 6ml of a mixture of equal parts of lidocaine (2%) and bupivacaine (0.5%), subcutaneously in inferotemporal (3ml) and superonasal quadrant (3ml).

All surgeries were done by a single experienced surgeon.

Patients were asked to grade the pain during administration of anesthetic, during surgery, and 6 hours post operatively on a 4-point verbal pain scale (0: No pain, 1: Slight sensation or discomfort but no pain, 2: Slight pain, 3: Moderate pain, 4: Intense pain).

The surgeon graded ocular movements on a scale of 0 to 3 (no movements = score 0, mild = 1, moderate = 2, severe = 3), and squeezing of the lids during surgery on a scale of 0 to 2 (little or no lid squeezing = score 0, moderate or ill sustained squeezing throughout = 1, instantaneous and sustained squeezing = 2) of increasing severity.

Both intra and postoperative complications (chemosis, subconjunctival haemorrhage, ptosis, ecchymosis) were noted and compared between the two groups.

The data was analyzed using SPSS statistical software. Descriptive statistics, like t test and Chi square test were used for analysis. P value of <0.05 was considered statistically significant.

RESULTS

The details of the pain scores during administration of anesthetic, during surgery and 6 hours postoperatively are shown in Table 1, Fig 1 and 2. Pain scores were significantly lower in subtenon's group (P<0.001**) compared. to peribulbar group, the mean pain scores being 1.4 and 2.4 for subtenon's and peribulbar respectively.

The overall pain scores during surgery as well as 6 hours post-operatively were significantly lower (P<0.001**) in subtenon's group compared to peribulbar group; the mean scores being 0.452 for subtenon'sand 1.16 for peribulbar groups.

Among the complications, squeezing of the lids (P<0.001**), eye movements (P<0.001**), sub-conjunctival hemorrhage (P<0.001**) and chemosis (P<0.001**) were significantly more commonly noted in the subtenon's group whereas ecchymosis (P<0.001**) was significantly more commonly noted in peribulbar group (Table 2 and 3).

Five cases in peribulbar group had

Table 1: Comparison of pain during administration of anesthesia, during surgery and 6 hours post surgery in two groups of patients studied

Pain	Group A (Subtenon's)		Group B (Peribulbar)		P value
	Mean	Std. Deviation	Mean	Std. Deviation	
Pain during anaesthesia	1.4	1.34	2.4	1.39	<0.001**
Intr-op and 6hrs post-op pain	0.452	0.78	1.16	1.19	<0.001**

Table 2: Comparison of akinesia and lid movements in two groups of patients studied

Variables	Group A (Subtenon's)		Group B (Peribulbar)		P value
	Mean	Std. Deviation	Mean	Std. Deviation	
Akinesia	0.848	1.18	0.392	0.95	<0.001**
Lid movements	0.196	0.44	0.056	0.23	<0.001**

Table 3: Comparison of complications in two groups of patients studied

Variables	Total no in each group	Group A (Subtenon's)	Group B (Peribulbar)	Chi-square	P value
SCH	250	146	36	104.53	<0.001**
Ecchymosis	250	0	40	43.48	<0.001**
Chemosis	250	70	36	13.84	<0.001**
Post-op transient ptosis	250	0	5	5.05	<0.05*

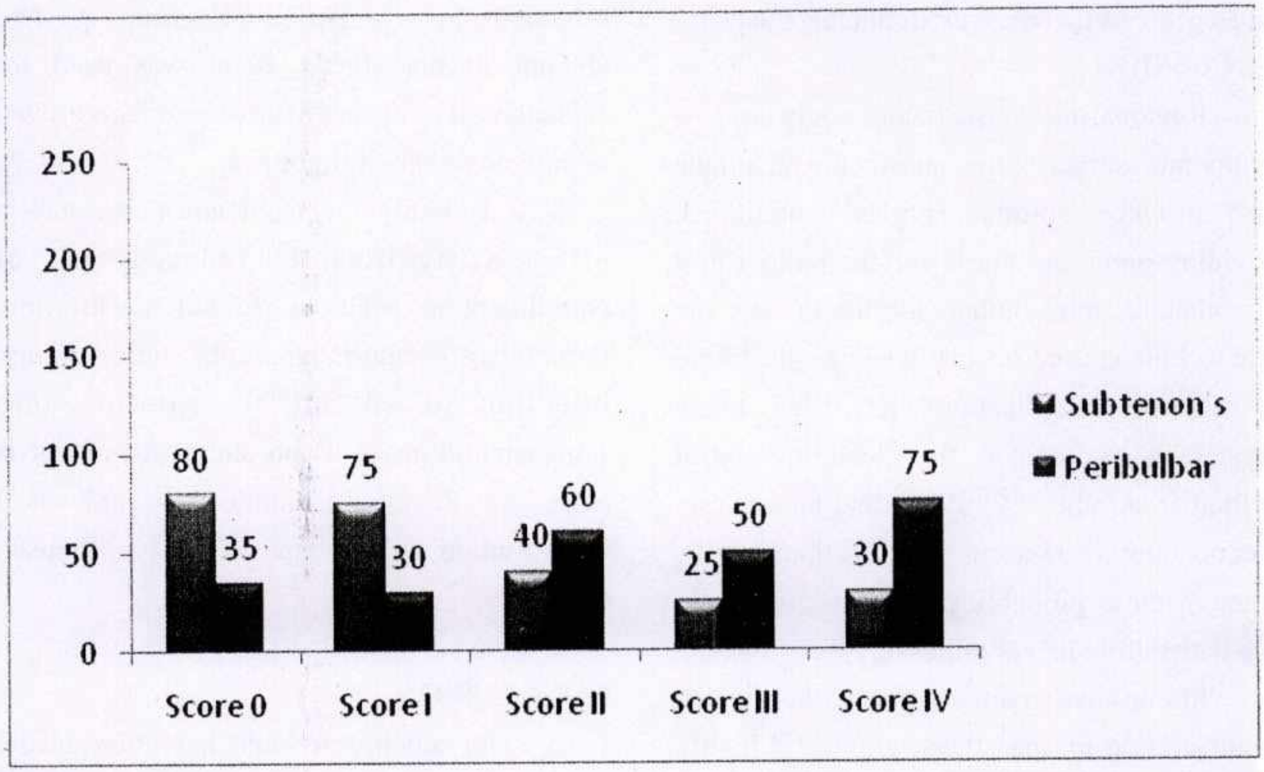

Fig 1: Pain during Anaesthesia

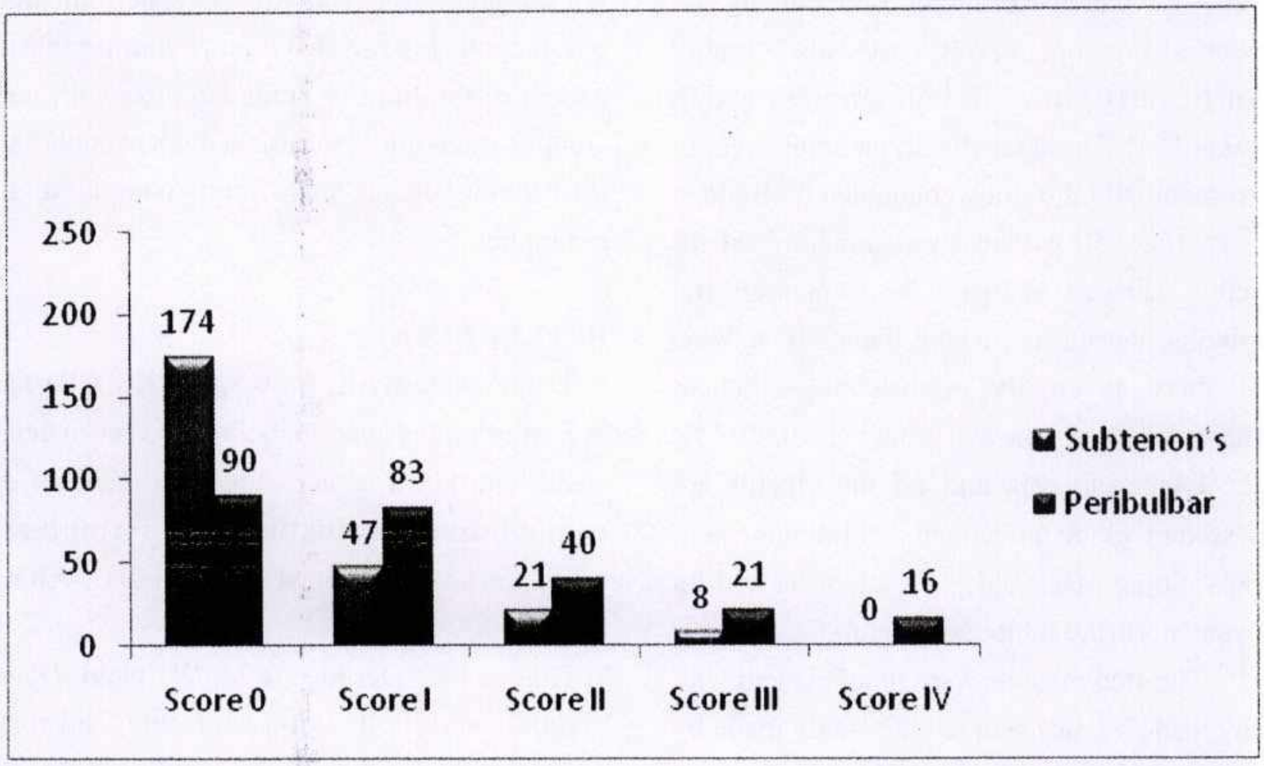

Fig 2: Pain during and 6 Hours after Surgery

transient ptosis that recovered spontaneously.

DISCUSSION

Regional anesthesia is commonly used for ophthalmic surgery; the anesthetic technique must produce optimal surgical conditions, providing good anesthesia for the patient in a safe manner, retro-bulbar anesthesia was the only technique used for many years ago.[6] Rare but serious complications have led many physicians to replace this technique with peribulbar anesthesia.[6,7] Peribulbar anaesthesia does not eliminate serious complications totally, although these probably occur less frequently than with retrobulbar anesthesia.[6,12]

In our study, pain scoring at the time of administration of anaesthesia showed a highly significant statistical difference between the 2 groups, the pain scoring being much low in subtenon's group compared to peribulbar ($P<0.001^{**}$). Pain scoring intra-operatively and 6 hours post-operatively was also highly significantly low in subtenon's group ($P<0.001^{**}$). These results of our study were in agreement with the study conducted by Budd et al.[6, 13] where 50 patients were randomized for elective cataract surgery by subtenon and peribulbar anesthesia, where the study showed that there is highly significant statistical difference between the two groups ($P< 0.001^{**}$).

Globe akinesia and lid movements are assessed by globe movement and lid movement scores. Some cases had globe akinesia and lid movements in the subtenon's group.

The study results were in agreement with study made by Tasneem et al,[6,13]study made by Dempsey et al [6,14]and Ashok et al.[6,15]

The incidence of subconjunctival hemorrhage and chemosis were slightly more in subtenons than in peribulbar group. As less amount of anaesthetic agent was used for subtenons, the chances of adverse effects as well as the cost was also minimized.

It is likely that subtenon's anaesthesia offers a significantly reduced risk of complications such as scleral perforation, retrobulbar haemorrhage, optic nerve injury, injection of anaesthetic solution into subarachnoid space as no sharp instrument is passed into the orbit. It should however be used with caution in patients with compromised sclera.[4]

CONCLUSION

The technique of blunt dissection and the type of cannula used to perform the block avoid the potentially serious side effects of retro- or peribulbar blocks. Thus subtenon's anaesthesia is a safe and effective alternative to peribulbaran anesthesia in MSICS as it is more comfortable to patient at the time of administration with less complications due to the use of blunt cannula and infiltration being superficial compared to peribulbar.

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