



## Original Research Article

## Peribulbar anaesthesia or subtenon's anaesthesia: Which is better in manual sics

Jayashree B<sup>1</sup>, Praveen Kumar Sadanand<sup>1,\*</sup><sup>1</sup>Dept. of Ophthalmology, Bidar Institute of Medical Sciences, Bidar, Karnataka, India

## ARTICLE INFO

## Article history:

Received 23-01-2020

Accepted 31-01-2020

Available online 30-09-2020

## Keywords:

Anaesthesia

Peribulbar

Subtenon's

## ABSTRACT

**Aim:** To compare subtenon's block with peribulbar block with respect to complications encountered.**Materials and Methods:** A prospective, comparative time bound study was conducted including a total of 140 patients who were randomized into 2 groups; 70 patients each in PB Group (peribulbar block) and 70 in ST Group (subtenon's block) who were selected for manual small incision cataract surgery. Any complications during administration of anaesthetic, limitation of ocular movements and onset of anaesthesia was assessed before starting the surgery and documented.**Results:** Most of the patients 92(65.7%) were between 50 to 60 years age. 58 patients in Peribulbar group experienced moderate pain at the time of block while only 18 patients experienced it in Subtenon's group. Subconjunctival haemorrhage was seen limited to the site of anaesthetic administration in 52 patients in subtenon's group. The onset of akinesia with subtenon's block was (3min+/- 1.5min) compared to peribulbar block (7min+/-2min).**Conclusion:** Subtenon's anaesthesia is safe and effective in manual small incision cataract surgery.© 2020 Published by Innovative Publication. This is an open access article under the CC BY-NC license (<https://creativecommons.org/licenses/by-nc/4.0/>)

## 1. Introduction

Akinesia is not essential for modern cataract surgery although some ophthalmic surgeons may prefer to operate on immobile eyes. Local anaesthetic methods can be kinetic or akinetic. Non akinetic methods include topical, subconjunctival, deep fornix anaesthesia and lignocaine gel. Akinetic methods using needle techniques such as intraconal, extraconal or combined intraconal or extraconal blocks are common, although rare but serious complications have occurred following needle blocks.<sup>1</sup> This has led to the introduction of the newer subtenon's block as a safer alternative.<sup>2</sup> It has been suggested that the subtenon's technique has a more acceptable risk profile than extraconal technique and it is a more efficient and safer technique as local anaesthesia.<sup>3</sup>

Manual small incision cataract surgery is very commonly performed under peribulbar block. An attempt is made to perform small incision cataract surgery under subtenon's

anaesthesia considering its safety profile. The present study compares subtenon's block with peribulbar block with respect to complications encountered.

## 2. Materials and Methods

This is a prospective, comparative time bound study conducted in a teaching hospital of North Karnataka from 15<sup>th</sup> July 2019 to 15<sup>th</sup> Jan 2020. A total of 140 patients were randomized into 2 groups; 70 patients in PB Group (cataract surgery under peribulbar block) and 70 in ST Group (cataract surgery under subtenon's block) who were selected for manual small incision cataract surgery from Ophthalmology Out Patient Department.

## 2.1. Inclusion criteria

All patients with uncomplicated Senile cataract willing for manual small incision cataract surgery and vision <6/60.

\* Corresponding author.

E-mail address: [drpravs@yahoo.co.in](mailto:drpravs@yahoo.co.in) (P. K. Sadanand).

## 2.2. Exclusion criteria

1. Age < 40 years
2. Sensitivity to Xylocaine
3. Pupil size < 5mm
4. Previous history of ocular surgery or injury
5. Myopes and patients with connective tissue disorders.

Institutional ethical committee clearance and written informed consent from each patient was taken. All surgeries were conducted by 3 surgeons equally dividing patients for each group. Comprehensive ocular examination was done after taking detailed history as is done for a routine cataract surgery including vision testing, slit lamp examination, funduscopy and IOL Power calculation. Preoperative preparation was done with moxifloxacin 0.5% eye drop, tropicamide plus 0.5% eye drops and flurbiprofen 0.3% eye drops. Anaesthetic mixture was prepared using 1 vial of hyaluronidase containing 1500IU, 30 ml vial containing 2% lignocaine with 1:200000 adrenaline and 20 ml vial containing 0.5% bupivacaine. The lignocaine provides an early onset of action, bupivacaine prolongs the efficacy and hyaluronidase permits diffusion into the orbit more effectively while adrenaline is added to improve the duration of the block. Sensitivity to the anaesthetic mixture was tested. The eye to be operated was cleaned with 10% povidone iodine solution and after few minutes, the anaesthetic block was given.

**Procedure for Subtenon's block:** The equipments required to perform consists of universal eye speculum, small forceps, curved blunt tipped spring scissors (Westcott) and a curved blunt tipped cannula (Steven's) all prepared sterile. After placing a drop of topical Proparacaine drop, lid speculum is placed, the conjunctiva is cleaned with 5% povidone iodine solution. The fused conjunctiva and anterior tenon's space is picked up at an inferonasal point 7mm to 8mm from the limbus, midway between the insertions of the medial and inferior rectus muscles. After making a small cut, the subtenon's space is accessed using the closed blunt Westcott scissor to create a thin channel just past the equator of the globe to the posterior subtenon's space. A blunt tipped cannula is then inserted into the posterior subtenon's space and approximately 4ml of local anaesthetic introduced at a speed of 1ml/3sec. Gentle constant digital pressure over the closed lids with two fingers, one of which is over the point where the conjunctival cut was made, is applied for 2 to 3 minutes.<sup>4</sup> Ocular massage was avoided.

**Procedure for Peribulbar block:** A 25G 2.5cm long disposable needle is attached to the syringe containing local anaesthetic. The patient is placed in the supine position and asked to look steadily straight ahead. The needle is inserted transcutaneously at the junction of the middle two thirds and lateral one third of the lower lid adjacent and parallel to the orbit floor for about 2.5cm. Gentle aspiration of the syringe is performed to rule out the possible entry of the needle

into a blood vessel and then 6 ml of the mixture is injected into the lateral adipose tissue of the orbit. Intermittent and uniform pressure is then applied to the site for 3 to 5 minutes.

The patients from each group were asked to grade the pain felt during the block and during surgical steps on a linear scale<sup>5</sup> (1 to 4).

The time of onset of akinesia was noted and graded based on ocular movement.

Grade 1: Complete restriction of movement.

Grade 2: < 20 degrees of movement in any quadrant.

Grade 3: > 20 degrees of movement in any quadrant.

Any complications during administration of anaesthetic such as subconjunctival haemorrhage, conjunctival chemosis or severe mishaps like globe perforation or retrobulbar haemorrhage was assessed before starting the surgery and documented. Statistical analysis was done by using SPSS software 19.0 version and data analysed using mean, standard deviation and percentages. Chi square test was applied where ever required. P <0.05 was considered statistically significant.



**Fig. 1:** Needle for Peribulbar block



**Fig. 2:** Needle for Subtenon block

## 3. Results

A total of 140 uncomplicated senile cataract patients underwent manual small incision cataract surgery with 70 patients each in PB (Peribulbar block) group and ST (Subtenon's block) group. All the surgeries were done by

**Table 1:** Grades of Analgesia.

<b>Grading of pain</b>	<b>PB Group</b>	<b>ST Group</b>
At the time of block	Number of patients(Percentage)	Number of patients (Percentage)
No pain	0(0)	0(0)
Mild pain	12(17.04)	52(73.84)
Moderate pain	58(82.36)	18(25.56)
During surgery		
No pain	63(89.46)	60(85.2)
Mild pain	7(9.94)	10(14.2)
Moderate pain		

None of the patients in either group had severe or very severe pain.

**Table 2:** Grades of Akinesia of the globe during surgery.

<b>Akinesia of the globe</b>	<b>PB Group No.(Percentage)</b>	<b>ST Group No.(Percentage)</b>
Grade 1: complete restriction of ocular movements	55(78.1)	2(2.84)
< 20 <sup>0</sup> movement in any direction	14(19.88)	48(68.16)
>20 <sup>0</sup> movement in any one direction	1(1.42)	20(28.4)

**Table 3:** Complications encountered at the time of anaesthetic block

<b>Complications</b>	<b>PB Group</b>	<b>ST Group</b>
1.Chemosis	No.(Percentage)	No.(Percentage)
None	54(76.68)	22(31.24)
in 1 quadrant	2(2.84)	30(42.6)
in >or = 2 quadrants	14(19.88)	18(25.56)
2. Subconjunctival haemorrhage		
None	67(95.14)	10(14.2)
1 quadrant	1(1.42)	52(73.84)
>or= 2 quadrant	2(2.84)	8(11.36)
3.Skin ecchymosis	5(7.14%)	0

3 surgeons randomly distributed in the group. Most of the patients 92(65.7%) were between 50 to 60 years age. 76 patients (54.3%) were males and 64 patients (45.7%) females. 82(58.6%) patients were operated for right eye and 58(41.4%) patients for left eye. Patients were equally divided into two groups with respect to age group and sex.

#### 4. Discussion

In the era of topical phacoemulsification, injecting anaesthesia for cataract surgery makes the patient anxious. Nevertheless, manual small incision cataract surgery is still done under peribulbar block which has inherent complications while subtenon's block is emerging as the more preferred anaesthetic method.

Our study found that the onset of akinesia with subtenon's block was (3min+/- 1.5min) compared to peribulbar block (7min+/-2min). In ST group, only 2 patients had total akinesia and 48 patients had >20<sup>0</sup> movement in any direction while 55(78.1%) patients in PB group had total akinesia. This is in agreement with Tsuneoka et al<sup>6</sup> who also reported poor akinesia with subtenon's anaesthesia.

Our study also corresponds to a study by Abhinay et al<sup>7</sup> where the onset of time of akinesia was 2.78+/-0.96 min with subtenon group and 9.96+/-1.40 min with peribulbar group.

58 patients in Peribulbar group experienced moderate pain at the time of block while only 18 patients experienced it in Subtenon's group. However mild pain was seen during subtenon's block in 52 patients in ST group. During surgery, 63 patients had no pain in peribulbar group and 60 patients in subtenon's group while 10 patients in ST group experienced mild pain during nucleus delivery. In a study by Tasneem P et al<sup>8</sup> experienced that 31 out of 88 patients (35.2%) of Peribulbar group and 62 out of 80 (77.5%) of subtenon's group experienced no pain during administration of anaesthesia. In a study by MR Pujari et al<sup>9</sup> found that 65% of patients had mild to moderate pain in peribulbar group and 26% of patients had mild to moderate pain in subtenon's group during surgical procedure. 58 patients had moderate pain at the time of administration of anaesthesia in peribulbar group while only 18 patients had moderate pain during giving block in subtenon's group. Chi square test showed p value which was statistically significant. Subtenon

group was more comfortable for the patient at the time of giving block compared to peribulbar group.

Chemosis was frequently seen in 48 patients with subtenon's block compared to only 16 patients in peribulbar group. Little practice is required to place the anaesthetic in to posterior subtenon's space in which case no chemosis was encountered as in 22 patients. Chemosis is unavoidable but is more likely to occur if dissection of tenon's capsule is not adequate or a large volume of local anaesthetic is injected. This is usually limited to the site of injection but may spread to other quadrants of globe. Presence of chemosis does not usually interfere with cataract surgery which is also justified by Chandru MK.<sup>10</sup> Subconjunctival haemorrhage was seen in 60 patients wherein hemorrhage limited to the site of anaesthetic administration was seen in 52 patients in subtenon's group. Some authors advocate using cautery before making the button hole to lower the incidence of hemorrhage, Greenbaum<sup>11</sup> which is not required and we have not done cautery. Application of gentle pressure on the globe over the injection site may limit the spread of haemorrhage. 5 patients in peribulbar group had skin ecchymosis at the injection site.

We did not encounter any severe complication like scleral perforation, retrobulbar haemorrhage, optic nerve injury in peribulbar group and also in subtenon's group as no sharp needle was passed into orbit. We could find some advantages of subtenon's anaesthesia over peribulbar as this technique eliminates the risk of sharp needle, immediate analgesia, no need of globe compression or rise of intraocular pressure and no preoperative sedation is required. Patients were more anxious while administration of peribulbar block compared to the time when subtenon's block was being given. Because of poor akinesia, subtenon's anaesthesia may not be suitable for beginner ophthalmic surgeons. The main advantage of topical anaesthesia is usually advocated in phacoemulsification with absence of chemosis and subconjunctival haemorrhage and a quicker visual recovery, while subtenon's anaesthesia appears to be reasonably good in manual small incision cataract surgery compared to peribulbar anaesthesia as lesser amount of anaesthetic is injected with lesser pain and anxiety. However it appears that conjunctival chemosis and localized subconjunctival haemorrhage is more frequent with subtenon's anaesthesia which can be avoided by proper technique of injection.

## 5. Conclusion

Subtenon anaesthesia is a better alternative to the frequently administered peribulbar anaesthesia. Subtenon anaesthesia is safe and effective in manual small incision cataract

surgery.

## 6. Source of Funding

None.

## 7. Conflict of Interest

None.

## 8. Acknowledgement

Authors would like to thank Ophthalmology Operation Theatre staff for the assistance and help.

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## Author biography

**Jayashree B** Associate Professor

**Praveen Kumar Sadanand** Assistant Professor

**Cite this article:** Jayashree B , Sadanand PK. Peribulbar anaesthesia or subtenon's anaesthesia: Which is better in manual sics. *Indian J Clin Exp Ophthalmol* 2020;6(3):379-382.