

A COMPARATIVE STUDY OF PAIN ASSESSMENT OF SUBTENONS BLOCK WITH PERIBULBAR BLOCK IN CASES OF PHACOEMULSIFICATION

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Abstract

Background: The most often performed surgical treatment that calls for local anaesthetic is cataract surgery. The majority of cataract surgery are done using regional anaesthetic. The development of the phacoemulsification technology led to an increase in regional anaesthetic interest among anesthesiologists and a decrease in surgical interest in procedures like complete anaesthesia and decreased intraocular pressure. Techniques including subtenonsanesthesia, peribulbar anaesthesia, and retrobulbar anaesthesia are becoming more and more common as a result. Hence, the aim of the study was to compare the pain assessment of subtenons block with peribulbar block in cases of Phacoemulsification. Objective of the study was to compare the anaesthesia achieved in subtenons block with peribulbar block in cases of phacoemulsification. **Materials and Methods:** A randomised comparative interventional trial was conducted to compare the pain assessment of subtenons block and peribulbar block in cases of phacoemulsification with the help of chit in the box method. The study was carried out in the single centre at a site Tertiary care centre in Moradabad, Uttar Pradesh India, from June 2021 to June2022. The study comprised 100 patients, categorised into two groups- Group A was administered Peribulbar Anaesthesia. Group B was administered Subtenon'sAnaesthesia. One surgeon performed all of the surgeries. One assessor completed all of the assessments. Patients received a questionnaire for the Numerical Pain Reporting scale pain evaluation following surgery. **Result:** The mean Numerical Pain Reporting Scale score was higher in PBB group (3.5 ± 1.5) in comparison to ST group (2.5 ± 1.4) and the difference between them is statistically significant. **Conclusion:** The present study showed that the sub-Tenon's anaesthesia was better than the peribulbar anaesthesia in terms of analgesia in performing the surgeries.

INTRODUCTION

The most often performed surgical treatment that calls for local anaesthetic is cataract surgery. The majority of them are done using regional anaesthetic. The development of the phacoemulsification technology led to an increase in regional anaesthetic interest among anesthesiologists and a decrease in surgical interest in procedures like complete akinesia and decreased intraocular pressure.^[1]

With the introduction of phacoemulsification for cataract surgery, anaesthetic techniques have improved in their ability to create ideal operative conditions and give patients a sufficient level of anaesthetic in a safer way. Techniques including

subtenons anesthesia, peribulbar anaesthesia, and retrobulbar anaesthesia are becoming more and more common as a result.^[2]

Sharp-needle procedures increase the risk of retrobulbar haemorrhage, optic nerve injury, and globe perforation. However, there is no connection between sub-anesthesia Tenon's and any effects that could endanger normal eyesight.^[3]

Early in the 1990s, Sub-block Tenon's was used in ophthalmological procedures. It was a good substitute for traditional needle blocks and offered secure anaesthesia using a straightforward process. It is also referred to as an episcleral block and a parabolbar block because of the way it is performed. In this method, the conjunctiva and the tenons are both injected with local anaesthetic solutions.

Through the conjunctival and Tenon's layers, an incision is made with Westcott scissors. A curved cannula is introduced into the hole made by the incision, and local anaesthetic is injected. The short ciliary nerves that travel to the globe through the Tenon capsule are blocked as the local anaesthetic penetrates beneath the capsule. Akinesia is the result of the anterior motor nerve fibres being blocked.^[4-6] In contrast, a 23-G needle is used for the peribulbar block, which is put in the inferotemporal quadrant. First, the needle is inserted.

It is passed deeper to reach the iris plane by passing beneath the globe and then moving in the direction of the orbital floor. There is a needle-hub intersection and the depth can be adjusted. The local anaesthetic medication is given once there has been no blood aspiration. All of the extraocular muscles are paralysed by this method, and the orbicularis is also paralysed when the anaesthetic agent diffuses through the orbital septum. In order to avoid any increase in intraocular pressure that could cause vitreous loss during the procedure, care should be taken to sufficiently compress the globe using digits. If sufficient compression cannot stop the ocular movement, supplemental anaesthetic injection for medial peribulbar block is given.^[7-8]

In addition to retrobulbar haemorrhage, globe damage, and optic nerve injury, brainstem anaesthesia is one of the significant risks associated with this procedure. Due to accidental intra-arterial injection, the anaesthetic solution may spread throughout the central nervous system (CNS) by flowing retrogradely from the ocular artery to the cerebral artery or internal carotid artery. Accidental injection procedures can also cause anaesthetic fluid to spread under the optic nerve's dural sheath, which can cause it to spread into the subarachnoid space. Depending on how much is administered, the anaesthetic solution might spread into different CNS regions. Consciousness loss, erratic shaking, apnea, contralateral amaurosis, hemiplegia, paraplegia, quadriplegia, and other signs and symptoms are the result of this. Tinnitus can develop in extreme situations when the 8th to 12th nerves are inhibited. vertigo, dysphagia, aphasia, deafness, and dysarthria. If this type of emergency arises, the anesthesiologist should be ready to do urgent cardiopulmonary resuscitation because failing to diagnose and treat the patient promptly can have fatal consequences.^[9,10]

To compare the pain assessment of ST block and PBB block in delivering intraoperative analgesia during phacoemulsification surgery in this setting, the current study was done.

MATERIALS AND METHODS

The Ethical and Research Committee's permission allowed the Teerthankar Mahaveer Medical College in Moradabad's ophthalmology department to begin and carry out the study.

The present study was carried out at a single centre at a site Tertiary care centre in Moradabad, Uttar Pradesh India, from June 2021 to June 2022. Participants were chosen among the patients who visited the onsite tertiary care center's outpatient department during the trial. The ethical committee of the institution gave its blessing before the trial began, and patients' written agreement was also acquired.

Aim of the study was to compare the effectiveness of subtenons block with peribulbar block in cases of Phacoemulsification.

Objective of the study was to compare the anaesthesia achieved in subtenons block with peribulbar block in cases of phacoemulsification.

For this study, a sample size of 100 was calculated, with 49 participants in the Peribulbar block group and 51 participants in the Subtenon's block group. A randomised comparative interventional trial was conducted.

Prior to the surgery, every patient was admitted one day in advance. All of these patients underwent standard pre-operative eye exams, including a history take, anterior and posterior segment examinations, a general physical examination, and a systemic assessment. Following informed consent for the procedure, patients were randomly divided into two groups using the Chit in the Box method. Peribulbar anaesthesia was delivered to Group A. Subtenon's Anaesthesia was administered to Group B.

Technique for Peribulbar Anaesthesia

The peribulbar approach involves administering two injections, one in the supraorbital notch of the upper lid and the other in the junction of the lateral 2nd and medial 1st of the lower lid. The peribulbar space is injected with a mixture of Xylocaine with 1: 10,000 adrenalin and Bupivacaine with powdered hyaluronidase. Applying light digital pressure or a soft ball finger will help the solution spread properly.

Technique for Subtenon anaesthesia

The lower fornix is injected with one drop of a 2 to 3.5 ml anaesthetic solution using Subtenon's technique. A tiny snip is cut through the Tenon's and conjunctiva, and a blunt cannula is used to inject the anaesthetic 2-3 mm behind the limbus in the inferior and medial quadrant of the globe. The cannula moves rearward after passing through the snip incision. The hand and syringe must rotate away from the globe as the equator is passed in order for the cannula tip to remain in the area and the anaesthetic to be safely injected.

One surgeon performed all of the surgeries.

One assessor completed all of the assessments.

Patients received a questionnaire for the Numerical Pain Reporting scale pain evaluation following surgery.

Evaluation of Pain

The measurement of pain was carried out both intraoperatively and postoperatively using an 11-point (0-10) numerical pain rating scale (NRS). It is

a linear scale that is divided into 10 equal intervals, with 0 denoting no pain and 10 denoting the most excruciating suffering conceivable. The scores are divided into three categories: mild, moderate, and severe pain, with mild being 1-3, moderate being 4-6, and severe being > 6. The chart was explained to the patients after randomization. They were told to rate the intensity of the pain they experienced both during the procedure and after it was over.

Numerical Pain Reporting Scale Grading

Grade	Pain
0	No
1-3	Mild
4-6	Moderate
7-9	Severe
10	Worst possible

Inclusion Criteria

Patient admitted for cataract surgery has a cataract.

Exclusion Criteria

1. Pediatric Patients.
2. Patients who are not fit for Local Anaesthesia.
3. Patients with xylocaine sensitivity.
4. Patients who refuse to give consent for the study.
5. Patients for combined surgeries, cataract and glaucoma.
6. Complicated Cataract.
7. Cataract with dislocated lens.
8. Cataract with Uveitis.

Statistical Analysis

SPSS V.24 software was used to evaluate the data after it had been tabulated in Microsoft Excel. The mean and standard deviation are used to express continuous variables. Frequency and percentage are used to express the category variables. The tests employed for comparison were the independent t test and the chi square test. A p value of 0.05 or lower was deemed statistically significant.

RESULTS

The mean NPRS was greater in the PBB group (3.51.5) than in the ST group (2.51.4), and there was a statistically significant difference between the two groups.

Out of one hundred patients selected for the study, 49 were included in Peribulbar block (PBB) group and 51 in Subtenon's (ST) block group. In PBB group, 16.3% was from the age group of below 50 years, 67.3% was from 50-60 years and 16.3% was from above 60 years; and in ST group, 7.8% was

from below 50 years, 88.2% was from 50-60 years and 3.9% was from above 60 years. Significantly marked difference exists in the distribution of age groups.

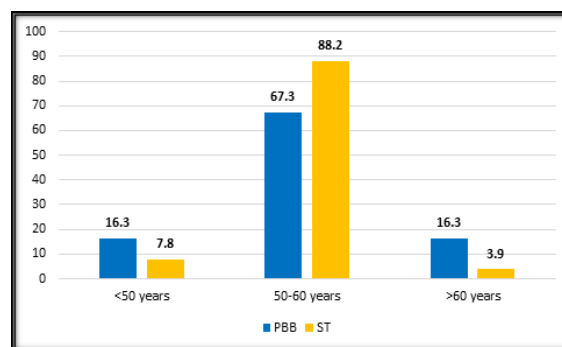


Figure 1: Distribution of age groups

In PBB group, 53.1% was male and 46.9% was female; in ST group, 51% was male and 49% was female.

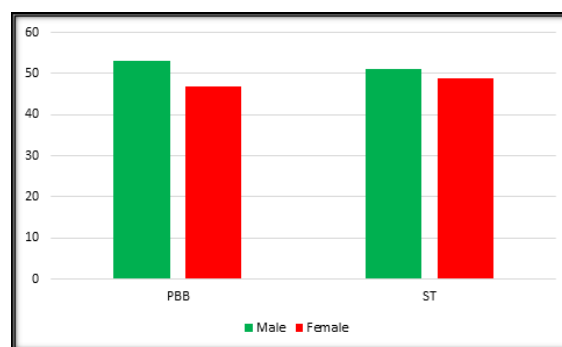


Figure 2: Distribution of gender

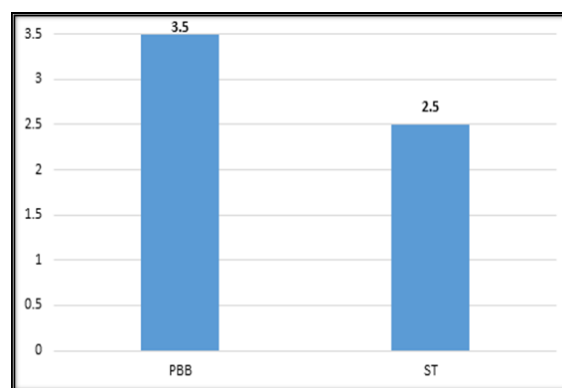


Figure 1: Comparison of NPRS

Table 1: Distribution of age groups.

Age groups	PBB		ST		P
	n	%	n	%	
<50 years	8	16.3	4	7.8	0.034
50-60 years	33	67.3	45	88.2	
>60 years	8	16.3	2	3.9	

Table 2: Distribution of gender

Gender	PBB		ST		P
	n	%	n	%	

Male	26	53.1	26	51.0	0.835
Female	23	46.9	25	49.0	

Table 3: Comparison of Numerical Pain Reporting Scale (NPRS)

Group	Mean	SD	P
PBB	3.5	1.5	0.017
ST	2.5	1.4	

DISCUSSION

Cataract is one of the primary reasons for avoidable blindness. Cataract operations are the ones which can be conducted under local or general anesthesia. Surgeons prefer local anesthesia as general anaesthesia has some side effects which is not desirable. Even local anesthesia can provide prompt recovery with much lesser pain. Among various types of local anesthesia, topical anesthesia has impact on the trigeminal nerve at the nerve terminals hence it cannot achieve the akinesia of the globe. In peribulbar technique, sharp needle is used to administer the anesthetic agent around the equator of the eyeball. In subtenons technique, the administration of anesthetic agent is done with blunt cannula. The ultimate aim is to achieve total anesthesia to have ideal conditions for surgery.

In this study 100 patients were included from the department of Ophthalmology, Teerthanker Mahaveer Medical College, Moradabad with the aim to compare the effectiveness of the subtenons block with peribulbar block in cases of Phacoemulsification. Among the 100 patients, 49 were in Peribulbar block group and 51 were in Subtenon's block group.

In this study, patients' age was comparable in the groups. Sherry et al (2014) and Ripart et al (2000) reported similar age distribution of the patients in their study.^[11,13]

In the present study, proportion of male was slightly higher than females in both the groups. Kalaiyaran et al (2012),^[15] reported that proportion of female was higher in PBB group and proportion of male was higher in ST group. Budd et al (2009),^[12] reported the proportion of female was higher. Sherry et al (2014),^[13] reported that proportion of female was higher in PBB group and male proportion was higher in ST group.

In this study, the PBB group's mean NPRS was higher than the ST group's, and this difference was statistically significant. According to Jayashree et al (2020),^[14] more patients in the PBB group than the ST group experienced significant discomfort at the moment of block. More patients in the PBB group than the ST group felt mild to moderate discomfort throughout the surgical process, according to Pujari et al (2015).^[16] Four hours after surgery, Sherry et al (2014),^[12] noted that the subtenon group's pain levels were noticeably low.

CONCLUSION

There has been a shift in the type of anaesthesia used as small incision phacoemulsification for cataract surgery has developed. The anaesthetic approach must result in ideal surgical conditions, giving the patient effective anaesthesia while remaining safe. Because of this, sub-anesthesia Tenon's with a blunt cannula has grown in acceptance. All of the extraocular muscles are paralysed by the peribulbar method, and the orbicularis is also paralysed when the anaesthetic agent diffuses through the orbital septum. In order to avoid any increase in intraocular pressure that could cause vitreous loss during the procedure, care should be taken to sufficiently compress the globe using either digits or the Honan Intraocular Pressure Reducer. However, in sub-method, Tenon's a tiny incision is made through the layers, exposing the sclera, using Westcott scissors. A posterior sub-cannula Tenon's fitted on a syringe with local anaesthetic is inserted through the hole made by the incision. The short ciliary nerves that travel to the globe through the Tenon capsule are blocked as the local anaesthetic penetrates beneath the capsule. The extraocular muscles are paralysed as a result of the blockage of the anterior motor nerve fibres, which causes akinesia. Thus, sub-anesthesia Tenon's is discovered to be superior to peribulbar anaesthesia. The current study also demonstrated that, in terms of analgesia, sub-anesthesia Tenon's was superior to peribulbar anaesthesia.

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