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COMPARATIVE STUDY OF LIGNOCAINE SUBTENONS ANESTHESIA VSPERIBULBAR ANESTHESIA IN MANUAL SMALL INCISION CATARACT SURGERY AND PHACOEMULSIFICATION

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Keywords:

Manual small incision cataract surgery, Peribulbar anesthesia, Subtenon anesthesia, Pain, complication

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ABSTRACT: Aim: Comparison of safety and efficacy in subtenon anesthesia versus peribulbar anesthesia in manual small incision cataract surgery by randomized control trial. **Setting and design:** A prospective observational study was conducted among 150 patients undergoing MSICS at a tertiary care hospital and was grouped into two groups peribulbar anesthesia and subtenon anesthesia. **Material and Method:** After randomization, 150 patients were assessed for various factors including pain at administration of anesthesia and pain during surgery. **Result:** A total of 150 patients were studied. The result shows no significant difference in pain during surgery and time of administration. Occurrences is chemosis and sub-conjunctival hemorrhage are more common in subtenon than in peribulbar anesthesia. **Conclusion:** Subtenon's anesthesia is safe and effective as peribulbar anesthesia and is more comfortable for patients during administration.

INTRODUCTION: Cataract surgery is a common surgical procedure with the best safety profile. During cataract surgery, anesthesia is used to reduce the disadvantages, risks, and complications [1]. Shorter-acting and easily invasive methods of anesthesia are used for small incision cataract surgery which is due to the development of surgical techniques [2]. The surgical techniques are self-scaling with small wounds, good intraocular lens design, and decreased tissue manipulation with modern instruments.

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Some of the anesthesia used are retrobulbar anesthesia, peribulbar anesthesia, perilimbal anesthesia, subtenon's anesthesia, and topical anesthesia [3]. Retrobulbar anesthesia has been used since ancient days for cataract surgery but is associated with multiple sight-threatening complications. The complications are chemosis, retrobulbar hemorrhage, perforation, extraocular muscle malfunction, optic nerve injury, and brain stem anesthesia [4].

Peribulbar anesthesia is the most popular technique with excellent analgesia and akinesia with complications like perforation and increased intraocular pressure [5]. Subtenon's anesthesia is a local anesthetic agent, and it is directly injected into the subtenon's space. After adding topical anesthetic drops in the conjunctiva, a small opening

is made through which a blunt cannula is inserted to decline the anesthesia [6]. It is a simple method and decreases needle injury and other complications. Hence, the method is used in developed countries for phacoemulsification with topical anesthesia. There are only limited studies in our country related to this topic. Therefore, the study is conducted to compare the safety, and effectiveness of subtenon anesthesia versus peribulbar anesthesia in manual small incision cataract surgery (MSICS).

Objective: The objective of the study includes:

- To collect the demographic details of undergoing cataract surgery patient
- To find the patient's pain during administering, the anesthesia, and during surgery by using a visual analog pain scale.
- To find the complication in both subtenon and peribulbar anesthesia routes.

MATERIALS AND METHOD: A prospective, observational study among 150 patients who attended the ophthalmology inpatient department in a tertiary care hospital for cataract surgery. The study was carried out for a period of 6 months from November 2014 to April 2015. After obtaining ethical approval (IEC-BMR App No: AVH-C-S-010/07-23) from our institutional review board and informed consent from the patients who are included in the study. The inclusion criteria include patients over 30 years of either gender or patients who are willing to sign the informed consent. The exclusion criteria include patients with types of cataracts other than senile cataract, patients with anxiety and unintentional eye movement, patients with a history of convulsion and epilepsy, patients who prefer conventional extracapsular surgery, patients with previous intraocular injury, inflammation, or surgery, and patient who are unable to give informed consent form.

The patient was recruited based on inclusion and exclusion criteria. Patients undergoing MSICS were divided into two groups peribulbar and subtenon's block by using a random number table. After randomization, the patient's demographic data like name, age, gender, chief complaint, diagnosis, etc are collected. The drug details which include the name of the drug, dosage, duration of therapy, route of drug administration, examination details, and choice of anesthesia were collected from the patient case sheet. The pain is assessed by the visual analog scale with numeric and descriptive ratings from 0 to 10. We used this scale to rate the level of pain felt during the operation including the pain after delivery of anesthesia. The verbal expression of pain during the operation was also recorded if pain was recorded additional anesthesia was given. Statistical analysis was done using SPSS version 21. After entering the data into MS Excel. The continuous variable was expressed in mean with standard deviation or median with intraquartile range. The categorical variables are expressed in frequency with percentage.

RESULT: A Prospective study was done to analyze cataract cases in a hospital. It was conducted in a tertiary care hospital, Salem for a period of six months from November 2014 to April 2015. A total of 150 cases of cataract surgery were collected and analyzed. Tables 01 and 02 include 150 cases that were classified according to gender and from these 59 (39.33%) male patients and 91 (60.67%) female patients were found. These 150 cases were then classified according to age and the maximum number of patients coming under the age group of 61-70. The average age of the patients was found to be 60.57±8.59. 150 patients undergoing cataract extraction were randomized into two groups comprising 75 patients each. Group A was given subtenon and group B peribulbar local anesthesia respectively. Patients were asked about pain scoring during surgery and the degree of analgesia was marked on a specified Proforma. 75 patients in group A received Subtenon and75 patients in group that received Peribulbar anesthesia. The two groups were almost similar in terms of age and sex distribution.

The total number of patients according to their diagnosis of Cataracts Immature cataractsis was about 124 (82.67 %) and for Mature cataracts 17 (11.33 %) and 9 (6%). The total number of patients who underwent natural surgery in cataract patients includes Small Incision Cataract Surgery (SICS) 144(96%) patients and Phacoemulsification 6 (4%) patients. The patients received one of the two types of anesthesia based on randomization:

Group A: Cataract Surgery under Administration of Subtenons Anaesthesia (75 cases).

Group B: Cataract Surgery under the Administration of Peribulbar Anaesthesia (75 cases).

For the subtenons Group (Group A=75) a small incision was made in the conjunctiva of about 5-7mm from the limbus with ophthalmic scissors. A curved irrigating cannula (19G, 25mm) was inserted with anesthetic solution in the syringe (2.5 ml of lignocaine (2%) with adrenaline), which slowly delivers of local anesthetic solution.

The peribulbar Group (Group B=75) received 6 ml of a mixture of lignocaine (3%) and Bupivacaine (0.5%) slow delivery of local anesthetic solution was then performed. Pain at the administration of Local anesthesia 60 patients in group A and 9 patients in group B experienced slight discomfort and mild pain, 15 patients in group A and 50 patients in group B experienced moderate intense pain during the administration of anesthesia, 16 patients in group B moderate to severe intensity of pain. The use of a few drops of topical anesthesia before peribulbar anesthesia made this technique almost pain-free. Pain during surgery 68 patients in group A and 59 patients in group B did not experience any pain or discomfort during surgery, 4 patients in group A and 10 patients in group B experienced slight discomfort and mild pain, 3 patients in group A and 6 patients in group B had slight pain. Ocular movement during surgery Seventy-two out of 75 (96%) patients in group B had scores of 4 or less; 65/75 (86.6%) of patients in the subtenon group had scores of 6 or more, with a mode score of 10. The Subtenon group had more sub-conjunctival hemorrhage in about 25 (33.3%) patients. About 45 (60%) patients in the peribulbaranesthesia group had absolute chemosis during surgery when compared to 10 (13.3%) patients in the sub-tenon group. In the Subtenon route administration of local anesthesia, the action of anesthetic to start surgery within 1-2 minutes. To compare the Peribulbar route the anaesthetic action to start surgery in 10 minutes. **Table 3** includes the duration of action of Local anesthetics and the volume used. **Table 4** includes, includes the efficacy of block in subtenons and peribulbar which shows that the success rate of subtenon is 74 and the success rate of peribulbar is 71. **Fig. 1**, explains the complication of subtenon and peribulbar which includes chemosis and subconjunctival hemorrhage.

TABLE 1: BASELINE CHARACTERISTICS

Characteristics		Freq	Percentage
Gender	male	59	39.33%
	female	91	60.67%
Age in years	31-40	4	2.67%
	41-50	8	5.33%
	51-60	48	32%
	61-70	64	42.67%
	71-80	25	16.67%
	Above 81	1	0.66%
Diagnosis	Immature cataract	124	82.67%
	Mature cataract	17	11.33%
	Congenital cataract	2	1.33%
	Cortical cataract	1	0.67%
	Posterior cataract	1	0.67%
	NSG	5	3.33%
Nature of Surgery	Small Incision Cataract Surgery (SICS)	144	96%
	Phacoemulsification	6	4%
Choice of Anaesthesia	Subtenonsanaesthesia	75	50%
	Peribulbaranaesthesia	75	50%
	Retrobulbaranaesthesia	0	0%

TABLE 2: COMPARISON OF SUBTENON VS PERIBULBAR

Characteristics		Subtenon	Peribulbar	Total
Patients pain during administration of Anaesthesia	Grade 1 (mild pain)	(Group A)	(Group B)	
	Grade 2 (Moderate)	15 (20%)	50 (66.67 %)	65 (43.33%)
	Grade 3 (severe)	0	16(21.33 %)	16 (10.67%)

Pain during surgery	Grade 0 (No pain)	68 (90.67%)	59 (78.67 %)	127 (84.67 %)
	Grade 1 (mild pain)	4 (5.33 %)	10 (13.33 %)	14 (9.33 %)
	Grade 2 (Moderate)	3 (4 %)	6 (8 %)	9 (6 %)
Ocular movement during surgery	0	0	45 (60%)	45 (30%)
	2	0	12 (16%)	12 (8%)
	4	8 (10.67%)	15 (20%)	23 (15.33%)
	6	7 (9.33%)	2 (2.67%)	9 (6%)
	8	30 (40%)	1 (1.33%)	31 (20.67%)
	10	28 (37.33%)	0	28 (18.67%)
	12	2 (2.67%)	0	2 (1.3%)
Subconjunctivalhemorrhage	Grade 0	50	65	115
	Grade 1	15	10	25
	Grade 2	10	0	10
	Grade 3	0	0	0
Chemosis	Grade 0	60	30	90
	Grade 1	10	33	43
	Grade 2	5	9	14
	Grade 3	0	3	3

TABLE 3: DURATION OF ACTION OF LOCAL ANESTHETICS AND VOLUME USED

S. no.	Duration and Volume	Subtenon	Peribulbar
1	Anaesthetic to start surgery; min	2 min	10 min
2	Anaesthetic to end surgery; min	38 min	45 min
3	The volume of anaesthetic used; ml	1.5 ml	5 ml

TABLE 4: EFFICACY OF BLOCK IN SUBTENON AND PERIBULBAR

S. no.	Block	Subtenon (Group A)	Peribulbar (Group B)	Total
1	Successful	74	71	145
2	Augmentation	1	4	4
	Total	75	75	150

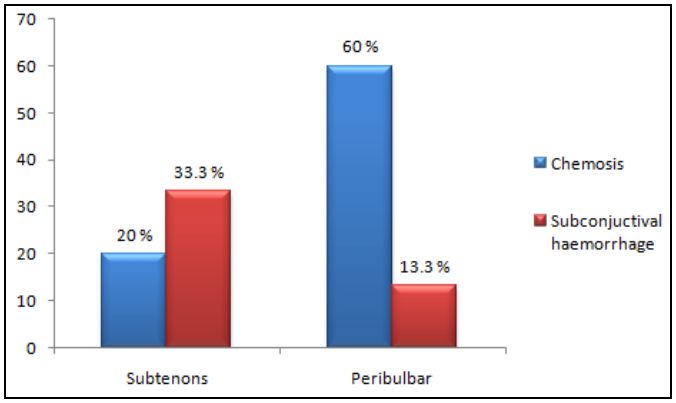

FIG. 1: COMPLICATIONS IN SUBTENONS AND PERIBULBAR

DISCUSSION: Cataract surgery is the most performed surgical procedure in our aging world. The majority of patients have concurrent disorders including hypertension, diabetes mellitus, and coronary artery disease. The anesthetic management varies between topical anesthetic applications, regional blocks to general anesthesia. The medical/mental condition and current medications are of prime importance in terms of their implications for anesthesia. It is also prudent to define and prevent drug interactions of ocular medication that are required during the perioperative or postoperative period. The type of intervention and skill of the surgeon are variables that influence the selection of the anesthetic regimen. Preoperative evaluation is therefore as important as anesthetic care for this surgical population. Based on the literature review and the data showing the seriousness of cataract surgery. These present working was attempted to detect the efficacy of lignocaine in undergoing cataract surgery in the route of peribulbar and subtenons.

A Prospective study was done to analyze the cataract cases in a hospital. It was conducted in a tertiary care hospital, Salem for a period of six months from November 2014 to April 2015. A total of 150 cases of cataract surgery were collected and analyzed. Tables 01 and 02 include 150 cases that were classified according to gender and from these 59 (39.33%) male patients and 91 (60.67%) female patients were found. These 150 cases were then classified according to age and the maximum number of patients coming under the age group of 61-70.

The average age of the patients was found to be 60.57±8.59. 150 patients undergoing cataract extraction were randomly divided into two groups comprising 75 patients each. Group A was given subtenon and group B peribulbar local anesthesia respectively. Patients were asked about pain scoring during surgery and the degree of analgesia was marked on a specified Proforma. 75 patients in group A received Subtenon and75 patients in group that received Peribulbar anesthesia. The two groups were almost similar in terms of age and sex distribution. The total number of patients according to their diagnosis of Cataracts Immature cataractsis was about 124 (82.67 %) and for Mature cataracts 17 (11.33 %) and 9 (6%). The total number of patients who underwent natural surgery in cataract patients includes Small Incision Cataract Surgery (SICS) 144(96%) patients and Phacoemulsification 6 (4%) patients.

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To compare the Peribulbar route the anaesthetic action to start surgery in 10 minutes. Table 03 includes the duration of action of Local anesthetics and volume used. Table 04 includes, includes the efficacy of block in subtenons and peribulbar which shows that the success rate of subtenon is 74 and the success rate of peribulbar is 71. **Fig. 1**, explains the complication of subtenon and peribulbar which includes chemosis and subconjunctival hemorrhage.

Adekola *et al* conducted a study on the comparison of peribulbar and subtenon anesthesia among 462 patients which reported less brain score which was significant. He also revealed a higher patient satisfaction with subtenon's technique which was significant with our results [7]. Ashok *et al* conducted a similar randomization control trial with 113 patients. They reported higher pain with the peribulbar technique when compared to the subtenon technique with minor complications and the result was significant to our study result [8].

Datti *et al* conducted a prospective randomized control trial among 500 patients which showed significant findings with our study results. It showed subtenon anesthesia as less complicated and good in pain management [9]. A few other studies by Hiremath *et al*, Igange *et al*, Matcha *et al*, Ngwu *et al*, Nithesha *et al*, and Padmavathi *et al* also have a similar conclusion [10, 11, 12, 13, 14, 15].

Subtenon anesthesia was comfortable for the patient at the time of local anesthetic administration, and it is also agood analgesia intraoperatively. The presence of subconjunctival hemorrhage was more in comparison with the peribulbar group. The surgery started immediately after the administration of anesthesia in the subtenon group. As a small amount of the anesthetic agent was used for subtenon the adverse effects were also minimized.

The subtenon technique is the safest method of introducing anesthetic fluid into the retrobulbar space without the complication of a sharp needle injection. Analgesia was effective and immediate with minimal volume of anesthetic agent and the procedure was less painful in subtenon local anesthesia as compared to peribulbar local anesthesia. There is no need for globe compression and preoperative sedation. The use of topical anesthesia before subtenon local anesthesia makes this technical most pain-free. The incidence of top-up anesthesia is less in subtenon anesthesia than in peribulbar anesthesia. Subtenon anesthesia is more effective with fewer complications as compared to peribulbar anesthesia due to the cannula used being a blunt needle and the infiltration being superficial as compared to the peribulbar route. The subtenon's technique for administration of local anesthesia during SICS is as safe as the peribulbar technique. It is recommended as a safe and effective alternative to peribulbar anesthesia for SICS.

CONCLUSION: Subtenon anesthesia was comfortable for the patient at the time of local anesthetic administration, and it is also a good analgesia intraoperatively. The subconjunctival hemorrhage was also slightly more as compared to the peribulbar group. The surgery was started immediately after the administration of anesthesia in the subtenon group. As a small amount of the anesthetic agent was used for subtenon and so the adverse effects were also minimized. The subtenon technique is the safest method of introducing anesthetic fluid into the retrobulbar space without the potential complication of a sharp needle injection. Analgesia was effective and immediate with minimal volume of anesthetic agent and the procedure was less painful in subtenon local anesthesia as compared to peribulbar local anesthesia. There is no need for globe compression and preoperative sedation. The use of topical anesthesia before subtenon local anesthesia makes this techniqueal most pain-free. The incidence of top-up anesthesia is less in subtenon anesthesia than in peribulbar anesthesia. Subtenon anesthesia is effective with fewer complications as compared to peribulbar anesthesia due to the cannula used being a blunt needle and the infiltration being superficial as compared to the peribulbar route. The subtenon's technique for administration of local anesthesia during SICS is as safe as the peribulbar technique. It is recommended as a safe and effective alternative to peribulbar anesthesia for SICS.

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