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RESEARCH ARTICLE

A STUDY TO EVALUATE THE SAFETY AND EFFICACY OF SUBTENON (PARABULBAR) ANESTHESIA IN CATARACT SURGERY

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ABSTRACT

Background: To study the safety and efficacy of sub tenon (parabulbar) anaesthesia by blunt 23-gauge cannula in cataract surgery. **Method:** A Prospective study of sub tenon anaesthesia, 30 patients were examined for sub tenon (parabulbar) anaesthesia for cataract surgery. One single surgeon has evaluated some parameters like pupil dilation preoperative and during operation, intraocular pressure before anaesthesia, just after anaesthesia and 2 minutes after anaesthesia. Akinesia, anaesthesia, subconjunctival hemorrhage and preoperative complication has been recorded. **Results:** In our study mean IOP measured before anaesthesia was 16.58. means IOP just after anaesthesia was 11.2 and after 2 minutes was 6.2. 83.22% patients were painless and 16.66% complained of mild pain during operative procedure after anaesthesia. No patient was having total akinesia just after the anaesthetic injection and after the surgical procedure 60.67% had moderate movement. Chemosis was the frequent side effect with sub tenon anaesthesia. 60% patients had chemosis in one quadrant. Only 13.3% patients had subconjunctival hemorrhage. **Conclusion:** Sub tenon anaesthesia is considered to be a safe technique. Also, it is more comfortable for patients. Sub tenon (parabulbar) anaesthesia is quick, safe and effective method of anaesthesia.

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INTRODUCTION

This is an era of rapid advancement in ophthalmic practice, particularly in the field of cataract operation. The process of phacoemulsification, small incision cataract surgery, laser cataract surgery, has revolutionized the concept of cataract surgery. The procedure is changing from retrobulbar to peribulbar surface anesthesia to without anesthesia ocular surgery. But within these different modes of anesthesia one particular method emerged which could avoid complications of first two types and had some advantages of the last one type. That is called as parabulbar or sub tenon's anesthesia, the latest advancement in this millennium. Local anesthesia for cataract surgery by sub-Tenon's injection with a short, blunt cannula is a relatively new technique that avoids the hazards in introducing a sharp object into the orbit. Penetration of the globe or optic nerve is unlikely with a blunt cannula. This prospective randomized study evaluates the effectiveness of sub-Tenon block in cataract surgery.

MATERIAL AND METHODS

The patients suitable for cataract surgery under local anesthesia were randomized. These patients with senile cataract were selected from M & J Institute of Ophthalmology, Ahmedabad. A systemic examination of all patients was carried out for any septic focus in the body or any cause of strain. Blood pressure was recorded and urine and blood examination done. Detailed history was taken including for any addiction. A detailed ocular examination was carried out of both the eyes. Visual acuity, anterior segment examination, intraocular tension and type of cataract was recorded. Direct and indirect ophthalmoscopy was carried out and patients in which fundus examination were not possible, Ultrasonic examination was done. Preoperatively both upper and lower lids were prepared of the operating eye. Ciprofloxacin (0.3%) eye drops were instilled in the eye to be operated 4 times before the surgery and one drop of betadine (5%) eye drops was administered before the surgery. The pupil was dilated with combination of Tropicamide (0.5%) eye drops and phenylephrine (10%) and Patients with high BP were

administered plain tropicamide or homatropine (2%) eye drops. To these patients sub-tenon's block (parabulbar anesthesia) was administered. In our study 30 patients were randomized to receive parabulbar block for cataract surgery. A single surgeon evaluated the following parameters.

- Pupil dilatation was considered adequate if it measured 6 mm preoperative and during operative procedure.
- Intraocular pressure was assessed before anesthesia, just after administration of block, and 2 min after administration of block.
- Akinesia was considered adequate if globe movements did not binder surgery or needed additional block.
- Anesthesia was considered adequate if the patient did not complain of any intraoperative pain or unpleasant sensation.
- Best corrected visual acuity was recorded at discharge and detailed postoperative ocular.

RESULTS

A study of 30 cases was undertaken who were administered parabulbar block (subTenon's block) for cataract surgery. The patients were operated by same surgeon by small incision cataract surgery or phacoemulsification technique. preoperative preparation, these patients received 4% paracaine topically once. 1.5 ml anesthetic mixture comprising equal volume of 2% lignocaine and 0.75% bupivacaine with 1500 units of hyaluronidase[1] was given in inferotemporal quadrant of the orbit after opening the lids / with a plain wire speculum and, using plain forceps to lift a fold of bulbar conjunctiva with underlying tenon into which 23-gauge cortex aspiration cannula. Following this massage was given for short duration of around 2 minutes and were evaluated by operating surgeon for various under mentioned parameters.

AGE ANO SEX: Age of the patients ranged from 35 to 70 years. The mean age in sub Tenon group (Group A) was 60.73 years range being (35-70) with percentage of males and females being respectively 23.4% and 76.6%.

TYPE OF CATARACT: The type of cataract was categorized in 3 broad types i.e., immature senile cataract, mature senile cataract and hyper mature senile cataract. The number of patients in our study having immature senile cataract was 20 (66.67%), with mature senile cataract 10 (33.33%) with hyper mature senile cataract O (00%).

TYPE OF CATARACT SURGERY: These patients under went small incision cataract surgery technique and phacoemulsification. Number of patients undergoing small incision cataract surgery were 26 (86.67%) phacoemulsification were 4 (13.3 %).

INTRAOCULAR PRESSURE: IOP measurements was done just before and after administration of block and 2 min after administration. The mean IOP measurement, preoperative before the block, just after the block and 2 min after the block are 16.58 mmHg, 11.2 mm Hg and 6.12 mmHg respectively. As shown in Table – 1

Table 1. Measurements of intraocular pressure before and after subtenon anaesthesia

Technique	Preoperative IOP	IOP before anesthesia	IOP just after anesthesia	IOP 2 min after anesthesia
Sub Tenon	16.58 +/-	16.58 +/-	11.2 +/-	6.12+/-
	1.21	1.21	0.8	0.21

ANAESTHESIA: The patients were subjectively questioned about pain at various stages of cataract surgery. In our study 12 patients (40%) reported sensation during superior and inferior rectus bridle suture, 4 patients reported mild pain during same procedure and 5 patient reported pain on subconjunctival injection. As shown in Table - 2

KINESIA: Complete akinesia was not found in any case Slight movement was seen in 4 cases (10.3%). Moderate eye movement was seen in 20 cases (66.66%) and whereas large movement in 6 cases (20%). As shown in Table – 4

CHEMOSIS: The severity of chemosis was found statistically more in patient administered with sub tenon anesthesia. No chemosis was seen in 3 cases (10%) whereas in 1 quadrant 18 cases (60.0%), involving 2 quadrant 7 (23.3%) and 3 or more quadrant 2 (6.7%). As shown in Table - 5.

SUBCONJUNCTIVAL HAEMORRHAGE: The severity of subconjunctival hemorrhage was found to be higher in patient administered with sub tenon anesthesia, subconjunctival hemorrhage was noted in 26 cases whereas in 1 quadrant it was 3 cases (10%) more 2 quadrant it was 1 case (3.3%).

PUPILLARY DIALATION: Pupillary dilatation was adequate preoperative. It was 7 mm during the surgery in all cases.

POST OPERATIVE VISUAL ACUITY: Post operative visual acuity is patients administered with sub Tenonanesthesia after I week 3.33% (6/60 to 6/36), 33.33% (6/24 to 6/18) and 63.34% (6/12 to 6/9). The postoperative visual acuity after one week in group 6/60 to 6/36 was found to be 3.33% mainly because of keratitis and fundus changes.

DISCUSSION

Sub tenon's anesthesia is used for cataract surgery using a blunt cortex aspiration 23gauge cannula instead of a needle. This technique avoids the hazards inherent in introducing a sharp object in to the orbit. Thus, it is less likely to be associated with some risks of peribulbar anesthesia such as globe perforation, retrobulbar hemorrhage, periocular hemorrhage, acute ischemic optic neuropathy, extraocular muscle paralysis and increased intraocular pressure. This retrospective study demonstrated the efficacy and safety of sub tenon anesthesia for phacoemulsification and small incision cataract surgery. In this study 30 patients were taken into consideration who were administered sub Tenon anesthesia. The patients were systemically evaluated for following. As compared to study conducted by Barak A.zinan et al. published in JCRS, 1999, there is a rise in intraocular pressure 1 min after anesthesia, which was 19.1 + 5.3 from the baseline. 16.8 + 5.2 the results were not comparable to our study probably due to following reasons. The volume of local anesthetic injected was 2 ml whereas in our study we used only 1.5 ml.

Table 2. Pain rating for surgical steps after subtenon anaesthesia

Stages	Bridle suture	Conjunctival peritomy	Scleral dissection	A/C entry			Nucleus delivery	Iris reposition	IOL insertion	Subconjunctival injection
Pain rating				Side Port entry	A/C maintainer	Tunnel entry				
+										
++	12									
+++	4									5
++++										

Table 3. Effect of subtenon anaesthesia on pain for operative procedure

Pain rating [2]	During surgery	
	Sub Tenon	Percentage
None (+)	10	33.33%
Sensation but No pain (++)	15	50.00%
Mild pain (+++)	05	16.67%
Moderate to severe pain	-	-

Table 4. Degree of akinesia after subtenon anaesthesia

Eve movement	Sub Tenon's Block	Percentage
None	0	-
Slight	04	13.33%
Moderate	20	66.67%
Large	06	20.0%
Total	30	100%

Table 5. Degree of chemosis after subtenon anaesthesia

Grade of chemosis[2]	Sub Tenon Block	Percentage
No chemosis	3	10.00%
1 quadrant	18	60.00%
2 quadrants	07	23.30%
3 or more quadrants	02	06.70%
Total	30	100.0%

Table 6. Ost operative visual Acuity of patients who received subtenon anaesthesia

Post Operative Visual Acuity	Sub Tenon Anesthesia	Percentage
6/60 to 6/36	01	03.33%
6/24 to 6/18	10	33.33%
6/12 to 6/6	19	63.34%

The solution had no hyaluronidase where as our solution had which facilitated faster spread local anesthesia.Alwitry A. et a/[5]: I n his study on effect of sub-Tenon's anesthesia on intraocular pressure reported that there was no significant difference between the IOP prior to and I min after injection. At all-time intervals after 3 min there was a significant reduction in IOP compared with the pre-injection measurement. At 5 min, the mean IOP reduction was 2.72 mmHg and at 10 min IOP was lowered by 2.92 mmHg. Both reductions were statistically significant compared with baseline. Pazit Pianka et al[4]: In his study on effect of sub-Tenon's and peribulbar anesthesia on intraocular pressure showed that there was significant reduction in IOP. In our study 12 patients (40%) reported sensation during superior and inferior rectus bridle suture taking, 4 patients reported mild pain d ring same procedure and 5 patient reported pain on subconjunctival injection. As compared to Stan J Roman et al[3] In his study on a sample of 109 consecutive patients which was published in British Journal on Ophthalmology on 1997.In his study he showed the anesthetic block was very efficacious, 97.3% of the patient reported no pain during surgery (87.2% reported No pain nor sensation and 10.1% only sensation)and in study of Barak Aznon et al[3] seen the effectiveness of sub Tenon's blocks versus Peribulbar block in extracapsular cataract surgery on a sample of 64 patients which was published in Journal of Cataract Refractive Surgery.

The sub tenons group reported similar pain levels as compared to peribulbar block. In study of Boo Kian Khoo et a/[6] compared sub Tenons anesthesia with retrobulbar anesthesia on a sample of 106 patients. Out of which 55 patients received sub Tenon block and 51patients received retrobulbar block which was published in Ophthalmic surgery Lasers. Only 1 of 55 (1.8%) of the patient who received sub tenon's anaesthesia experienced pain. In our study at the end of the surgical procedure 6 patients (20%) had complete movement, 20 patients (60.67%) had moderate movement Remaining 4 patients (10.33%) had slight movement. That compares to a study of Stan J.Roman et al[2] suggested that Complete eye movement remained for 93.7% of the patient and no patient had total akinesia. At the end of surgical procedure, no patient had complete Akinesia and 37.6% had no akinesia at all. Tsuneoka et al[7] who also report poor akinesia using 1ml of 2% lignocaine solution. Mein and Woodcock[8] report complete akinesia after a four-quadrant injection of 1.5 ml of an anesthetic solution of anesthetic mixture of H. Lignocaine and bupivacaine (0.375%) mixed with hyaluronidase in 58 cases. Also, Greenbaum[10] published his study in American Journal of Ophthalmology, 1992, 14: 696-9.Greenbaum[10] reports good akinesia within 1 minutes of anesthetic administration using 2 ml solution of 4% lignocaine and 0.75 bupivacaine. 50:50 mixture.Steven J.D. [11]conducted study on a sample of 50 patients.

He reported complete akinesia in 54% of the patients after sub tenons injection of 50:50 mixture of lignocaine 2% and Bupivacaine 0.5% solution. Dr. A. K. Amitava[9] AIOC 20002 conducted study on sample of 65 patients out of which 30 patients was given parabulbar block 2 ml of 2% lignocaine. Some surgeons find difficult to work without akinesia, however as reported by many authors the lack of akinesia does not cause intraoperative difficulties. Stabilization of the globe is adequate during a two-handed procedure (as during phacoemulsification). Most of the time patients do not have movement. If necessary unwanted movement can be controlled by forceps fixation lack of kinesia can even be helpful to the surgeon when asking the patient to look in a particular direction to expose a desired area. Furthermore, instructing the patient not to look at the microscope light of the phototoxic maculopathy. One study of Stan J Roman et al[2] Suggested that subconjunctival hemorrhage was frequent more than half of the patient (56%) had subconjunctival hemorrhage. it was limited to one quadrant one patient had three quadrants involved. Stevens reports subconjunctival hemorrhage involving at least one quadrant in 32% of the patient. Some authors advocate using cauterization before making the button hole to lower the incidence of hemorrhage.

CONCLUSION

- The parabulbar block is considered to be a safe technique. As because the needle is blunt tipped, proximally expanded and inserted into the sub Tenon's space under direct supervision. It is not a blind procedure like retrobulbar and parabulbar anesthesia has been totally devoid of serious complications.
- In our study the IOP was sufficiently decreased in all patients.
- The rating score for preoperative pain and' discomfort showed that sufficient surface anesthesia of blocks in all patients. The patients merrily had discomfort while giving subconjunctival injection.
- A reasonably moderate amount of akinesia was obtained by using lignocaine (2 %) and Bupivacaine (0.75 %) and hyaluronidase 1500 U in our study.
- The most frequent complication noted was subconjunctival hemorrhage and chemosis. It usually subsides within 4-5 days.
- The effect of parabulbar anesthesia was quick. There is no need to pause before operation. No ocular compression devices were required making it the most efficient mode of local anesthesia.
- The cataract surgery performed as a day case under local anesthesia appears to be well tolerated by all.
- There is an immediate recovery of vision as sub Tenon anesthesia does not hamper lid movement, the natural protection by lid is maintained.
- In summary, our experience of the parabulbar block suggests that this is a safe, effective method of providing an aesthesia for eye surgery. It prevents the anxiety which patients suffers during peribulbar and retrobulbar block.

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