"EFFICACY OF PERIBULBAR ANAESTHESIA VERSUS TOPICAL WITH INTRACAMERAL LIGNOCAINE ANAESTHESIA IN MANUAL SMALL INCISION CATARACT SURGERY: A 1-YEAR RANDOMIZED CONTROLLED TRAIL."

By

Dr. SAMYAKTA SHETTI

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In

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Under the Guidance of

Dr. REKHA B.K. **MS, DOMS.,Ph.D.**

PROFESSOR

DEPARTMENT OF OPHTHALMOLOGY,

JAWAHARLAL NEHRU MEDICAL COLLEGE,

BELGAUM, KARNATAKA.

APRIL 2014

KLE University, Belgaum, Karnataka

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Date :

Place : **Belgaum**

Dr. REKHA B.K. MS,DOMS,Ph.D

Professor,
Department of Ophthalmology,
J. N. Medical College,
Nehru Nagar, Belgaum - 590 010.

KLE University, Belgaum, Karnataka

Endorsement By The Hod, Principal / Head Of The Institution

This is to certify that the dissertation entitled **"EFFICACY OF PERIBULBAR ANAESTHESIA VERSUS TOPICAL WITH INTRACAMERAL LIGNOCAINE ANAESTHESIA IN MANUAL SMALL INCISION CATARACT SURGERY: A 1-YEAR RANDOMIZED CONTROLLED TRAIL"**. is a bonafide research work done by **Dr. SAMYAKTA SHETTI** under the guidance of **Dr. REKHA B.K.** MS,DOMS,Ph.D Professor, Department of Ophthalmology, Jawaharlal Nehru Medical College, Belgaum.

Dr. S.B PATIL MS,DOMS

Professor and Head,
Department of Ophthalmology
J. N. Medical College,
Nehru Nagar,
Belgaum-590 010

Date :
Place : **Belgaum**

Dr. A.S GODHI MS, FICS

Principal,
J. N. Medical College,
Nehru Nagar,
Belgaum-590 010

Date :
Place : **Belgaum**

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Dr. SAMYAKTA SHETTI

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ABSTRACT

INTRODUCTION AND AIMS: Cataract is most common treatable cause of blindness in elderly population . The only treatment available is cataract surgery.Anesthesia is an important part of the cataract surgery which aims at creating a comfortable environment for the patient and surgeon during surgery and quick recovery of function without added risks**.** This study was done to study the efficacy of peribulbar anesthesia versus topical with intracameral lignocaine anesthesia in manual small incision cataract surgery. To compare surgeon's experience during surgery under both technique and to evaluate surgical outcome in both groups.

METHODS: The present study of randomized controlled trail was conducted at KLES Dr. Prabhakar Kore Hospital and MRC Belgaum from January 2012 to December 2012. The study was approved by the ethical and research committee. One twenty patients undergoing cataract surgery were randomized into two groups(60 each).Group one was peribulbar anaesthesia and group two was topical with intracameral anaesthesia. Patients with cataract and age more than 50 years were included in the study.Un – cooperative patients, corneal dystrophies/ degenerations ,one eyed patient were excluded. Informed written consent was obtained from all the patients for the anesthetic procedure and surgery. Detailed history and ocular examination was done preoperatively. Group one patients were administered peribulbar block and Group two patients were administered topical lignocaine jelly preoperatively and preservative free 1% lignocaine intracameral intraoperatively. Parameters studied in both the groups were akinesia,analgesia and complications occurring during administration of anaesthesia; surgeon's experience was evaluated in

terms of patient's cooperation, difficulty while doing surgery due to ocular movements ,anterior chamber stability,time taken to complete surgery; surgical outcome was studied with regards to any complications during surgery,best corrected visual acuity at 6 weeks. Statistical analysis was done using chi-square test. . Statistical correlations were done by SPSS statistical data package editor, version 12.0

RESULTS: One twenty patients were included. Mean age was 64.5 years. Males were 54.17% and females were 45.83%. Lid akinesia was 96.66% and globe akinesia was 100% which were seen only in peribulbar group and lacked in topical group which was statistically significant ($p<0.001$).No major vision or life threatening complications occurred in both the groups while administration of anesthesia. Minor complications such as chemosis(45%) and subconjunctival haemorrhage (21.66%) was statistically and clinically significant ($p<0.001$) where exclusively seen in peribulbar group. Corneal abrasion (3.33%), giddiness (5%) which were not significant ($p=0.242$) were seen only in peribulbar group. Surgical step during which pain occurred was scleral incision, tunneling, cortical wash which was statistically significant in topical group. Surgical complications like posterior capsular rent without vitreous loss occurred in (3.33%) in peribulbar group and (1.66%) in topical group which was not significant ($p=1.000$).No other significant complications occurred while surgery. Pain scale between both the groups showed no significant difference ($p=0.226$) immediately after surgery. Pain scale was significant in peribulbar group after 4hrs of surgery ($p<0.001$)**.**Patient cooperation and lesser ocular movements during surgery was better in peribulbar group ($p<0.001$). Anterior chamber stability was similar in both the groups ($p=0.266$). Best corrected visual

acuity 6 weeks post operatively showed no significant difference in both the groups (p=0.324) and 56.7% had 6/9 visual acuity.

CONCULSION: Peribulbar anesthesia provides excellent akinesia which lacks in topical anaesthesia. Needle related complications do occur in peribulbar anesthesia which is eliminated by topical anaesthesia. Analgesia provided is similar under both the techniques. Patient's cooperation and difficulty due to ocular movement is better in peribulbar anesthesia as experienced by surgeon .In our study,both the techniques were free from vision or life threatening complications and had no difference in best corrected visual acuity.

Topical with intracameral anaesthesia can be an alternative to peribulbar anaesthesia for manual small incision cataract surgery provided the patient is very cooperative.

KEY WORDS: peribulbar, topical, intracameral, manual small incision cataract surgery.

LIST OF ABBREVIATIONS USED

MSICS	–	MANUAL SMALL INCISION CATARACT SURGERY
VAS	-	VISUAL ANALOG SCALE
BSS	-	BALANCED SALT SOLUTION
CNS	-	CENTRAL NERVOUS SYSTEM
MIN	-	MINUTES
mL	-	MILLILITERS
OVD	-	OPHTHALMIC VISCOSURGICAL DEVICES
PCR	-	POSTERIOR CAPSULAR RENT
VL	-	VITREOUS LOSS
BCVA	-	BEST CORRECTED VISUAL ACUITY

CONTENTS

LIST OF TABLES

LIST OF GRAPHS

LIST OF PHOTOGRAPHS

Chapter 1

Introduction

INTRODUCTION

Cataract is the most common treatable cause of blindness in elderly population .There is a backlog of 3.8 million people who develop blinding cataract every year in India as against 2.7 million cataract surgeries done every year.[1,2]

The only treatment of cataract is its surgical removal which is the commonest ophthalmic surgical procedure.[2] Anesthesia being an integral part of the cataract surgery which may be performed under topical, local or general anesthesia. Patient comfort, safety and low complication rates are the essentials of anaesthesia.[3] Anesthesia for cataract surgery today aims at creating a comfortable environment for the patient and surgeon during surgery and quick recovery of function without added risks.

General anaesthesia might be preferred in patients with uncooperative patients or co-existing disorders. It offers almost motionless optimal surgical conditions and possesses no major complications risk related to the injection. However, it needs anaesthetic staff, equipment during administration, require a longer recovery time and is increasingly expensive. General anaesthesia paved way for early ocular surgery until the development of the hypodermic needle which allowed local anaesthetics to be used in ophthalmic field.Retrobulbar block was one of the most frequently followed techniques. Its advantages includes obtaining ocular akinesia and sufficient analgesia but there is a risk of damage to surrounding structures including globe perforation or penetration, entry into the cerebrospinal fluid and vascular structures behind the eye, causing respiratory depression and cardiovascular collapse. While rare, they are significant causing its limited use in practice. Due to the relatively higher risks of retrobulbar blocks this technique is quickly becoming obsolete. Later retrobulbar block was modified into peribulbar block which gives excellent akinesia

and analgesia where as its disadvantages include high rate of chemosis, increased local anaesthetic agent requirement and longer latent period requirement for akinesia, associated with risk such as globe perforation, damage to optic nerve, retrobulbar hemorrhage and ocular muscle injury.[4] The occurrence of rare but sight-threatening complications have led to the adoption of the technique of sub-Tenon's block, which avoids the use of sharp needles. Sub-Tenon's block or 'blunt needle' block is performed by mainly blind dissection of the sub-Tenon's space. Advantages are reduction of complication rates mainly in myopic eyes and the option of re-injections to top up the anaesthesia during surgery. Anaesthetic leakage, need for dissection and sutures are its limitations.[4]

Topical and intracameral anesthesia are new options for pain control in modern cataract surgery. In recent times, cataract surgery has increasingly been performed under topical anaesthesia. Lack of ocular akinesia and insufficient analgesia are considered as disadvantages of this method.The advantages over injected local anesthesia technique is that it is economical, avoids undesirable cosmetic adverse effect, its ease of application, minimal to absent discomfort on administration, rapid onset of anesthesia ,faster postoperative functional recovery and more important eradication of complications associated with peribulbar injection.[4,5]

Though topical anesthesia is widely used in phacoemulsification technique it has been rarely used in manual small incision cataract surgery which is very suitable procedure for high volume surgeries in developing countries. Many parts of our country still do not have access to phacoemulsification due to cost consideration of the procedure.[2,5]

Therefore, the purpose of this study is to compare efficacy of peribulbar anesthesia versus topical with intracameral anesthesia in manual small incision cataract surgery.

Chapter 2

Objectives

OBJECTIVES

Primary objective: To study the efficacy of peribulbar anesthesia versus topical with intracameral lignocaine anesthesia in manual small incision cataract surgery.

Secondary objectives:

1. To compare surgeon's experience during surgery under both anaesthetic technique.
2. To evaluate surgical outcome in both groups.

Chapter 3

Review of Literature

REVIEW OF LITERATURE

Anesthesia or anaesthesia is derived from Greek an- means without and aisthēsis, means "sensation", the condition of having sensation blocked or temporarily taken away. [6] Anaesthesia in ophthalmology has been a popular topic of discussion since the beginning of profession. As the incision size of cataract extraction has reduced, anesthesia techniques have also advanced significantly. We have moved a full circle from ancient days of no anesthesia couching to Kollers topical cocaine through general anesthesia, Knapp's local anesthesia and now to topical and no anesthesia.[7] It has been said that the disadvantage of not understanding the past is to not understand the present. Knowledge of the history of anesthesia enables us to appreciate the discoveries made and keep discovering newer techniques for patient's comfort.

HISTORICAL PERSPECTIVE

GENERAL ANESTHESIA

600 BC outlined the use of inhalational anesthesia for couching by Susruta, the ancient Indian surgeon.[8]Egyptian and Assyrian surgeons compressed carotid to produce transient cerebral ischemia under which couching was done. In the 1st century, Greek physician Dioscorides, reported on the analgesic properties of mandragora, extracted from the bark and leaves of the mandrake plant. Agents such as ethyl alcohol, cannabis and opium were inhaled by the ancients for their stupefying effects before surgery. Alchemist and physician Arnold of Villanova used a mixture of opium, mandragora, and henbane to make his patients insensible to pain.[9] From 9th to 13th century, the "soporific sponge" was used to provide pain relief which were

impregnated with a liquid made from combination of mandrake leaves, poppies, and herbs. Before surgery, the sponge was reconstituted with hot water and placed over the nostrils of patient in order to deliver anesthesia. Alcohol fumes were also used in the surgical setting during the middle ages, but proved to be of poor value due to their inadequacy both in pain relief and in minimizing the recollection of unpleasant memories of the surgical procedure.[9]

In thirteenth century, Spanish alchemist described a mixture of sulfuric acid and alcohol called "sweet vitriol" in Greek means "the upper, pure bright air." [10] In the 16th century, Paracelsus produced Laudanum, or "wine of opium," which was used as an analgesic. Still, alcohol and opium were regarded as of practical value in diminishing the pain of operations by the mid-1800s, despite their relative ineffectiveness.[9]In 1730, this substance was renamed ether. In 1818 ,Faraday reported its anesthetic effect.In the late eighteenth and the nineteenth centuries the use of other general anesthetic agents, such as nitrous oxide, chloroform ,carbonic acid gas was described.[8] Humphrey Davy noted the nitrous oxide effect on respiration and the central nervous system and coined term "laughing gas" because of its ability to trigger uncontrollable laughter. This gas remains the oldest inhaled anesthetic still utilized today. During the first half of the 20th century the search for an ideal inhaled anesthetic led to the introduction of ethyl chloride, ethylene, cyclopropane and other volatile agents. However, their use faded because of strong pungency, weak potency, and flammability. They were soon replaced by fluorinated hydrocarbons halothane, Isoflurane, desflurane, sevoflurane.Today, these agents in addition to nitrous oxide, constitute the mainstay of inhalation anesthetics.[9]

Topical anaesthesia:

1653 marks the history of cocaine for the use of medical purposes. Use of cocaine in medicine was cessed due to its adverse effects including toxicity, episodes of syncope, excessive stimulation, hallucinations, haziness and damage to the cornea,addiction and the development of safer and more effective topical and injectable drugs. In 1855, Cocaine was isolated and purified by Niemann. In 1884 , Koller's demonstrated the anaesthetic effect of topical cocaine to abolish the pain for ophthalmic surgery. In 1884, Knapp achieved anaesthesia during operations using multiple subconjunctival injection of cocaine around the muscles and optic nerve. In the 1930s, topical cocaine was then replaced by tetracaine 1 %. In the 1960s drugs like proparacaine was introduced and then in 1990s ibuprocaine, lidocaine and bupivacaine were discovered. The use of topical anaesthesia gradually declined after late 1930s and then made resurge for cataract surgery in the last two decades as technique in cataract surgery evovled.[11] In 1986, Shimizu had demonstrated topical cocaine (3%) use in clear corneal cataract surgery. In 1992, Fichman described a method for performing anesthesia with tetracaine.[12] In the late 1990s Gills and others proposed the addition of intracameral unpreserved lidocaine.[13,14] In 2000,Agarwal introduced no anesthesia technique in phacoemulsification.[15] The term "vocal local" is used to emphasize the importance of constant communication with the patient during the procedure.Sadove remarked, "I want to emphasize that a few carefully chosen words are as potent as any sedation ... vocal is about as good as local." [16]

Injection anaesthesia techniques

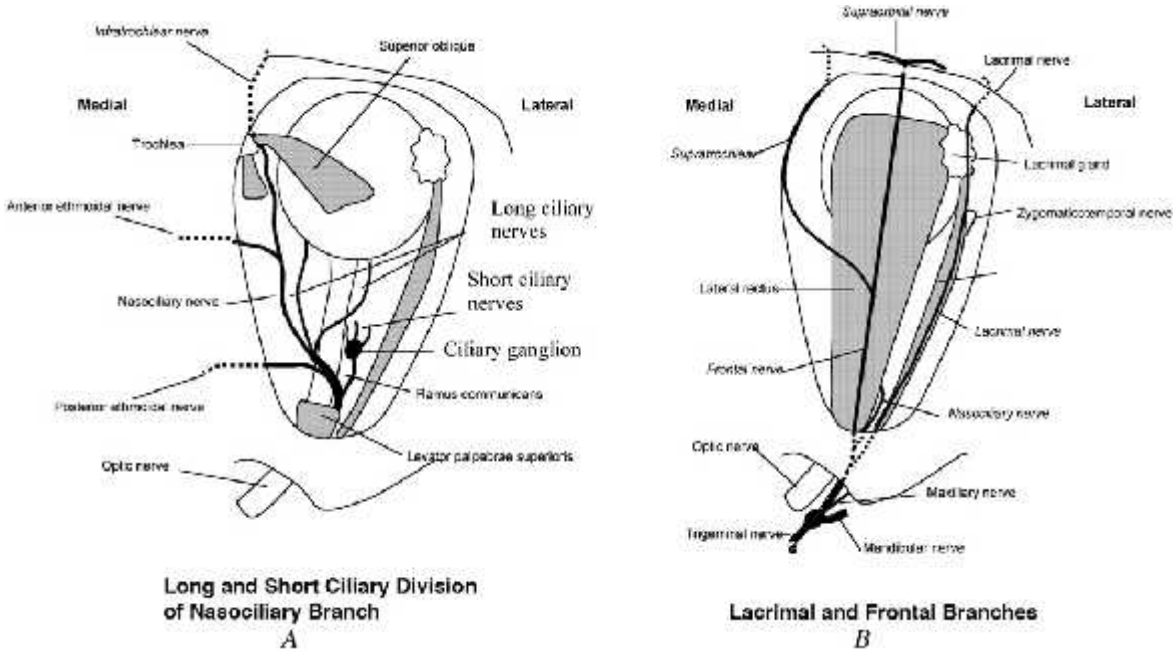
In 1920s it was established that good surgical conditions for cataract surgery and for enucleation was given by regional orbital block which was called 'ciliary ganglion block'. In 1929,O'Brien demonstrated a method for more proximal

facial nerve block.[17] In 1935,Gifford observed that ciliary ganglion block had a high rate of excellent surgical results. In 1940s and 1950s Atkinson's intraconal ciliary ganglion block came to be known as the 'retrobulbar block' following its success led to the development of regional anaesthesia for cataract surgery. Van Lint was the first to show a method for blocking the orbicularis oculi to prevent blepharospasm during cataract surgery. In 1943, Lofgren and Lundquist synthesized lidocaine. In 1953, Atkinson proposed alternative approach to block the facial nerve in which he introduced then needle through an intradermal at the inferior edge of the zygomatic bone.[18]In 1985 and following year, Davis reported the use of peribulbar anesthesia which he credited Kelman for its introduction in mid-1970s.[19] In the mid-1980s ,transconjunctival retrobulbar anesthesia was also introduced . In 1990, Hanson and his colleagues introduced a modification of Turnbull's sub-Tenon's technique.[18]

APPLIED ANATOMY:

A thorough understanding of anatomy is crucial to successful anesthesia. Orbit is an irregular four sided pyramid with its apex pointing poster medially and its base facing interiorly. The orbit is mainly filled by adipose tissue and globe is suspended it its anterior part. Annulus of zinn, a fibrous ring arising from the superior orbital fissure form the apex. The base is formed by surface of cornea, conjunctiva and lids. Globe movements are controlled by the rectus muscles (superior, inferior, lateral, medial) and oblique muscles (superior and inferior). The rectus muscles arise from annulus of zinn near the apex of orbit and insert anterior to the equator of the globe. The distance from the inferior temporal orbital rim to annulus measures 42 to 54mm.[20,21]

Within the annulus and the muscle cone lie the optic nerve (II), the oculomotor nerve (III containing both superior and inferior branches), the abducent nerve (VI), the nasociliary nerve (branch of V nerve), the ciliary ganglion and vessels. The superior branch of oculomotor nerve supplies the superior rectus and levator palpebrae muscles.The inferior branch of oculomotor nerve supplies the medial rectus,inferior rectus and inferior oblique muscles. Abducen nerve supplies lateral rectus. Trochlear nerve (IV nerve) runs outside and above the annulus and supplies the superior oblique muscle (retained activity of this muscle is seen as anaesthetic agent failing to block this nerve).Motor nerves enter the muscle bellies of the four rectus muscles from their conal surface, 1 to 1.5 cm from the apex. Anasthestic agents have to reach 5 to 10 mm exposed segment of these motor nerves in the posterior intracone space for conduction block of these nerves and akinesia of their supplied muscles to occur. Ciliary Ganglion is located 15 mm behind the globe and 7 to 10 mm from the orbital apex. It receives long sensory nerves containing sensory fibers from cornea, iris and ciliary body. Short motor nerves which carry parasympathetic axon to supply iris sphincter and sympathetic route that supply innervation for pupillary dilatation and functions of smooth muscles of the eyelids.[22] Corneal and perilimbal conjunctival and superonasal quadrant of peripheral conjunctival sensations are mediated through the nasociliary nerve. The remainder of the peripheral conjunctival sensations is supplied through the lacrimal, frontal and infraorbital nerves coursing outside the muscle cone hence intraoperative pain may be experienced if these nerves are not blocked.[20-22]



Long and Short Ciliary Division of Nasociliary Branch
A

Lacrimal and Frontal Branches
B

FIGURE-1. Diagram of the division of the ophthalmic nerve. Left: Long and short ciliary division of the nasociliary branch. Right: Lacrimal and frontal branches.

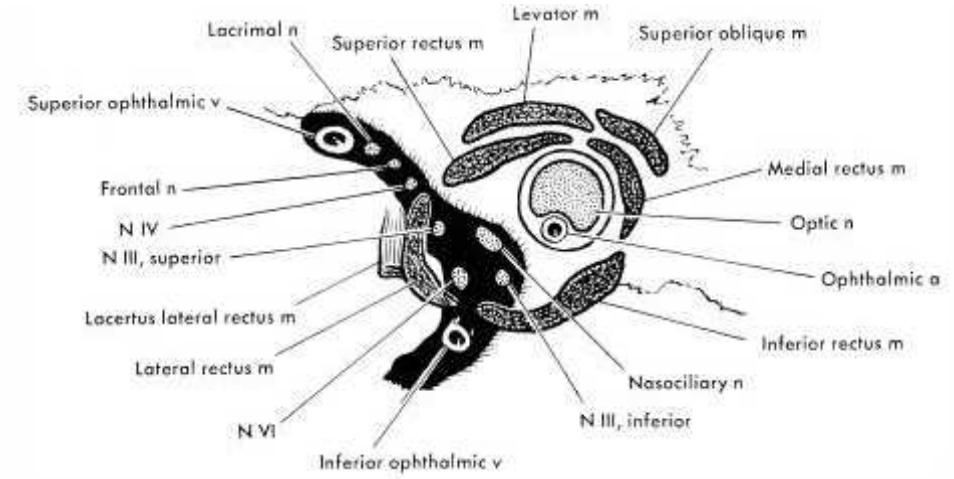


FIGURE -2. Posterior part of orbit showing topographic relationship of muscle origins in annulus of Zinn.

When local anaesthetic solution is injected into lateral adipose compartment from the inferotemporal needle insertion it normally blocks the nasociliary, lacrimal, frontal, supraorbital and supratrochlear branches of the ophthalmic division of the trigeminal nerve and infraorbital branch of the maxillary division.[23]

When local anaesthetic solution is injected into medial compartment through a needle placed between the caruncle and the medial canthal angle it blocks the medial branches of the nasociliary nerves, the long ciliary nerves, the infratrochlear nerves and the medial components of the supraorbital and supratrochlear nerves.[23]Ocular sensitivity is based on terminations of 5th cranial nerve distributed to cornea and ciliary body in anterior part of eye.The fibers are non-myelinated types A-delta and C. They carry sensation of pain, temperature and touch which are blocked by lower concentration of drugs compared with motor fibers.The order of loss of nerve function is first pain then temperature, touch, proprioception and skeletal muscle tone.[24] The anaesthetic agent when comes in contact with non-myelinated fibers or on ranvier nodes of myelinated fibers exert their activity. To suppress impulse propogation, 3 to 5 nodes of ranvier must be blocked for a length of 3-7 mm.[25]

Sensory termination block is important in topical anaesthesia involving the inhibition of sodium channels at nerve endings or receptor by anesthetic agents blocking the production of nerve impulse. Topically applied anesthetic agent directly act on the corneal epithelium and stroma and if penetrates into anterior chamber could suppress iris and ciliary body pain. The concentration of anesthetic agent coming in contact with deep seated structures can be increased by repeating eyedrop application before surgery starts or by adding some drug after first surgical incision, additional eyedrop after conjunctival incision or intracameral injection after opening the anterior chamber.[24]

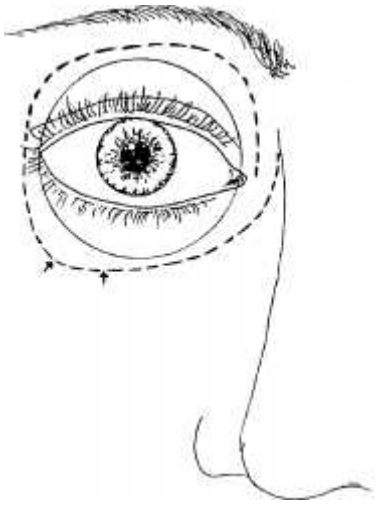


FIGURE 3: Traditional and modified needle entry positions. The outline of the globe is superimposed on a template of the orbital rim. Traditional inferior block injection site is just inside the orbital rim at T. Modified injection site is inferior-temporal, just inside the orbital rim at M.

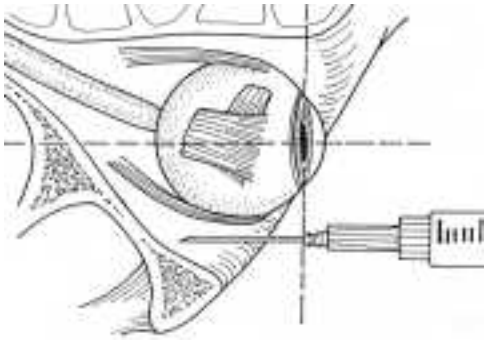


FIGURE 4:Peribulbar block.Needle outside the muscle cone

PHARMACOLOGY OF LOCAL ANESTHETIC AGENTS :

Chemical compounds employed for ophthalmic anesthesia are tertiary amines composed of an aromatic hydrophobic ring usually benzene and an amidic hydrophilic group with an ester or an amidic intermediate chain.[24,26]

A. Ester linked drugs	**B. Amide linked drugs**
1. Cocaine	1. Lidocaine
2. Procaine	2. Etidocaine
3. Chlorprocaine	3. Mepivacaine
4. Amethocaine	4. Ropivacaine
5. Oxybuprocaine	5. Bupivacaine
6. Tetracaine	6. Prilocaine
7. Benoxinate.	

Lignocaine (Lidocaine, Xylocaine)-

Lignocaine is currently most common employed anesthetic agent. As local injection it is available as 1% to 2% and for topical use it is available as 4% with preservative and 1% as preservative free for intracameral use.At corneal surface, the onset of anesthesia is slower than with ester on topical use as eyedrop. Lidocaine crosses rapidly the corneal epithelium and stroma causing sodium channel blockade on the cornea. lidocaine is not degraded within the eye and can exert its anaesthetic effect on anterior chamber structures for a long period upto 20 minutes.[24]

Adjuvants :

Vasoconstrictors :

Vasoconstrictors (epinephrine) are commonly mixed with local anesthetic solution to increase the intensity and duration of block and minimize bleeding from small vessels.[27]Absorption of local anesthetic is reduced, thus avoiding high concentrations of local anesthetic in the plasma and avoiding systemic complication. Therefore at a concentration of 1:2,00,000 it has no systemic effect.[28] Use of epinephrine containing solution should be avoided in elderly patients suffering from cerebrovasular and cardiovascular diseases.

Hyaluronidase :

Hyaluronidase is an enzyme which reversibly liquefies the interstitial barrier between cells by depolymerization of hyaluronic acid to a tetrasaccharide thereby enhancing the diffusion of molecules through tissue planes.[29]It increases the permeability of the fibrous septa that divides orbit into compartments thereby enhancing uniform spread of local anesthetic solution producing better anesthetic effect. It is available as white freeze dried water soluble powder containing 1500 I.U per vial which is used in concentration of 5 to 25 unit/ml of anesthetic solutions after reconstitution with distilled water or anesthetic solution itself.[30]

Influence of formulation:

1. pH

Anesthetic drugs for ocular use contain sodium chloride or other salts to make them isotonic resulting in a pH between 5 and 7 which contributes to burning sensation on first eyedrop application. pH of solution can be raised by diluting the

drugs in bicarbonate or BSS or BSS plus approaching the physiologic pH of 7.2-7.4.[24]For 10cc of lignocaine solution 1ml of 7.5% sodium bicarbonate is used. Alkalinization decreases time of onset, prolongs duration of action and decreases the pain during injection.[31]

2. Preservatives :

Presence of preservatives in drug solutions such as methylparaben improves stability and sterility but can cause toxicity for ocular structures. Preservatives like - benzalkonium chloride also increases corneal penetration.Corneal epithelial swelling has been frequently observed with preserved formulations of lidocaine. Use of unpreserved formulation of anesthetic agents is recommended.[13]

3. Temperature :

Temperature influences the stability of solution. A warm solution is more stable and better tolerated by patients and more active therefore solution should not be refrigerated before use.[24]

Different types and techniques of regional anesthesia :[32]

I. Akinetic Techniques :

A. Needle based techniques

1. Retrobulbar block

2. Peribulbar block

B. Cannula based injection technique

1. Sub – Tenon's block

II. Non-kinetic technique

1. Topical anesthesia

PERIBULBAR ANESTHESIA :

Charles kelman first described modified retrobulbar injection which originally was not considered peribulbar approach. Here the anesthetic solution is deposited outside the muscle cone therefore called as pericone or extraconal block.

Procedure :

The principle of this technique is to instill the local anesthetic agent outside the muscle cone and avoid proximity to the optic nerve. A 23 gauge or 24 gauge needle of l inch long is inserted at junction of lateral one third of lower lid above the orbital rim. Once the needle with bevel up is directed towards the globe along the orbital floor, passing the globe equator to the depth controlled by observing needle hub junction reaching the plane of iris.[22] After negative aspiration for blood, with globe in primary gaze, 4 to 5cc of local anesthetic agent is injected. The total volume ranges from 6-10 ml which can be given slowly at one site itself or can be given at two sites which can be superotemporal, superonasal or medial compartment. Following inferotemporal injection, intraocular pressure increases significantly and may lead to vitreous loss during surgery.[33] To avoid this adequate compression of the globe either by using digits or Honan intraocular pressure reducer can be used. Ocular digital compression is done gently with the middle three fingers placed over a sterile gauze on upper eye lid with middle finger pressing directly down the eye ball. For every 30seconds digital pressure is released for 5seconds to allow for vascular pulsations to occur (intermittent digital pressure). Honan's balloon is applied for 10-20 min with the pressure set at 30mm Hg. After adequate compression, if significant movement of eye still persists supplementary (second) injection is given.

Medial peribulbar block is given using 26G ½ disposable needle with the bevel facing the medial orbital wall needle is passed into the blind pit between the medial caruncle and canthus. It is passed backwards in the transverse plane, directed at 5° angle away from the sagittal plane and towards the medial orbital wall. If the medial wall is in contact the tip is slightly withdrawn and needle is redirected to a depth of 15-20 mm and after negative aspiration for blood, 3-5cc of local anesthetic solution is injected.[34] This extraconal space is an excellent site for administration of local anesthesia as it communicates freely with intraconal space.

Injection at superomedial quadrant should not be administered as it more vascular in nature compared to other quadrants resulting in more chances of haemorrhage to occur in lid and as the globe is closer to roof than to the floor resulting in perforation of the globe.[35] Injection at superotemporal is given through the skin of the upper lid in the sagittal plane of the lateral limbus. The needle is advanced parallel to the roof and keeping very close to the roof. This is relatively avascular and safer area. Injection at inferonasal is given at the junction of medial one third and lateral two thirds of the lower lid at the inferior orbital rim the needle is directed parallel to the floor and parallel to the medial wall of the orbit or slightly towards the medial wall.

Advantages of Peribulbar anesthesia

1. Less chances of retrobulbar haemorrhage
2. Less chances of perforation of eye or injury to the optic nerve.
3. Compared to retrobulbar block potential for intraocular or intradural injection is decreased because the anesthetic is deposited outside the muscle cone.

4 Provides reasonably good akinesia and anesthesia.

5. No intra operative or post-operative amarousis.

Disadvantages of peribulbar anesthesia :

1. Akinesia of the extraocular muscle may be less complete requiring more than one injection.
2. Greater volume required ,more time required to achieve satisfactory block.
3. Greater incidence of periorbital ecchymosis, conjunctival chemosis making operating conditions difficult.
4. Ptosis can remain for upto 90 days.
5. Skill is required
6. Although needle remains tangential to the globe key structures may be damaged.[36]

Complications of Peribulbar Anesthesia:

There are many complications of needle blocks ranging from simple to serious which may be systemic or limited to orbit and its content and may arise immediately or may be delayed.Complications may be directly related to the local anesthetic used or the method of administration.[32]

Systemic Complications :

Systemic toxicity with local anesthetics is related to total dosage, vascularity at the site of injection ,type of drug used ,speed of injection and if epinephrine is used as an adjunctive to delay systemic release. Intravenously if given rapidly target organs namely central nervous system and myocardium are affected. Negative aspiration before injection and injecting slowly reduces likelihood of this complication. Intrarterial injection of local anesthetic with retrograde flow to cerebral circulation may result in an acute grand mal seizure.[37,38]

Brainstem anesthesia :

It is a form of central nervous system toxicity which is not caused by increasing levels of local anesthetics in the systemic circulation but by direct spread of anesthetic to the brain from the orbit. It is reported to occur in 1 in 350-500.[39] The patient first describes symptoms within 2 min of orbital injection peaks up to 10-20min and resolves over 2-3 hrs. Therefore ,this is a potential complication after block is given so patient should not be draped for surgery until 15mins have lapsed after completion of block or else identification and corrective treatment may be delayed.[40,41]

Clinical features vary from mild confusion, marked shivering or convulsant behaviour, bilateral brainstem nerve palsies, hemiplegia, paraplegia, quadriplegia with or without loss of consciousness to apnea with marked cardiovascular instability. Blockade of eight to twelfth cranial nerves results in deafness, tinnitus, vertigo, dysarthria, dyphagia and aphasia.[32] Treatment of this central spread includes reassurance, ventilatory support with oxygen, intravenous fluid therapy and vagolytics, vasopressor, vasodilators or adrenergic blocking agents .Avoidance of deep penetration of the orbit that is maximum penetration from orbital rim should not exceed 31mm is advisable to prevent this complication.[42]

Allergy :

Allergic reactions are almost exclusively confined to the ester linked durgs which on breaking down paraminobenzoic acid is produced which trigger an allergic reaction in certain individuals.

Orbital Complications

Retrobulbar Hemorrhage

This is due to penetration of needle either through veins or artery in the orbit. Venous hemorrhage develops slowly with marked chemosis and does not threaten visual acuity. Arterial hemorrhage causes rapid orbital swelling with marked proptosis and immobility of the globe and tight eyelids, ecchymosis, lid swelling and dramatic increase in intraocular pressure.Bleeding can be controlled and spread confined by digital pressure over a gauze pad applied to closed lids.Most of the cases can be treated conservatively. IOP can be lowered with acetazolamide or intravenous mannitol, rarely immediate lateral canthotomy or paracentesis is required to reduce orbital pressure.Hemorrhage can be avoided if needle is placed at site that are relatively avascular so superionasal quadrant should be avoided as end vessels are present here and also deep needle placement should be avoided as large orbital blood vessels are located in posterior orbit.[32]

Globe penetration / Perforation

Globe penetration refers to entry of needle into eyeball whereas globe perforation has two puncture wounds one entry and other exit wound. Patients with deep seated eye, repeated injections, axial length > 26mm are more prone to Globe perforation. It was seen that patients in whom perforated globes developed were unco-operative during injection causing difficulty in performing the standard method of peribulbar injection.Clinical features of Globe penetration include hypotonic eye, poor red reflex, vitreous hemorrhage, poking through sensation. Fundoscopy confirms the diagnosis if media is clear. Clinical features of Globe perforation includes intense ocular pain, sudden loss of vision and hypotony.[32] When there is excessive resistance for injection of anesthetic agent penetration should be suspected. If there is retinal

perforation it may require cryopexy and external tamponade for anterior perforation sites or laser photocoagulation for posterior holes. It has been seen that ideal time for surgical intervention after double penetrating injury is 10 days, so a careful ophthalmoscopic examination should be done within 10 days after peribulbar injection to detect and treat occult perforation.[43]

Myotoxicity

Diplopia and ptosis are common post operatively and if recovery of muscle function is delayed more than 6 weeks its common causes include intramuscular injection leading to local anesthetic myotoxicity, surgical trauma, ischemic contracture of Volkmann's type after trauma or hemorrhage.[32] Highest concentration of local anesthetic should not be used as they cause myotoxicity. Most frequently affected is inferior rectus muscle. There can be superior oblique, medical rectus palsies with nasal injection superior rectus or elevator palpebrae superioris palsies following superior injection or as a consequence of surgery. Injection directly into muscle can be avoided by needle insertion into inferotemperal, nasal, supero temporal site.[44]

Optic nerve Injury :

The Atkinson's position i.e. looking up and nasally makes the optic nerve highly susceptible to injury by the needle as the optic nerve, ophthalmic vein and posterior pole of globe are brought to close proximity of the needle. Therefore Katsev et al suggested that the length of the needle injected should not exceed 31mm to avoid damage to optic nerve. Optic nerve injury with needle tip can cause brain stem anesthesia by the subarachnoid spread of anesthetic agent directly into CNS, central retinal artery occlusion, central retinal vein occlusion, hemorrhage within the nerve sheath ,direct damage to optic nerve, contralateral amaurosis, partial or total optic

atrophy in later post operative period. All injections should be made with the globe in the primary gaze position so that the optic nerve remains in its normal position.[45]

Chemosis

Chemosis occurs after injection of large volume of peribulbar injections which resolves after compression and passage of time.[45]

Corneal Abrasion

This occurs from use of compression device or digital pressure, if lid is incompletely closed or post operatively as the motor effects of the local anesthetic wean off causing the eyelid to open then exposing cornea.[46]

TOPICAL ANESTHESIA

At present the definition of topical anesthesia includes the use of anesthetic eyedrops without sedation and intracameral anesthesia by the use of anesthetic irrigation of the anterior chamber at any step of surgery.[24] In 1886, Karl Koller started using anesthetic effect of cocaine on the cornea and in ophthalmic surgery. Its use declined due to addiction potential and side effects of cocaine that complicated the surgery.It again became popular and its use for phacoemulsification was first reported by Richard Fishman, which was presented at American Society of Cataract and Refractive Surgery meeting in April 1992.[47]

Routes of administration

1. Eyedrop Instillations

Proparacaine, tetracaine,lidocaine, bupivacaine or benoxinate anesthetic eye drops are primarily used as topical agent. It is instilled into fornix of the eye or over corneal surface. Bilateral instillations of anesthetic agent prevent blinking and bell's

phenomenon elicited by non operated eye. This allows the patient to keep both eyes open without effort during surgery. if topical anesthesia is used alone 6 instillations of 4% lidocaine at 10 min intervals gives analgesia for 15-20 min but if intracameral anesthetic agent is used number of eye drops can be reduced to three.[24]

2. Gel Application

Gel preparations of anesthetic agents prolong the contact between drug and ocular surfaces. It can be applied twice 15 min apart before surgery or single application of lidocaine 2% gel into the conjunctival sac. Tetracaine also can be applied as gel.[24] Viscous lidocaine gel is often mixed with dilating medications, antibiotics and nonsteroidal antiinflammatory agents. It is reported that 5 mLof lidocaine gel 2% mixed with 4 drops of tropicamide, 4 drops of cyclopentolate 1%, 4 drops of phenylephrine 10%, 10 drops of moxifloxacin, and 4 drops of ketorolac, applied to the operative eye twice before the surgery typically achieves excellent dilation and anesthesia.[48]

3. Drug soaked sponges

Sponges soaked with an anesthetic agent in contact with ocular surfaces to obtain analgesia was proposed in 1995. The advantage of this is that lesser amount of drug is in contact with corneal epithelium and hence lesser amount of toxicity.[24]

4. Intracameral irrigations

Intracameral irrigation with anesthetics was first proposed by Gills et al. Topical anesthetic agents block trigeminal nerve ending in cornea and conjunctiva only and does not anesthetise intraocular structures in the anterior segment. Manipulation of iris and stretching of the ciliary body and zonules during surgery can irritate the ciliary nerves causing discomfort. Therefore addition of intra cameral

anesthesia is an adjunctive to topical anesthesia.[49] Higher drug concentrations in anterior chamber occur with anesthetic gels than with equivalent dose of drops and may produce superior surface analgesia.[4]

The most employed drug is lidocaine at 1% concentration which is prepared from 4% solution by diluting in BSS or BSS plus or directly 1% unpreserved lidocameral irrigation are available.Other drugs used for intracameral are bupivacaine and mepivacaine.[24]

Preservative free lidocaine 1% is injected into anterior chamber immediately after first corneal incision or at hydrodissection, drug is rapidly absorbed by iris, ciliary body and cornea consequently the drug is removed by anterior chamber irrigation thus limiting tissue exposure.[24] Intracameral lidocaine alone dilates the pupil due to direct action of lidocaine on the iris which causes muscle relaxation.

5. Viscoelastic Borne Anesthesia

Recently, anesthetic drug solution combined with ophthalmic viscosurgical devices (OVD) with lidocaine have been developed (VISTHESIA combination of OVD and local anesthesia, carl zeiss).In cataract surgery injection of these OVD's protect intraocular tissue from physical trauma during surgical procedure, maintain the shape of ocular structures, provide coating to the eye to minimize trauma, avoids additional step of irrigating the anterior chamber with lidocaine solution, prolong anesthesia time if there is delay in completion of surgery.[50] One system is based on methylcellulose and second system is based on sodium hyaluronate.[24] Some are available as prepared syringe with viscoanaesthetic mixture and ampoules of jelly eyedrops to be applied before surgery. Visthesia intracameral either 1% or 1.5% is injected into the anterior chamber with a 27 gauge cannula. Prior to wound closure it should be completely removed using standard irrigation and aspiration technique.[50]

Experimentally the use of viscoanesthesia appeared to be safe with no evidence of postoperative reaction after phacoemulsification.[24]

Advantages of Topical Anesthesia

1. Route of administration is quick, simple, non-invasive, time efficient.
2. Immediate useful vision is provided postoperatively.
3. Appropriate for monocular patients who can experience anxiety due to post-operative amaurosis of their functional eye following akinetic blocks.
4. Patients with significant bleeding diathesis or abnormal global orbit features can be operated under topical.
5. Avoids systemic and local complications associated with eye blocks.
6. Undesirable cosmetic side effects are avoided.
7. Technique is economical.
8. There is no need for an anesthetist to be present.

Disadvantages of Topical Anesthesia

1. It does not provide akinesia.
2. Not suitable for un-cooperative and high anxiety patients, deaf and dumb, dementia.
3. There is possibility of retinal and corneal toxicity with use of intracameral.
4. During surgery excessive eye movement, photophobia, blepharospasm can be difficult for patient and surgeon.
5. Surgical skill required.

Side Effects and Toxicity of Topical anesthesia

General side effects:

In a study,topically applied 4% lidocaine, blood levels found after 1 hour from the last instillation were 0.009 ± 0.001µg/ml following three instillations and 0.12 ± 0.02 µg/ml following six instillation. Topically applied 0.75% bupivacaine less than 1 µg/ml were measured in plasma. Their amounts are too low to cause systemic problems. All performed studies showed no differences in pulse rate, blood pressure and oxygen saturation following topical anesthesia.[24]

Local side effects :

Corneal Toxicity

On application of anesthetic agent into the conjunctival sac it causes burning sensation and impair tear film due to dilution. In older patients who have low tear secretion inhibition of cellular sodium channels cause swelling of corneal epithelium with possibility of superficial punctate keratitis. Epithelial toxicity is more when preservatives are added to the solution. Epithelial side effect can impair visibility during surgery and can last a few days after surgery slightly affecting vision often in both eyes following bilateral instillation. Some patients reported dry eye sensation for 8-12 weeks after surgery.[2]High or prolonged doses of local anesthetic agents not only cause corneal epithelial toxicity but also prolongs wound healing and corneal erosion. Gel formulation cause less burning on application and less corneal dehydration than eye drops.[24] Several studies came up to study the effect of corneal toxicity on use of intracameral anesthesia,doses ranged from 0.1ml to 0.5ml of preservative free lignocaine 1% and early endothelial studies ranged from 2 weeks, 1 month, 3 months showed no change in endothelial cell count compared with control and no difference

in blood aqueous barrier permeability between lidocaine and control group at one month.[51]

Kadonosono et al injected preservative free lidocaine in concentration of 0.02%, 0.2% and 2% intracamerally into one eye of rabbit and BSS in the fellow eye control. Eyes injected with lidocaine 2% showed irregular hexagonal endothelial cells and significant loss of microvilli ,no abnormal findings was seen in the eye injected with either lidocaine 0.02% or 0.2% when compared with control.[51]

Werner et at studied rabbit cornea exposed to lidocaine 1% lidociane 5% and control with BSS.Cells exposed to lidocaine 5% had more irregular shapes and borders. Eggeling et at exposed porcaine cornea to preservative free lidocaine at 1%, 5% and 10% for 60 min. Significant corneal endothelial cell loss was observed with lidocaine 5% and lidocaine 10% groups. [51]

Retinal Toxicity

Retinal toxicity of intracameral lidocaine is another concern if it diffuses posteriorly to the retina. There are reports of patients losing light perception temporarily following intracameral anesthesia. Anders et al injected lidocaine 1%, 0.15ml in treatment group had electroretinogram evaluated preoperatively and 40 min postoperatively and compared with control group the study showed decrease of b- wave amplitude 40 min postoperatively in both groups but there was no significant change in control and lidocaine group in term of implicit time of amplitudes.[51]

Wirbelauer et al evaluated the systemic levels of lidocaine after intracameral injection of 0.5 ml of preservative free lidocaine 1% at 1 min, 2 min, 5 min, and 15 min after injection and there was no detectable systemic level of lidocaine in blood of the patients.[51] Compared with lidocaine, intracameral bupivacaine is not well studied but it may be more toxic to corneal endothelium than lidocaine 1%. Thus

preservative free lidocaine 1% in doses of 0.1 to 0.5ml has been suggested as the local anesthesia of choice for intra cameral anesthesia.[48]

Chapter 4

Methodology

METHODOLOGY

This randomized controlled trial was conducted to compare the efficacy of Peribulbar anesthesia versus Topical with intra cameral lignocaine in manual small incision cataract surgery at KLES Dr. Prabhakar Kore Hospital and MRC, Belgaum from January 2012 to December 2012.Patients were randomized into two groups using computer generated chart.

STUDY DESIGN

One year Randomized controlled trail non blinded.

METHOD OF COLLECTION OF DATA

Source of data

Patients undergoing manual small incision cataract surgery at KLE's Dr. Prabhakar Kore Hospital and Medical research centre Belgaum.

Sample Size

One Hundred and twenty patients undergoing cataract Surgery.

Sampling Procedure

The following formula was used to calculate the sample size.

$\alpha = 0.05$	Z_α	=	1.96
$\beta = 0.2$	Z_β	=	0.84
Power = 80%	P_o	=	Efficacy in 1st group 40% Patients having no pain sensation
	P_1	=	Efficacy in 2nd group 60% patients having no pain sensation
Sample size will be	P_o-P_1	=	Effect size
$n = \frac{2 (Z_\alpha + Z_\beta)^2 pq}{(P_o - P_1)^2}$	$P = \frac{P_o - P_1}{2}$		
$= 58 = 60$			

Thus, Group 1 : Peribulbar group n = 60

Group 2 : Topical with intracameral group n = 60

Selection Criteria:

Inclusion Criteria

1. Patients with cataract causing diminution of vision.
2. Patients willing for cataract surgery.
3. Patient's age more than 50 years.

Exclusion Criteria:

1. Un – cooperative patients (causes mentally challenged, involuntary movement disorders, high anxiety)
2. Patients who are unable to understand and comply with verbal commands (causes deafness, dementia, aphasia)
3. Patients who are unable to understand modified visual analog pain scale.
4. Sensitivity to xylocaine.
5. Corneal dystrophies/ degenerations, corneal opacifications, corneal thinning.
6. One eyed patient.

Method of collection of data

This study was conducted in the department of ophthalmology at KLE's Dr. Prabhakar Kore Hospital and medical research centre, Belgaum between January 2012 to December 2012. All patients undergoing manual small incision cataract surgery fulfilling the inclusion criteria were eligible for the study. A total of 120 cases were taken for the study with 60 cases in the peribubar group and 60 cases in topical with intracameral group. The study was approved by the ethical and research committee of Jawaharlal Nehru Medical College, Belgaum.

All patients were in-patients of the hospital. Informed written consent was obtained from all the patients for the anesthetic procedure and surgery. Detailed history and ocular examination,vision, anterior segment examination and slit lamp examination, fundus examination by direct and indirect ophthalmoscopy, tonometry, lacrimal sac syringing was done.

PROCEDURE:

Pre – operative preparation:

All patients received Tab ciprofloxacin 500mg twice a day and topical ciprofloxacin eye drops (0.3%) one drop six times per day, one day prior to surgery .Xylocaine sensitivity was done on all patients.

Tropicamide 0.8% and phenylephrine 5% eye drops were instilled for mydriasis every 15 min starting two hours prior to surgery. Patient was randomized to one of two groups of study by computer generated randomized chart. Group one patients received peribulbar anesthesia and Group two patients received topical with intracameral anesthesia.

Peribulbar group :

Preparation of anesthetic mixture

Lignocaine 2% with adrenaline 1 in 2,00,000 (30ml) solution was used.Hyaluronidase 1500 IU was reconstituted with 3ml of anesthetic solution. 1 ml of solution was added to 30 ml vial of the anesthetic solution resulting in 15 IU of hyaluronidase / ml anesthetic mixture.

Technique of Peribulbar block :

Using modified weiss technique peribulbar group of patients received two injection with 26 half G disposable needle in the infero temporal and superonasal quadrant. First injection was given at the junction of medial 2/3rd and lateral 1/3rd of the inferior orbital margin with patient looking is primary position, needle directed parallel to orbital floor. After aspiration 5ml of anesthetic solution was injected.

The second injection was injected at superonasal quadrant near the supraorbital notch with needle directed along the orbital roof.If required medial injection was also given. Digital pressure was applied to eye for 5 min akinesia was then noted. A repeat injection of 2 ml was given at inferotemporal site if adequate akinesia was not achieved. Any complication during administration of anesthesia were noted both local and systemic.

Topical with intracameral group:

Patients in this group received topical 2% sterile Xylocaine jelly into superior and inferior fornices two applications one at 20 min before surgery and second at 5 min before surgery

.

Intra operative Intracameral use:

1% preservative free xylocaine was injected into anterior chamber after making entry into anterior chamber during surgery.

Surgical technique:

Under all aseptic precautions part was painted with povidine iodine and spirit. Saline wash was given to eye and was draped. A wire speculum was placed and no

superior rectus bridle suture taken. A fornix based conjunctival flap was made superiorly with corneoscleral scissors and hemostasis was achieved by cautery of bleeding vessels.

A 6.5mm straight scleral incision was made 1.5 mm posterior to surgical limbus with 11 number surgical blade. Scleral tunnel was made using crescent knife.In group one, anterior chamber was entered from sclerocorneal tunnel using a 3.2mm entry keratome. Viscoelastic was injected into the anterior chamber. A continuous curvilinear capsulorrhexis with relieving incisions or can opener capsulotomy was done using bent 26 gauge needle. Hydrodissection was done. Tunnel was extended with keratome.Nucleus was prolapsed into anterior chamber and delivered out using a classical simocae cannula .Polymethylmethacrylate posterior chamber intraocular lens was implanted and dialled in place. Viscoelastic was aspirated with simmcoe cannula. Anterior chamber formed with ringer lactate and side port opening sealed by stromal hydration. In group two, After entry into anterior chamber through side port 1% preservative free Xylocaine 0.5ml was injected into anterior chamber and waited for 1 min after which viscoelastic was injected into anterior chamber.

No subconjunctival injection where given. Antibiotic drops put and eye padded. Intra operative pain was assessed by holding the hand of the patient and was asked to squeeze whenever the patient felt the pain and step at which pain occurred was noted .Total time taken to complete the surgery from inserting wire speculum to removal of speculum was noted in both the groups. All surgeries were done by single surgeon.

Post Operative evaluation:

Immediately after surgery pain was evaluated with modified visual analog scale and again after 4 hours .Surgeon's experience was also noted with regards to patient co-operation, difficulty due to ocular movements, anterior chamber stability. Eye patch was removed after 4 hrs and topical antibiotic steroids started every 2 hourly and tapered for next 6 weeks.

Assessment in both Groups:

The following parameters were studied.

1. Akinesia:

Effectiveness of the block was assessed for onset of akinesia of lids and globe

2. Analgesia:

Analgesia (immediately after surgery and 4 hrs after surgery) was assessed and graded by subjective grading called visual analogue pain scale (modified).[52]

Grade 0(no pain)
Grade 1(mild)
Grade 2(moderate)
Grade 3(severe)
Grade 4(maximum)

Intraoperative pain was noted by patient squeezing the hand of observer and surgical step during which it occurred was also noted.

3. Surgeon's Experience :

Surgeon was interviewed regarding the surgical experience under both groups and was asked to grade the experience regarding

a) **Patient co-operation as follows:**

Grade 1 – excellent**,** Grade 2 – good**,** Grade 3 – poor

b) Difficulty due to ocular movement:

Grade 1 – none ,Grade 2 – Some, Grade 3 – great difficulty

c) Anterior chamber stability :

Grade 1 – excellent**,** Grade 2 – good**,** Grade 3 – poor

Any specific remarks by operating surgeon was also noted.

Time taken to complete surgery was also considered

4. Complications

I. During administration of anesthesia the following complications were noted as either being present or absent.

a) Local

* Burning sensation
* Chemosis
* Subconjunctival haemorrhage
* Retrobulbar haemorrhage
* Globe perforation
* Optic nerve injury

b) Systemic

* Convulsions
* Loss of consciousness
* Respiratory arrest
* Cardiac arrest
* Any other complications

II. Any complications occurring during surgery were also noted.

Patient was followed up on 1st day,1st week and 6th week for visual acuity on snellen's chart unaided and pin hole and detailed slit lamp examination. Subjective refractive correction was given at six weeks.

Chapter 5

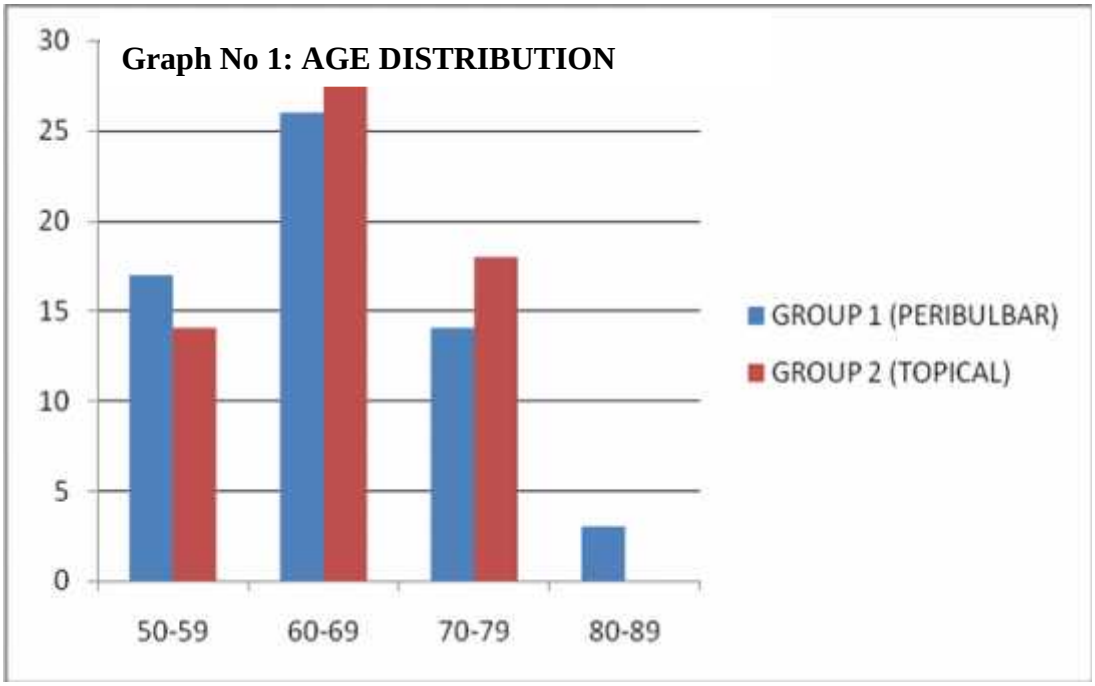
Results

RESULTS

The present study "Efficacy of Peribulbar anaesthesia versus Topical with Intracameral lignocaine anaesthesia in Manual small incision cataract surgery: a 1-year randomized controlled trail" was conducted on 120 patients who underwent MSICS at Department of Ophthalmology, KLES Dr. Prabhakar Kore Hospital and Medical Research Centre, Belgaum during study period January 2012 to December 2012. The patients were divided into two groups that is Group one (Patients who underwent MSICS under peribulbar anaesthesia) and Group two (Patients who underwent MSICS under topical with intracameral anaesthesia). The data obtained was tabulated as below:

Table No 1: AGE DISTRIBUTION

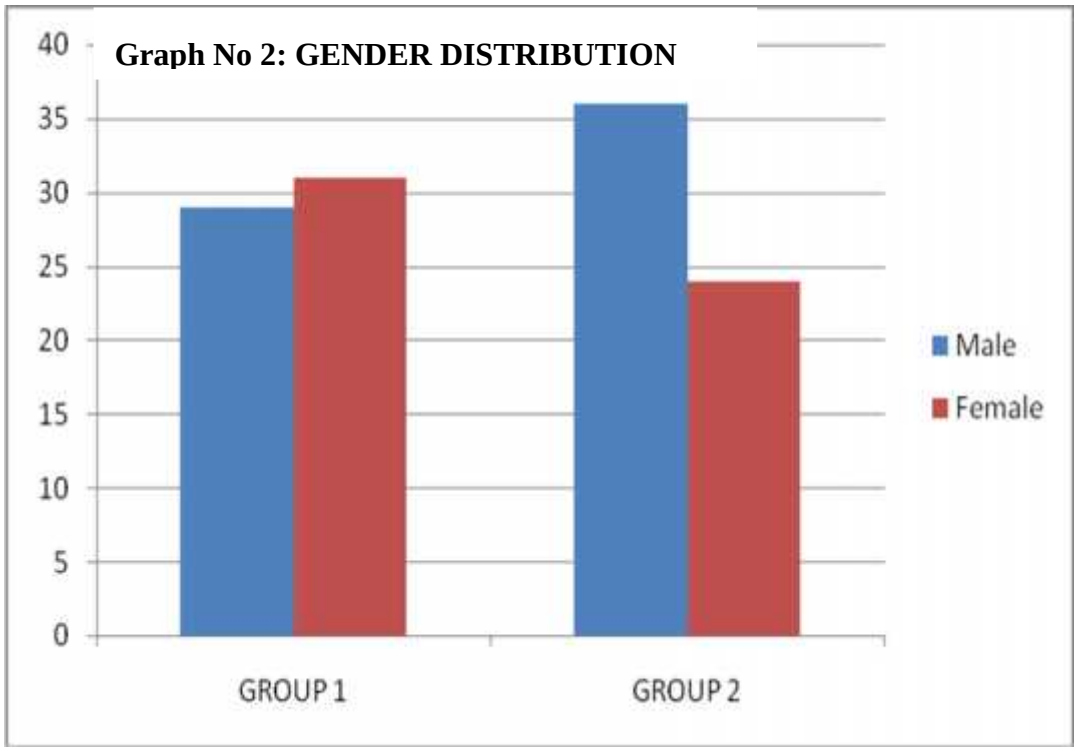
AGE (YRS)	Group 1(n= 60) (PERIBULBAR)	Group 2 (n=60) (TOPICAL)	TOTAL	% ge
50-59	17	14	31	25.83
60-69	26	28	54	45
70-79	14	18	32	26.66
80-89	3	0	3	2.5
TOTAL	60	60	120	100



In the present study,45% of the patients belonged to age group of 60-69 years of age, 25.83% belonged to 50-59 years of age and 26.66% belonged to the age group of 70-79 years,2.5% belonged to the age group of 80-89.Mean age 64.5years.

Table No 2: GENDER DISTRIBUTION

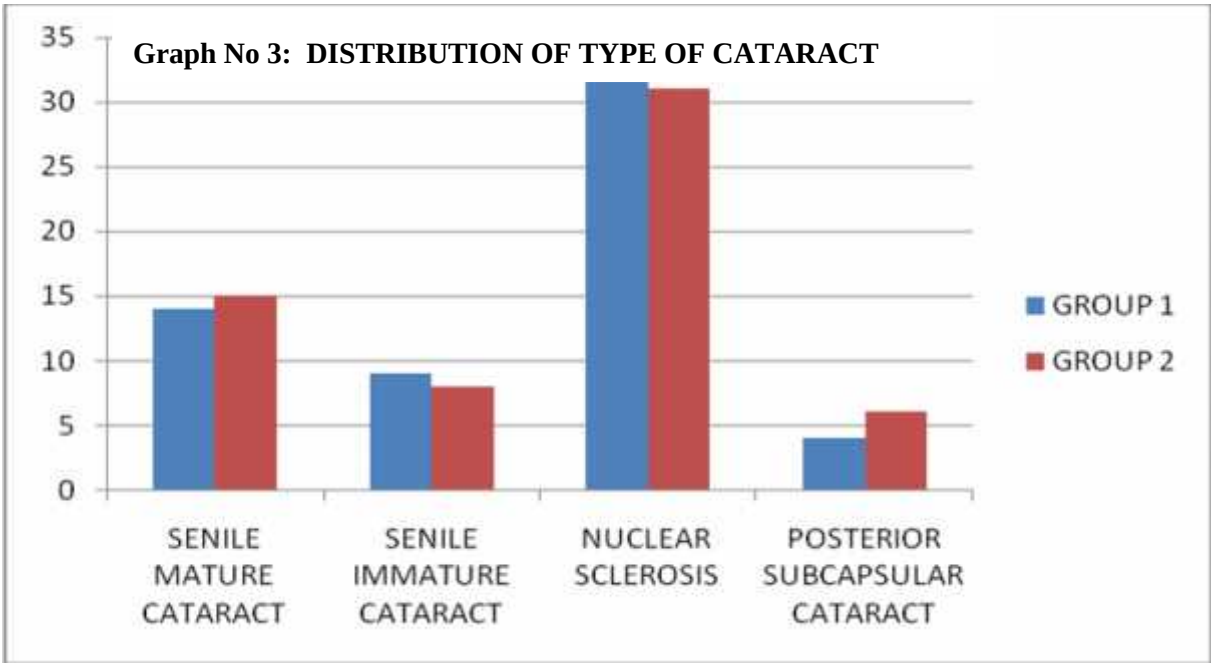
GENDER	Group 1 (n= 60) (PERIBULBAR)	Group 2 (n=60) (TOPICAL)	TOTAL	% ge
Male	29	36	65	54.17
Female	31	24	55	45.83
Total	60	60	120	100



Out of 120 patients, 65 (54.17%) were men and 55 (45.83%) were women. In Group one, 29 were men and 31 were women. In Group two, 36 were men and 24 were women.

Table No 3: DISTRIBUTION OF TYPE OF CATARACT

TYPE OF CATARACT	Group 1(n= 60) (PERIBULBAR)	Group 2 (n=60) (TOPICAL)	TOTAL	%
SENILE MATURE CATARACT	14	15	29	24.17
SENILE IMMATURE CATARACT	9	8	17	14.17
NUCLEAR SCLEROSIS	33	31	64	53.33
POSTERIOR SUBCAPSULAR CATARACT	4	6	10	8.33
TOTAL	60	60	120	100

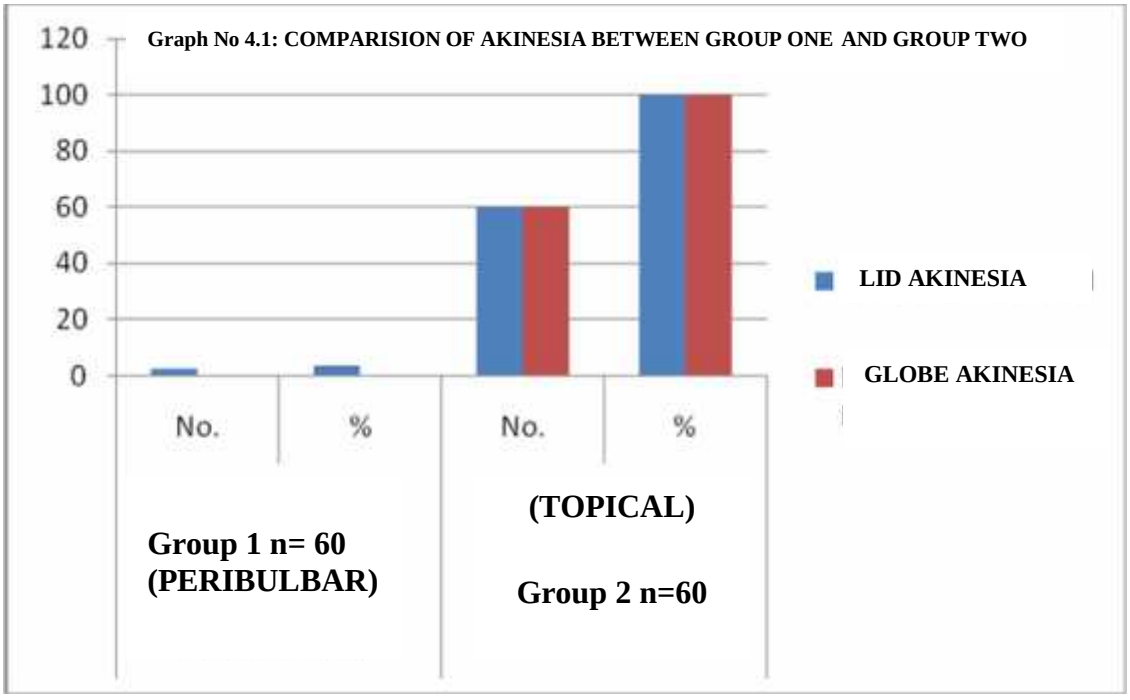


Out of 120 patients, type of cataract according to morphology was nuclear sclerosis 64 (53.33%) ,33 in group one and 31 in group two.Senile mature cataract was 29 (24.17 %), 14 in group one and 15 in group two. Senile immature cataract was 17(14.17%),9 in group one and 8 in group two. Posterior subcapsular cataract was 10 (8.33%),4 in group one and 6 in group two.

PRE-OPERATIVE

Table No 4.1 : COMPARISION OF AKINESIA BETWEEN GROUP ONE AND GROUP TWO

	Group 1 n= 60 (PERIBULBAR)		**Group 2 n=60 (TOPICAL)**	
	No.	%	No.	%
LID AKINESIA	58	96.66	0	0
GLOBE AKINESIA	60	100	0	0

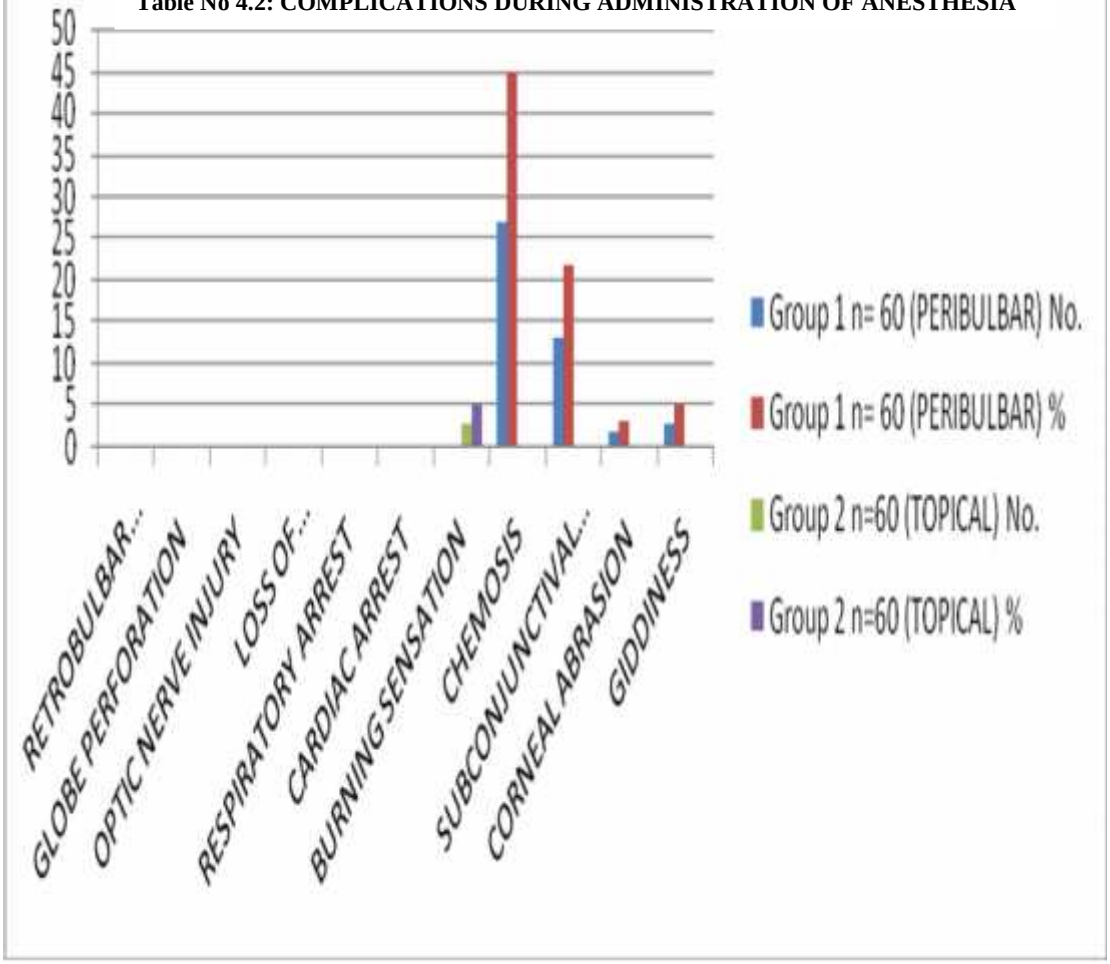


Among 60 patients,58 (96.66%) had lid akinesia in group one which lacked in all patients of group two which was statistically significant ($p<0.001$).Globe akinesia was present in all patients of group one which lacked in all patients in group two which was statistically significant ($p<0.001$).

Table No 4.2: COMPLICATIONS DURING ADMINISTRATION OF ANESTHESIA

	Group 1 (n= 60) (PERIBULBAR)		**Group 2 (n=60) (TOPICAL)**	
	No.	%	No.	%
BURNING SENSATION	0	0	3	5
CHEMOSIS	27	45	0	0
SUBCONJUNCTIVAL HAEMORRAGE	13	21.66	0	0
CORNEAL ABRASION	2	3.33	0	0
GIDDINESS	3	5	0	0
RETROBULBAR HAEMORRAGE	0	0	0	0
GLOBE PERFORATION	0	0	0	0
OPTIC NERVE INJURY	0	0	0	0
LOSS OF CONSCIOUSNESS	0	0	0	0
RESPIRATORY ARREST	0	0	0	0
CARDIAC ARREST	0	0	0	0

Table No 4.2: COMPLICATIONS DURING ADMINISTRATION OF ANESTHESIA



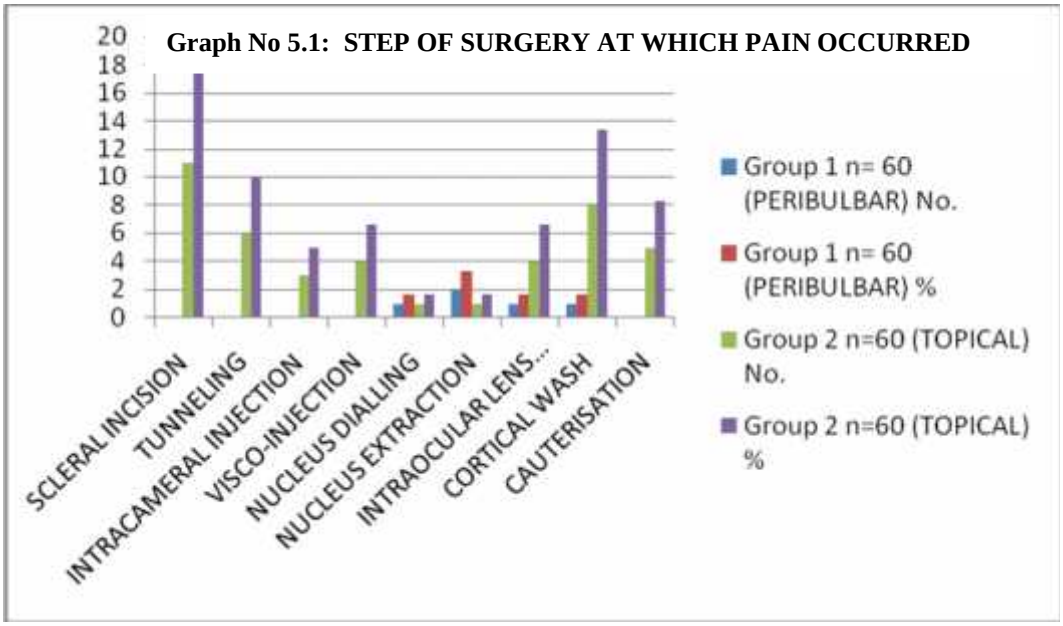
In group one out of 60, 27 (45%) had chemosis which was statistically significant ($p<0.001$), 13 (21.66%) had subconjunctival haemorrage which was statistically significant ($p<0.001$), 2(3.33%) had corneal abrasion which was statistically not significant ($p=0.476$), 3(5%) had giddiness which was statistically not significant ($p=0.242$).In group two out of 60, 3(5%) had burning sensation.No cases of retrobulbar haemorrhage,globe perforation,optic nerve injury,loss of consciousness, respiratory arrest, cardiac arrest occurred.

INTRA-OPERATIVE

Table No 5.1: STEP OF SURGERY AT WHICH PAIN OCCURRED

STEP AT WHICH PAIN OCCURED	Group 1 n= 60 (PERIBULBAR)		Group 2 n=60 (TOPICAL)	
	No.	%	No.	%
SCLERAL INCISION	0	0	11	18.33
TUNNELING	0	0	6	10
INTRACAMERAL INJECTION	0	0	3	5
VISCO-INJECTION	0	0	4	6.66
NUCLEUS DIALLING	1	1.66	1	1.66
NUCLEUS EXTRACTION	2	3.33	1	1.66
INTRAOCULAR LENS INSERTION	1	1.66	4	6.66
CORTICAL WASH	1	1.66	8	13.33
CAUTERISATION	0	0	5	8.33

Graph No 5.1: STEP OF SURGERY AT WHICH PAIN OCCURRED

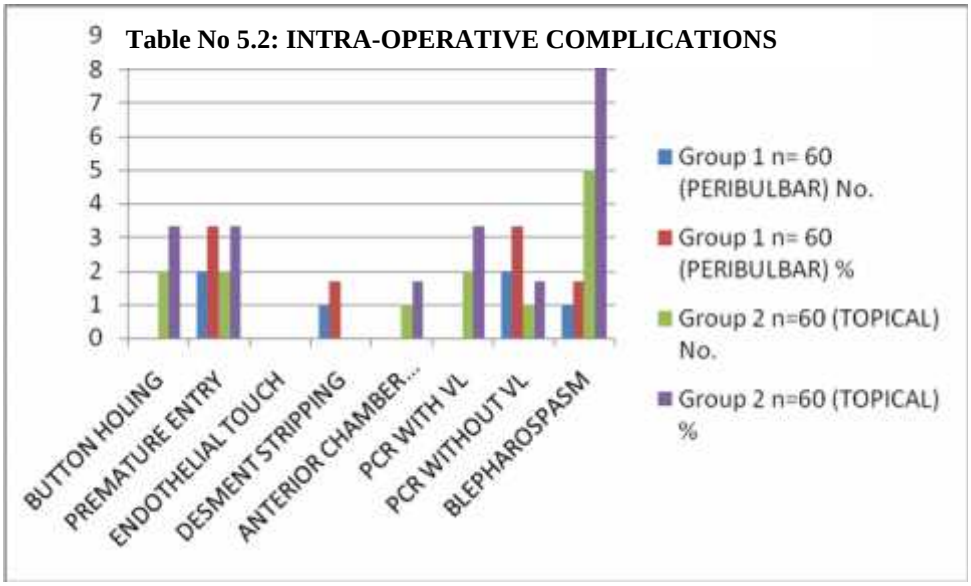


Out of 60 patients in group one, none (0 %) had pain during scleral incision and in group two out of 60,11 (18.33%) patients had pain which was statistically significant (p=0.001).During tunneling none (0%) had pain in group one and 6(10%) patients had pain in group two which was statistically significant (p=0.036).In group two, 3(5%) patients had pain during intracameral injection of lignocaine. Visco-injection caused no (0%) pain in group one and 4(6.66%) patients in group two which was statistically not significant (p=0.127).

Nucleus dialing caused pain in 1 (1.66%) patient each in both the groups. Nucleus extraction caused pain in 2(3.33%) patients in group one and 1(1.66%) patient in group two which was statistically not significant(p=1.000). Intraocular lens insertion caused pain in 1 (1.66%) patient in group one and 4(6.66%) patients in group two which was statistically not significant(p=0.361). Cortical wash caused pain in 1(1.66%) patient in group one and 8(13.33%) patients in group two which was statistically significant (p=0.038). Cauterisation causing pain was 0% in group one and 5(8.33%) patients in group two which was statistically not significant(p=0.068)

Table No 5.2: INTRA-OPERATIVE COMPLICATIONS

	Group 1 n= 60 (PERIBULBAR)		**Group 2 n=60 (TOPICAL)**	
	No.	%	No.	%
BUTTON HOLING	0	0	2	3.33
PREMATURE ENTRY	2	3.33	2	3.33
ENDOTHELIAL TOUCH	0	0	0	0
DESMENT STRIPPING	1	1.66	0	0
ANTERIOR CHAMBER SHALLOW	0	0	1	1.66
POSTERIOR CAPSULAR RENT WITH VITREOUS LOSS	0	0	2	3.33
POSTERIOR CAPSULAR RENT WITHOUT VITREOUS LOSS	2	3.33	1	1.66
BLEPHAROSPASM	1	1.66	5	8.33



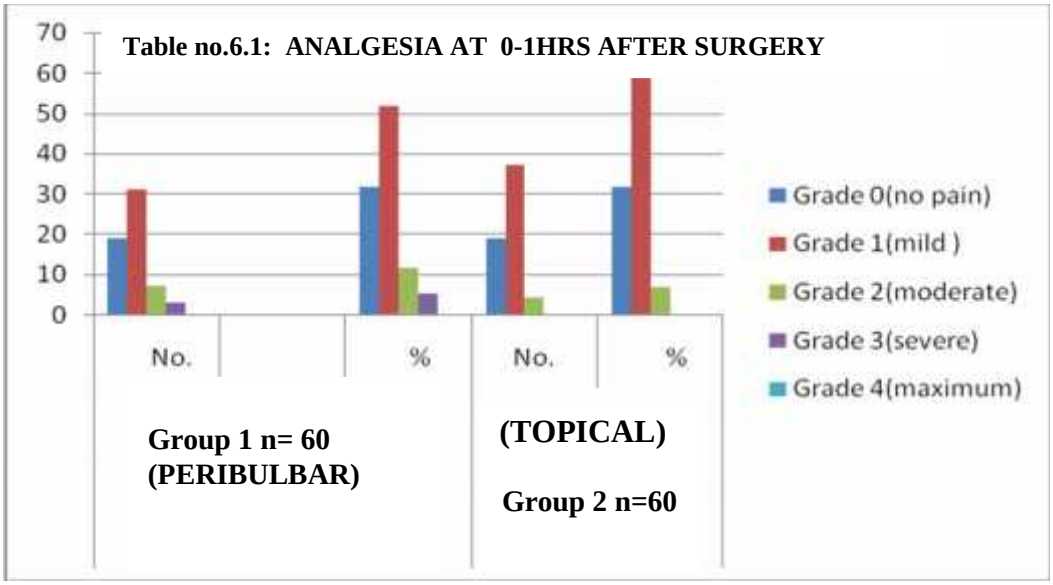
Out of 60 in group one, 0% had button holing whereas it was seen in 2 (3.33%) patients in group two which was statistically not significant(p=0.476). Premature entry occurred in 2 (3.33%) patients in both the groups.No endothelial touch occurred in either group. Desment stripping occurred in 1(1.66%) patient in group one and none(0%) of the patients in group two which was statistically not significant (p=1.000). Anterior chamber was shallow in none (0%) of the patients in group one and 1(1.66%) patient in group two which was statistically not significant(p=1.000).

Posterior capsular rent with vitreous loss was seen in 0% in group one and 2(3.33%) in group two which was statistically not significant (p=0.476). Posterior capsular rent without vitreous loss occurred in 2 (3.33%) patients in group one and 1(1.66%) in group two which was statistically not significant(p=1.000). Blepharospasm was seen in 1 (1.66%) patient in group one and in 5(8.33%) patients in group two which was statistically not significant (p=0.209)

POST-OPERATIVE ANALGESIA

Table no.6.1: ANALGESIA AT 0-1HRS AFTER SURGERY

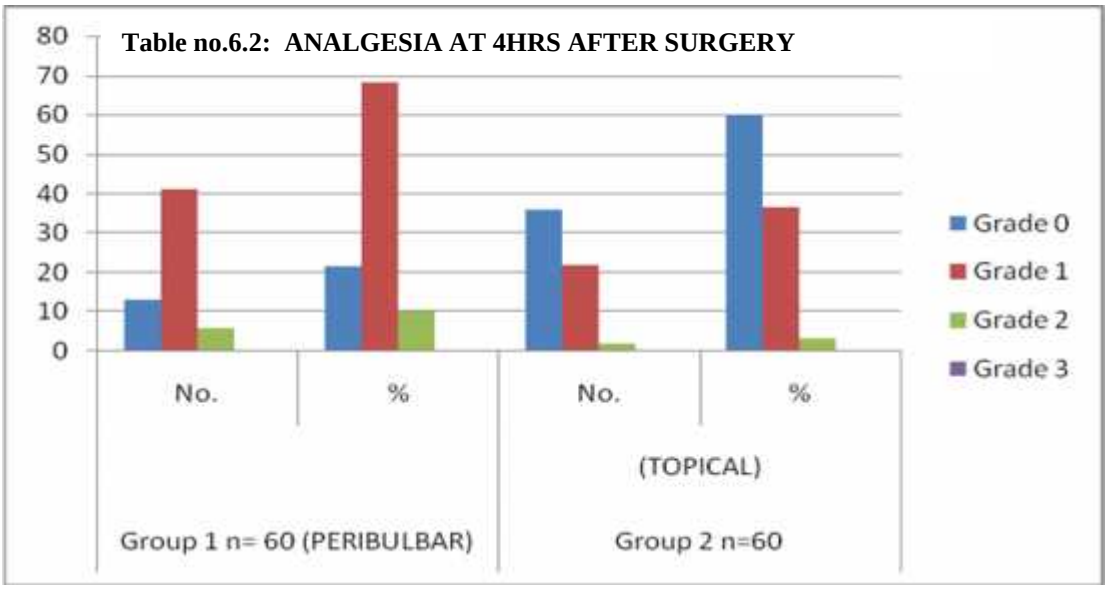
VAS	**Group 1 n= 60 (PERIBULBAR)**		**Group 2 n=60 (TOPICAL)**	
	No.	%	No.	%
Grade 0(no pain)	19	31.66	19	31.66
Grade 1(mild)	37	61.66	31	51.66
Grade 2(moderate)	4	6.66	7	11.66
Grade 3(severe)	0	0	3	5
Grade 4(maximum)	0	0	0	0
TOTAL	60	100	60	100



Out of 120, group one had mild pain in 37(61.66%) patients and 31(51.66%) patients in group two. Both Groups had no pain in 19(31.66%) patients. Group one had moderate pain in 4(6.66%) patients and 7(11.66%) patients in group two. Group one had severe pain in none(0%) of the patients and 3(5%) patients had severe pain in group two which were statistically not significant(p=0.226)

Table no.6.2: ANALGESIA AT 4HRS AFTER SURGERY

VAS	Group 1 n= 60 (PERIBULBAR)		Group 2 n=60 (TOPICAL)	
	No.	%	No.	%
Grade 0(no pain)	13	21.66	36	60
Grade 1(mild)	41	68.33	22	36.66
Grade2(moderate)	6	10	2	3.33
Grade 3(severe)	0	0	0	0
Grade4(maximum)	0	0	0	0
TOTAL	60	100	60	100

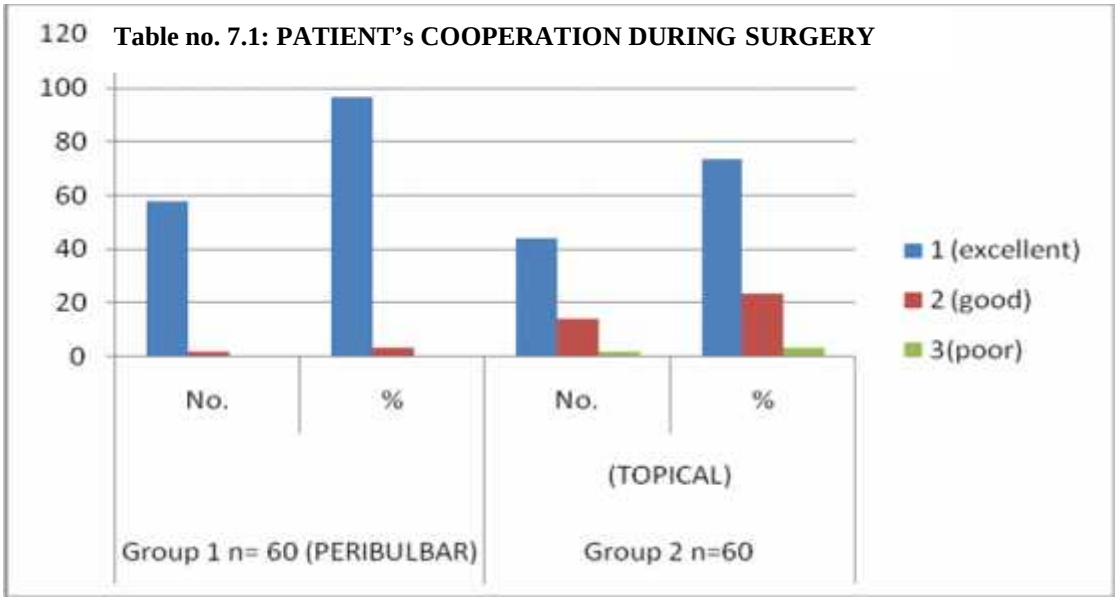


Out of 120, group one had mild pain in 41(68.33%) patients and 22(36.66%) patients in group two. Group one had no pain in 13(21.66%) patients and 36(60%) patients in group two . Group one had moderate pain in 6(10%) patients and 2(3.33%) patients in group two which were statistically significant ($p<0.001$)

SURGEON'S EXPERIENCE

Table no. 7.1: PATIENT's COOPERATION DURING SURGERY

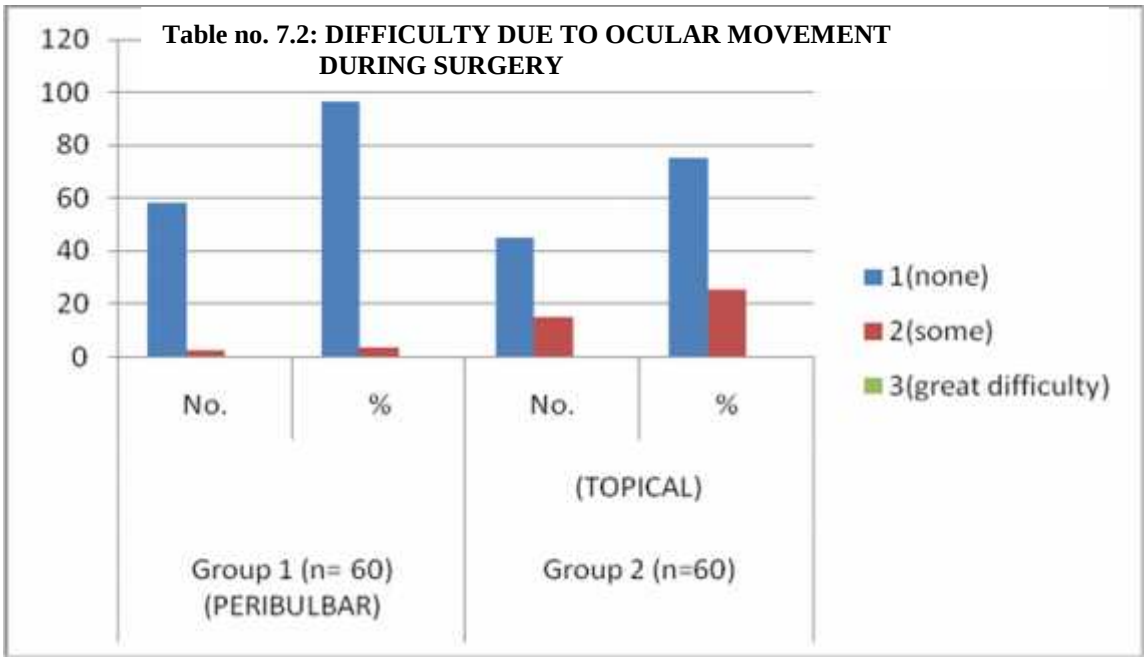
PATIENT's COOPERATION	Group 1 n= 60 (PERIBULBAR)		Group 2 n=60 (TOPICAL)	
	No.	%	No.	%
1 (excellent)	58	96.66	44	73.33
2 (good)	2	3.33	14	23.33
3(poor)	0	0	2	3.33
TOTAL	60	100	60	100



Out of 120, 58(96.66%) patients had excellent co-operation in group one and 44(73.33%) patients in group two . Good co-operation was seen in 2(3.33%) patients in group one and 14(23.33%) in group two . Poor cooperation was seen in group two in 2 (3.33%) patients which were statistically significant ($p<0.001$).

Table no. 7.2: DIFFICULTY DUE TO OCULAR MOVEMENT DURING SURGERY

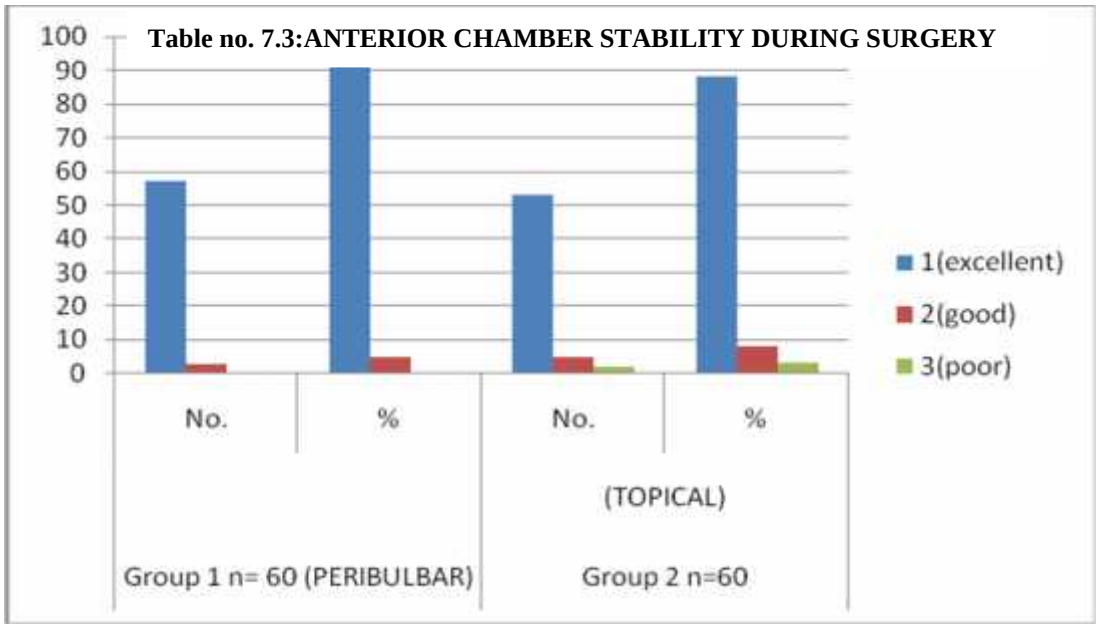
DIFFICULTY DUE TO OCULAR MOVEMENT	Group 1 (n= 60) (PERIBULBAR)		Group 2 (n=60) (TOPICAL)	
	No.	%	No.	%
1(none)	58	96.66	45	75
2(some)	2	3.33	15	25
3(great difficulty)	0	0	0	0
TOTAL	60	100	60	100



Out of 120 patients, surgeon had no difficulty during surgery due to ocular movements in 58(96.66%) patients in group one and 45(75%) patients in group two. Surgeon had some difficulty in 2(3.33%) patients in group one and 15(25%) patients in group two which were statistically significant ($p<0.001$)

Table no. 7.3: ANTERIOR CHAMBER STABILITY DURING SURGERY

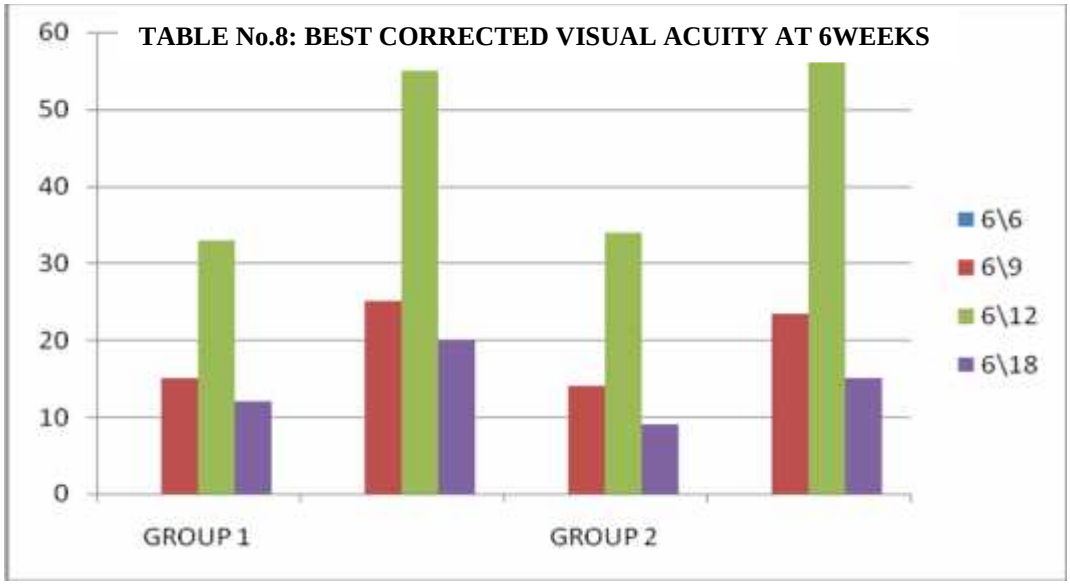
ANTERIOR CHAMBER STABILITY	Group 1 n= 60 (PERIBULBAR)		Group 2 n=60 (TOPICAL)	
	No.	%	No.	%
1(excellent)	57	95	53	88.33
2(good)	3	5	5	8.33
3(poor)	0	0	2	3.33
TOTAL	60	100	60	100



Out of 120 patients,anterior chamber stability during surgery was excellent in 57(95%) patients in group one and 53(88.33%) patients in group two, good in 3(5%) patients in group one and 5(8.33%) patients in group two,poor in 0 % in group one and 2(3.33%) patients in group two which was statistically not significant (p=0.266)

TABLE No.8: BEST CORRECTED VISUAL ACUITY AT 6WEEKS

	Group 1 (n= 60) (PERIBULBAR)		**Group2(n=60) (TOPICAL)**	
	No.	%	No.	%
6/6	15	25	14	23.33
6/9	33	55	34	56.7
6/12	12	20	9	15
6/18	0	0	3	5
TOTAL	**60**	**100**	**60**	**100**



Out of 120 patients,after 6weeks BCVA was 6/6 in15(25%) patients in group one and in group two,14(23.33%) patients .In group one, 33(55%) patients and in group two ,34(56.7%) patients had visual acuity of 6/9.In group one ,12(20%) patients and in group two,9(15%) patients had visual acuity of 6/12. In group two,3(5%) patients had 6/18 visual acuity which was statistically not significant.[Chi-3.47,3 degree p=0.324]

Chapter 6

Discussion

DISCUSSION

In our study we included 120 patients . They were assigned to either Group one or Group two using computer generated chart. Those in Group one underwent MSICS under peribulbar anaesthesia and those in Group two underwent MSICS under topical with intracameral anaesthesia. Both groups had 60 patients each.

Most of the patients belonged to age group of 60 to 69 years (45%) in both the groups with mean age of 64.5 years. In a study by, Gupta S K et al mean age of the patients was 64.2 years.[2]

Out of one twenty patients ,65 (54.17%) were males and 55(45.83%) were females. In a study by N Smitha et al 57 were males and 93 were females which was statistically not significant.[1]

According to morphology, nuclear sclerosis type of cataract was the highest , which were 53.33% followed by senile mature cataract 24.17 %, senile immature cataract 14.17%, posterior subcapsular cataract 8.33%. In our study, all types of cataract were included and there was no significant difference between the type of cataract and best corrected visual acuity.

Lid akinesia was seen in 58 (96.66%) patients in peribulbar group which lacked in all patients of topical group which was clinically and statistically significant ($p<0.001$).Globe akinesia was present in all 60 (100%) patients of peribulbar group where as it lacked in all patients in topical group which was clinically and statistically significant ($p<0.001$).In one study,the result showed that globe akinesia was seen in 86.2% and lid akinesia in 76.4%.[52] In another study,the percentage of patients with total akinesia was 66% in peribulbar group. [53] Our

study compared to other studies showed higher rate of akinesia in peribubar group due to multiple injections. Topical procedures does not cause akinesia which is the main disadvantage. This can make operating conditions difficult specially in MSICS. However,absence of akinesia can be helpful to the surgeon by asking the patient to look in a particular direction to expose a desired area, optimizing red reflex and wound access.[15,54] It is also helpful to the patient postoperatively as it does not cause diplopia and there is early visual recovery. In cases of uncooperative patients akinesia can be achieved by peribulbar block which is its major advantage.

Minor complications such as **i)** Burning sensation was experienced by 3(5%) of the patients in the present study while application of lignocaine jelly in topical group. In other study, 2% in the topical anesthesia group felt burning sensation [5]. One study showed that advantage of gel preparation is that the number of application required is less compared to topical drops as it maximizes the time of contact and lidocaine is slowly released from the gel.[55] Our study coorelates well with the study. Topical anaesthesia technique is economical, avoids undesirable cosmetic adverse effects, and allows instant visual rehabilitation .Its advantages over injected local anesthesia include its ease of application, minimal to absent discomfort on administration, rapid onset of anesthesia ,faster postoperative functional recovery .More important topical anaesthesia eliminates the risk of complications caused due to needle injection in peribulbar anaesthesia such as subconjunctival haemorrhage ,chemosis, retrobulbar haemorrhage, globe perforation, optic nerve injury, respiratory arrest, cardiac arrest.[5,55] **ii)** Chemosis in peribulbar group was seen in 27 (45%) patients

in our study which was clinically and statistically significant (p<0.001) .In a study, done by Parkar T et al,34% of patients had chemosis.[56]Our results are consistent with other studies.Chemosis occurs due to anterior spread of drug and use of large volume of anaesthetic agent. Chemosis is more common with periconal blocks.[42]

iii) Subconjunctival haemorrhage in peribulbar group was seen in 13 (21.66%) patients which was statistically significant (p<0.001) compared to topical group. In other study,the incidence of subconjunctival hemorrhage amounted to 18% . While Wasee and colleagues reported subconjunctival hemorrhage in 23% of patients .[57]Our results are comparable with other studies. Subconjunctival hemorrhage is the main complication of peribulbar anesthesia, which subsided within 3 days to one week after surgery. [53] iv) Corneal abrasion in two(3.33%)patients was due to incomplete closure of the lids while giving digital pressure ,this did not interfere during the surgery however this is not seen in topical group which but obvious does not require digital pressure,this was not significant (p=0.476) . Corneal abrasion can occur from a compression device or postoperatively as the motor effects of the local anaesthetic wear off, allowing the eyelid to open, thus exposing an anaesthetic cornea. Three (5%) patients had giddiness in peribulbar group in whom vitals were stable which were statistically not significant (p=0.242).

Major complications such as retrobulbar haemorrhage, globe perforation, optic nerve injury, loss of consciousness, respiratory arrest ,cardiac arrest was not seen our study. The incidence of serious retrobulbar bleeding is reported to be in the range of 1%–3% by Morgan et al and as 0.44% in a series of 12,500 cases

in another study. Brainstem anesthesia is reported to occur in 1 in 350–500 intraconal local anesthesia injections. [42]

Pain during surgical step occurred while **i)** scleral incision in 11(18.33%) patients out of 60 in topical group where as none had pain in peribulbar group which was clinically and statistically significant (p=0.001). **ii)** During tunneling none had pain in peribulbar group but in topical group, 6(10%) patients had pain which was clinically and statistically significant (p=0.036).**iii)** Intracameral injection of lignocaine caused pain in 3(5%) patients in topical group**.iv)** Visco-injection caused no pain in peribulbar group and 4(6.66%) patients had pain in topical group which was statistically not significant (p=0.127) .In study by Gupta S K et al 3.1% had pain during viscoelastic injection.[2] Pain occurred because of increase in volume of anterior chamber caused stretching of structures leading to pain during initial part of injection. Topical agents only block superficial structures like cornea and conjunctiva and do not anaesthetize deep structures thus handling of iris and stretching of ciliary body and zonules causes pain.Therefore, use of intracameral lignocaine decreases pain from anaesthetized intraocular anterior segment structures and during inflation and deflation of the globe called Uveal anaesthesia. It also helps to dilates the pupil due to its relaxing effect on iris muscle and decreases sensitivity to light of operating microscope due to anaesthetic effect on retina-ganglion cell-optic nerve complex.[58,59]**v)** Nucleus dialing caused pain in one(1.66%) patient in each of the groups **vi)** Nucleus extraction caused pain in two(3.33%) patients in peribulbar group and one (1.66%) patient in topical group which was statistically not significant(p=1.000). A study by N Smitha et al showed that most of patients felt

pain during these steps.[1] Wang et al study also showed that patients had pain during nucleus dialing and prolapse. [59] Nucleus delivered through the section in MSICS causes more pain.Therefore, increase in wound length, use of untoothed forceps and fish hook technique would cause less pain which was seen in study by Gupta S K et al.[2] **vi)** Intraocular lens insertion caused pain in one(1.66%) patient in peribulbar group and four(4.66%) patients in topical group which was statistically not significant(p=0.361) and was similarly seen in study by S Ahmed.[54] Our result compares well with other studies. **vii)** Cortical wash caused pain in one (1.66%) patient in peribulbar group and 8(13.33%) patients in topical group which was statistically significant(p=0.038) while 4 % of patients had pain in study by Gupta S K et al.[2]Our result was not in agreement with other study. **viii)** Cauterisation causing pain was not seen in peribulbar group but was seen in five(8.33%) patients in topical group which was statistically not significant(p=0.068)

Surgical complications like **i)** button holing of scleral tunnel was not seen in peribulbar whereas it was seen in two(3.33%) patients in topical group which was similarly seen in study by N Smitha et al.[1]**ii)** Premature entry occurred in two(3.33%) patients in both the groups. **iii)** Descement stripping occurred in one(1.66%) patient in peribulbar group and none in topical group.In a study, descement stripping mainly occurred in topical group. Our result is in contrast to other study. [62] **iv)** Anterior chamber was shallow in none in peribulbar group and one(1.66%) patient in topical group which was managed by air injection**.v)**Posterior capsular rent with vitreous loss was not seen in peribulbar group and was seen in two(3.33%)patients in topical group which was

statistically not significant (p=0.476) .**vi)**Posterior capsular rent without vitreous loss occurred in two (3.33%) patients in peribulbar group and one(1.66%) patient in topical group which was statistically not significant(p=1.000). Smitha et al study showed posterior capsular rent in 2.7% patients in topical group and 1.3% in peribulbar group.[1] Rent occurred due to sudden movement of the patient's eye while operating due to lack of akinesia in topical group.Our results are comparable to other study.**vii)** Blepharospasm was seen in one(1.66%) patient in peribulbar group due to ineffective block and in five(8.33%) patients in topical group which is commonly encountered in topical anaesthesia. However it was statistically not significant(p=0.209). Our study compares well with study done by Gupta S K et al study who had blepharospasm as an integral difficulty faced by the surgeons under topical anaesthesia.[2]

Pain immediately after surgery was evaluated by visual analog scale which showed no pain in 19(31.66%) patients in both the groups. Mild pain was seen in 37(61.66%) patients in peribulbar group and 31(51.66%) patients in topical group .Moderate pain was seen in 4 (6.66%) patients in peribulbar group and 7(11.66%) patients in topical group . Severe pain was seen in 3(5%) in topical group and none in peribulbar group.However,on comparing both the groups pain scale difference was not significant (p=0.226). This in agreement with study by Naeem et al and another study where there was no statistical difference in pain score between topical and peribulbar groups.[60,61]The results of the present study was similar to various studies done for topical group except that none of the patients in this study needed subtenon lignocaine injection as it was required by

few patients in other studies.[2]A study by Collin and colleagues,showed that females experience more pain than males during surgery.[63]

Analgesia after 4hrs of surgery, no pain was seen in 13(21.66%) patients in peribulbar group and 36(60%) patients in topical group in our study. Mild pain was seen in 41(68.33%) patients in peribulbar group and 22(36.66%) patients had in topical group. Moderate pain was seen in 6(10%)patients in peribulbar group and 2(3.33%) in topical group .Statistical analysis showed that peribulbar group had more pain compared to topical group after 4hours ($p<0.001$).This seem to contradict the finding by N Smitha et al where there was no difference in pain scale between the two groups after 4 hours of surgery due to the fact that pain scale is very subjective causing this difference.[1]

Surgeon experienced **i)** excellent co-operation of patients while operating in 58(96.66%)in peribulbar group and 44(73.33%) in topical group in our study. Good co-operation was seen in 2(3.33%) patients in peribulbar group and 14(23.33%) in topical group.Poor cooperation was seen in 2(3.33%) patients in topical group which were statistically significant ($p<0.001$) indicating that patient cooperation was better in peribulbar group compared to topical group.In N Smitha et al study, patient cooperation was very good in 96.5%. [1] Study by Gupta S K et al demonstrated good patient's cooperation in 87.5%.[2]This emphasis sticking to selection criteria.Patient cooperation can be improved by surgeon-patient communication , talking or assuring the patient which lessens patient's anxiety (vocal anaesthesia) at any time during surgery, by warning the

patient before each important step of surgery.[15]**ii)** Surgeon had no difficulty during surgery due to ocular movements in 58(96.66%) in peribulbar group and 45(75%) in topical group. Surgeon had some difficulty in 2(3.33%) in peribulbar group and 15(25%) in topical group which were statistically significant ($p<0.001$) indicating that surgeon was more comfortable to operate in peribulbar group compared to topical group.Our study compares well with study by Naeem et al and Gupta S K et al.[2,60] It is seen that lack of akinesia do not cause difficulty in surgery for a experienced surgeon and if the patients are cooperative. Uncontrolled eye movements can be minimised by lowering the brightness of operating microscope to low intensity and constant communication with the patient.[54,60]**iii)** Surgeon graded anterior chamber stability has excellent in 57(95%) patients in peribulbar group and 53(88.33%) in topical group, good in 3(5%)in group one and 5(8.33%) in topical group,poor in 0 % in peribulbar group and 2(3.33%) in topical group which was statistically not significant ($p=0.266$). Gupta S K et al states that under topical anaesthesia there is no rise in intraocular pressure when compared to peribulbar anaesthesia.[2]

Mean time taken for surgery in this study from insertion of speculum to taking off ,in group one was 12±1.98min and in group two was 15±2.7min which was statistically significant [$t=7.058$,OF=118,$p=0.001$].Time taken in topical was longer due to difficulty in ocular movements, constant communication with patient and being cautious before each important step during surgery.However, study by N Smitha et al had average time of 7minutes.[1]

Most of patients in both the groups had best corrected visual acuity of 6/9 at end of 6 weeks.There was no significant difference in both the groups with regards to visual acuity which correlates well with study by N Smitha et al.[1]

Chapter 7

Conclusion

CONCULSION

Peribulbar anesthesia is comparable with topical with intracameral anesthesia with regards to efficacy and safety.

Peribulbar anesthesia provides excellent akinesia under operative condition but has needle related complications during its administration. Topical with intracameral anesthesia eliminates the risk but does not provide akinesia. Analgesia provided between both the groups showed no significant difference.

Patient's cooperation and difficulty due to ocular movement was better in peribulbar group as experienced by surgeon .Both the technique were free from vision or life threatening complications and had no difference in best corrected visual acuity.

Therefore topical with intracameral anaesthesia can be an alternative to peribulbar anaesthesia for manual small incision cataract surgery provided the patient is very cooperative.

Chapter 8

Summary

SUMMARY

This study was done to compare the efficacy of peribulbar anaesthesia versus topical with intracameral anaesthesia at KLES Dr. Prabhakar Kore Hospital and MRC Belgaum from January 2012 to December 2012.One twenty patients undergoing cataract surgery were randomized into two groups(60 each)

- The mean age of patients was 64.5years.
- Males (54.17%) were more in number than females (45.83%).
- Nuclear sclerosis type of cataract was highest (53.33%) in number in both the groups and there was no significant difference between the type of cataract and best corrected visual acuity.
- Lid akinesia (96.66%) and globe akinesia (100%) was seen only in peribulbar anaesthesia which lacked in topical anaesthesia which was both statistically and clinically significant.
- No major vision or life threatening complications occurred in both the groups while administration of anesthesia. Minor complications such as chemosis (45%) and subconjunctival haemorrhage (21.66%) where exclusively seen in peribulbar group. Needle related complication was completely eliminated in topical group.
- Patients in topical group mainly had pain during scleral incision (18.33%), sclera-corneal tunneling (10%), cortical wash (13.33%) which were statistically and clinically significant compared to peribulbar group.
- Button holing (3.33%) and posterior capsular rent (3.33%)occurred in topical group due to unexpected eye movement which was clinically significant. There was no significant difference between both the groups with regards to various other complications during surgery.

- Pain scale between both the groups showed no difference immediately after surgery.Most of patients had mild pain 61.66% in peribulbar group and 51.66% patients in topical group. Pain scale was significant in peribulbar group after 4hrs of surgery ($p<0.001$).
- Patient cooperation and lesser ocular movements during surgery was better in peribulbar group and also clinically significant. Anterior chamber stability was similar in both the groups. Unwanted ocular movements and lid squeezing were common difficulties faced by surgeon.
- Time taken to complete surgery was longer under topical anaesthesia. Under peribulbar anaesthesia mean time was 12±1.98min and under topical was 15±2.7min which was statistically significant.
- Best corrected visual acuity 6 weeks post operatively showed no statistical significant difference in both the groups.

Chapter 9

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CONSENT FOR PARTICIPATION IN RESEARCH STUDY

I.D. NO. ☐☐☐

Mr/Mrs/Ms_____

You are invited to participate in our research study titled **"**EFFICACY OF PERIBULBAR ANAESTHESIA VERSUS TOPICAL WITH INTRACAMERAL LIGNOCAINE ANAESTHESIA IN MANUAL SMALL INCISION CATARACT SURGERY: A 1-YEAR RANDOMIZED CONTROLLED CLINICAL TRAIL''conducted by Dr. Samyakta Shetti, Post Graduate student in M.S.Ophthalmology, under the guidance of Dr.Rekha BK, Professor, Department of Ophthalmology,J N Medical College, Belgaum.

Respected Sir/Ma'am we request you to enroll yourself in our study as you are eligible for participation. Your participation in research is voluntary. If you decide to participate you are free to withdraw at any time.

Purpose of the Study: The purpose of research is to compare the efficacy of peribulbar anesthesia versus topical with intracameral lignocaine anesthesia in manual small incision cataract surgery.

Procedure Involved: If you agree to enroll yourself in this study, you will be asked your present, past and family history. You will be clinically examined and relevant investigations will be done.You will receive anesthesia before your cataract surgery either in the form of peribulbar injection near your eye or topical jelly on your eye. Selection of the procedure will be based on randomization chart, so you can be selected in either of the groups. You would be asked to grade the severity of your pain using a chart & also to come for follow up on specified dates when your progress would be monitored, documented.

Risks and Benefits: There are no major risks involved with the use of either. However you can have some discomfort. For which all necessary precautions would be taken. Your participation may benefit you and others by establishing certain facts about the study.

Alternatives: If you are not willing to participate you will be treated according to the existing protocol & it will not affect your relationship with this hospital.

Costs for participating in this research: There will not be any extra cost incurred by you. You will, however, have to pay for the investigations which are part of the existing management protocol for the condition. There is no commitment for any reimbursement or any other compensation.

Privacy and Confidentiality: Your privacy is guaranteed. However, your medical records can be directly accessed and reviewed by authorized individuals or by the ethics committee. Records, which could reveal your identity, will be kept confidential. Personal data will remain anonymous if data is being published or written as a dissertation.

Authorization to Publish Results: When the results of the research are published or discussed, in a conference, no information will be displayed that would disclose your identity.

Compensation: In the event of injury related to the study, treatment will be made available through KLESDr.PrabhakarKore Hospital & MRC, Belgaum. There is no compensation or payment for such medical treatment by law. The doctors

and the staff will provide facilities and medical attention to you.

Questions

If you have any questions about the research you may please contact:

1. Investigator, Dr. Samyakta shetti, Post Graduate student, Department of Ophthalmology, JNMC, Belgaum. Contact No. 9972535632
2. Guide, Dr. Rekha B K, Professor , Department of Ophthalmology, JNMC, Belgaum. Contact No.9449938997
3. Dr. P.V Patil Prof & Head Pathology, JNMC, Belgaum and Chairman, Institutional Ethics Committee. Contact No.(0831)2471350

Consent for participation in research trial

I, Mr./Ms./Mrs _____ voluntarily agree for the participation as a subject of this study. By signing this consent form, I am not giving up any of my legal rights. I may withdraw from the study at anytime. I am signing the consent form after having read or been read for me in my own vernacular language, including the risks and the benefits and having all my questions answered.

Subject Name : _____

Signature or the Left Thumb Print of Subject : _____

Witness Name:_____

Signature of Witness:_____

Guide: Dr Rekha B K_____

Co-Investigator: Dr Samyakta shetti_____

Signature of Investigator:_____

Date:

Place:

CONSENT FOR PARTICIPATION IN RESEARCH STUDY

I.D. NO. ☐☐☐

Mr/Mrs/Ms_____

You are invited to participate in our research study titled **"**EFFICACY OF PERIBULBAR ANAESTHESIA VERSUS TOPICAL WITH INTRACAMERAL LIGNOCAINE ANAESTHESIA IN MANUAL SMALL INCISION CATARACT SURGERY: A 1-YEAR RANDOMIZED CONTROLLED CLINICAL TRAIL''conducted by Dr. ---------- Post Graduate student in M.S.Ophthalmology, under the guidance of Dr----------, Professor, Department of Ophthalmology,J N Medical College, Belgaum.

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Authorization to Publish Results: When the results of the research are published or discussed, in a conference, no information will be displayed that would disclose your identity.

Compensation: In the event of injury related to the study, treatment will be made available through KLESDr.PrabhakarKore Hospital & MRC, Belgaum. There is no compensation or payment for such medical treatment by law. The doctors

and the staff will provide facilities and medical attention to you.

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2. Guide, Dr.----------Professor, Department of Ophthalmology, JNMC, Belgaum. Contact No.----------
3. Dr.----------l Prof & Head Pathology, JNMC, Belgaum and Chairman, Institutional Ethics Committee. Contact No.----------

Consent for participation in research trial

I, Mr./Ms./Mrs _____ voluntarily agree for the participation as a subject of this study. By signing this consent form, I am not giving up any of my legal rights. I may withdraw from the study at anytime. I am signing the consent form after having read or been read for me in my own vernacular language, including the risks and the benefits and having all my questions answered.

Subject Name : _____

Signature or the Left Thumb Print of Subject : _____

Witness Name:_____

Signature of Witness:_____

Guide: _____

Co-Investigator: _____

Signature of Investigator:_____

Date:

Place:

DATA COLLECTION INSTRUMENT

I D ☐☐☐ No.

Name (in capital letters)

(First name) (Middle name) (Last name)

Age (in ☐☐☐ yrs)

Sex : ☐ 1=Male; 2=Female)

OP No. ☐☐☐☐☐☐☐☐

IP No. ☐☐☐☐☐☐☐☐

Address:

Telephone No. ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐

Date of admission: ☐☐ ☐☐ ☐☐☐☐

Date of surgery: ☐☐ ☐☐ ☐☐☐☐

Date of discharge: ☐☐ ☐☐ ☐☐☐☐

Provisional Diagnosis:

cataract type :

Cataract grading:

Inclusion Criteria: ☐ (1=Met; 2=Not met)

Informed consent: ☐ (1=Taken; 2=Not taken)

Chief Complaints (1=Yes; 2=No)

Diminution of vision	☐	☐

History of present illness:

	RE	LE
(1= yes;2=no)		
History of Diminution of vision:	☐	☐
Gradual in onset:	☐	☐
Painless:	☐	☐
Progessive in nature:	☐	☐
History of redness:	☐	☐
History of watering:	☐	☐
History of discharge:	☐	☐
History of itching:	☐	☐
History of ocular irritation:	☐	☐
History of photophobia:	☐	☐
History of diplopia:	☐	☐
History of coloured halos:	☐	☐
History of using glasses:	☐	

(If 1,duration:)

Other complaints: (if present):

Past History (1=Yes; 2=No)

	RE	LE
Intra-ocular Surgery If 1,Specify:		
Trauma		
Other		

Other past history (if present):

Medical History (1=Yes; 2=No)

Diabetes	
Hypertension	
Bleeding disorders	
Others	

Other medical history (if present):

Family History ☐ (1=Significant; 2=Insignificant)

If 1, specify:

Personal History ☐ (1=Significant; 2=Insignificant)

If 1, specify:

General Physical Examination

Vitals

- Pulse (per min) ☐☐☐
- Blood Pressure (systolic/diastolic) (mm of hg) ☐☐☐/☐☐☐
- Temperature ☐ 1=Febrile; 2=Afebrile)
- Respiratory Rate (per min) ☐☐☐

(1=Yes; 2=No)

Pallor		Clubbing	
Icterus		Lymphadenopathy	
Cyanosis		Oedema	

Systemic Examination (1=Normal; 2=Abnormal)

C V S If 2, specify	
R S If 2, specify	
C N S If 2, specify	
P / A If 2, specify	

Ocular Examination

- Head posture ☐ (1=Erect; 2=Tilted)
- Facial symmetry ☐ (1=Symmetrical; 2=Asymmetrical)
- Visual axes ☐ (1=Parallel; 2=Deviated)
- Extra-ocular movements (1=Normal; 2=Restricted)
    - Uniocular RE ☐ LE ☐
    - Binocular ☐

- Vision

	RE	LE
Unaided		
Pin-hole		
Spectacles		

- Near vision:

	RE	LE
Unaided		
Spectacles		

- Anterior segment examination

	RE	LE
Adnexa (1=Normal; 2=Abnormal) If 2, specify		
Conjunctiva (1=Normal; 2=Abnormal) If 2, specify		
Cornea (1=Clear; 2=edematous; 3=other) If 3, specify		
Sclera (1=Normal; 2=Abnormal) If 2, specify		
Anterior chamber (1=Normal depth; 2=shallow; 3=deep)		
Iris (1=Normal; 2=Atrophic patches; 3=other) If 3, specify		
Pupil		

• Size (1=normal; 2=constricted; 3=dilated) • Reactions: o Direct o Indirect (1=present; 2=absent; 3=sluggish)		
Lens (cataract) (1=Cortical; 2=Nuclear; 3=Posterior subcapsular;4=Pseudophakia;5=Aphakia; 6=Clear If 1:i=immature,ii=mature If 2;i= grade 1,ii=grade 2,iii=grade 3,iv=grade 4)		

- Fundus

	RE	LE
Glow (1=Good; 2=Faint; 3=Absent)		
Media (1=Clear; 2=Hazy)		
Disc • Size (1=Normal; 2=small; 3=large) • Margins (1=Normal; 2=Abnormal) • CDR (1=0.2; 2=0.3; 3=0.4; 4=0.5; 5=0.6; 6=0.7; 7=0.8; 8=0.9; 9=1.0) • NRR (1=Normal; 2=Thin)		
Blood vessels (1=Normal; 2=Abnormal)		
Background (1=Normal; 2=Tessellated; 3=Other)		
Macula (1=Normal; 2=Abnormal)		

Investigations

- BP:
- Lacrimal Syringing:
- Tonometry: (Schiotz method)

	RE	LE
IOP (mm Hg)		

- Random blood sugar: ☐☐☐
- Any specific investigation:

DIAGNOSIS:

Eye to be operated: (RE=1,LE=2) ☐

ANAESTHESIA:

TYPE OF ANAESTHESIA GIVEN : Peribulbar ☐

Topical with intracameral ☐

I.Analgesia (Modified visual analog score –see back page)

1. Pain during administration of anaesthesia: ☐

2.Intraoperative pain : (1=Yes; 2=No,Squeezing the hand of observer)

(If 1, surgical step during which pain occurred i.scleral incision ☐

ii.nucleus dailling ☐ ii.nucleus delivery ☐ iv.iol insertion ☐ v.cortical wash ☐

v.others-)

3.Pain immediately after surgery: ☐

4.Pain after 4hours of surgery: ☐

II.Akinesia

1.Lid akinesia: ☐ (1=Yes; 2=No)

2.Globe akinesia: ☐ (1=Yes; 2=No)

III.Surgeon's Experience:

1.Patient cooperation: ☐ (1=excellent,2=good,3=poor)

2.Difficulty due to ocular movements: ☐ (1=none,2=some,3=great difficulty)

3.Anterior chamber stability: ☐ excellent,2=good,3=poor)

4.Other:

Time taken:

IV.Complications: (1=Yes; 2=No)

1.During administration of anaesthesia:

Local:

Chemosis: ☐

Subconjuctival haemorrhage: ☐

Retrobulbar haemorrhage: ☐

Globe perforation: ☐

Optic nerve injury: ☐

Others:

Systemic:

Convulsions: ☐

Loss of consciousness: ☐

Respiratory arrest: ☐

Cardiac arrest: ☐

Others:

2.During surgery:

FOLLOW UP:

1. **ON NEXT DAY OF SURGERY:**

- VISION:

	RE	LE
Unaided		
Pin-hole		

- LIDS: (1=Yes; 2=No)

Lid ecchymosis: ☐

Lid edema: ☐

Ptosis: ☐

- CONJUNCTIVA: (1=Yes; 2=No)

Conjunctival congestion: ☐

Chemosis: ☐

Subconjunctival haemorrhage: ☐

Others:

- SLIT LAMP EXAMINATION: (1=Yes; 2=No)

Cornea: Descemets folds: ☐

Stromal haze: ☐

Microcystic edema: ☐

Others:

Anterior chamber: Formed ☐ (1=Yes; 2=No)

Flare ☐ (1=Yes; 2=No)

(If 1,i=0,ii=1+,iii=2+,iv=3+,v=4+)

Cells ☐ (1=Yes; 2=No)

(If 1,i=0,ii=1+,iii=2+,iv=3+,v=4+)

Content ☐ (1=none,2=cortical matter,3=blood,4=others -)

IOL: PCIOL: ☐ (1=Yes; 2=No)

ACIOL: ☐ (1=Yes; 2=No)

Aphakia: ☐ (1=Yes; 2=No)

2. FOLLOW UP AFTER 1 WEEK:

- VISION:

	RE	LE
Unaided		
Pin-hole		

- SLIT LAMP EXAMINATION:

FOLLOW UP AFTER 6 WEEKS:

- VISION:

	RE	LE
Unaided		
Pin-hole		
Spectacles		

NOTES:

PHOTOGRAPHS

PHOTO NO.1:Drugs and instruments required for Peribulbar anaesthesia

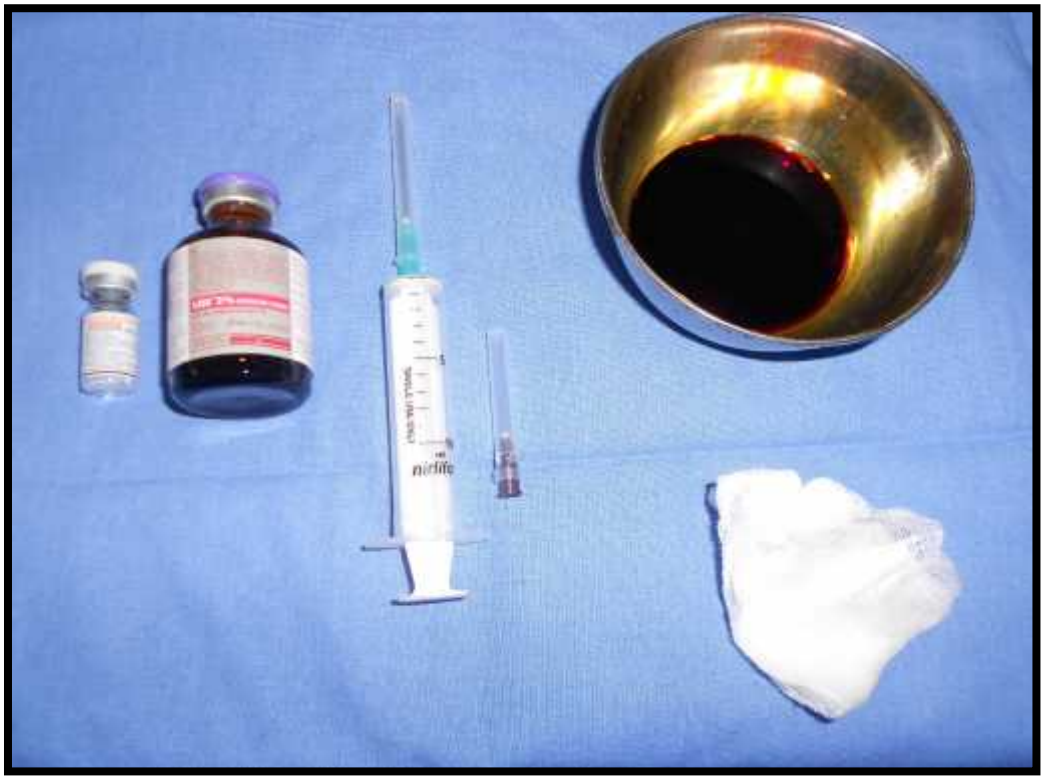

PHOTO NO 2:Drugs required for Topical and Intracameral anaesthesia

PHOTO NO.3: Administration of Peribulbar anaesthesia- superionasal site

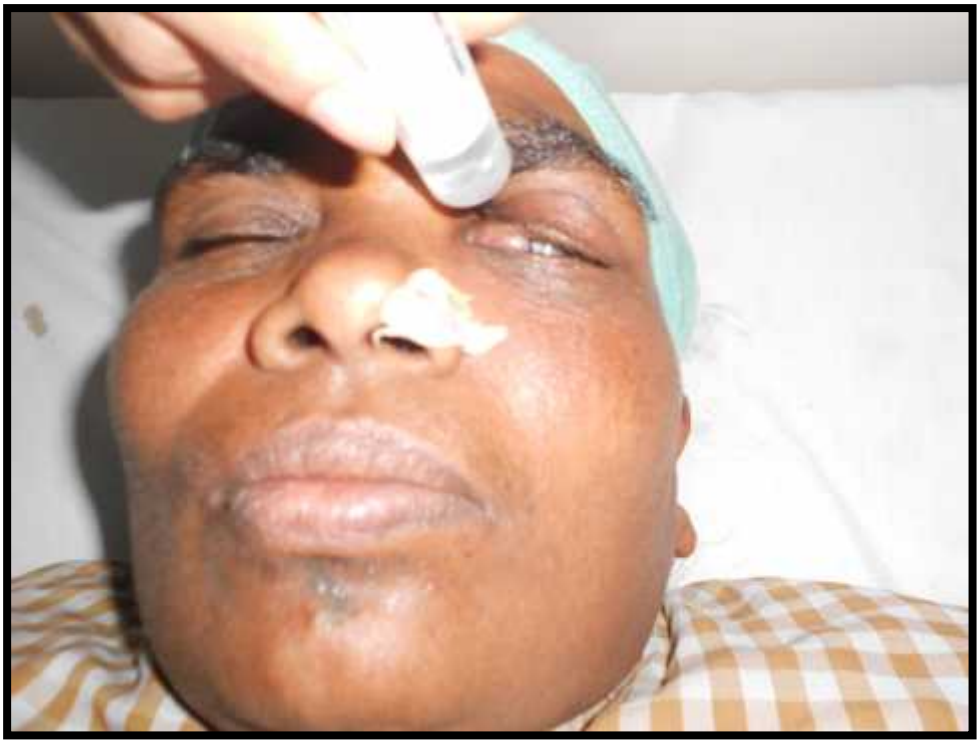

PHOTO NO.4:Administration of Peribulbar anaesthesia- inferiotemporal site

ANNEXURE I – II

ANNEXURE III- KEY MASTER CHART

Sl no	-	Serial number
IP No	-	In Patient No.
M	-	Male
F	-	Female
1(i)	-	Senile mature cataract
1(ii)	-	Senile immature cataract
2(i)	-	Grade I nuclear sclerosis
2(ii)	-	Grade II nuclear sclerosis
2(iii)	-	Grade III nuclear sclerosis
2(iv)	-	Grade IV nuclear sclerosis
3	-	Posterior capsular cataract
VL	-	Vitreous loss
Mins	-	Minutes
Wk	-	week

PERI BULBAR

SL. NO.	NAME	I.P. NO	AGE	SEX	DIAGNO	PRE-OPERATIVE															INTRA - OPERATIVE																		POSTOPERATIVE		SURGEON'S EXPERIENCE				VISUAL ACUITY	
						ANALGESIA PAIN DRUG ADMINISTRATION	LID AKINESIA	GLOBE AKINESIA	RETROBULBAR HEMORRAGE	GLOBE PERFORATION	OPTIC NERVE INTURY	LOSS OF CONSCIOUSNESS	RESPIRATORY ARREST	CARDIAC ARREST	BURNING SENSATION	CHEMOSIS	SUB CONJUCTIVAL HEMORRAGE	CORNEAL ABRASION	GIDDINESS	SCLERAL INCISION	TUNELLING	INTRACAMERAL INJECTION	VISCOINJECTION	NUCLEUS DIALING	NUCLEUS EXTRACTION	IOL INSERTION	CORTICAL WASH	CAUTERISATION	BUTTON HOLING	PREMATURE ENTRY	ENDOTHELIAL TOUCH	DESCEMET STRIPPING	ANTERIOR CHAMBER SHALLOW	POSTERIOR CAPSULAR RENT WITH VL	POSTERIOR CAPSULAR RENT WITH OUT VL	BLEPHAROSPASM	0-1HOUR	4HOUR	PATIENT CO-OPERATION	DIFFICULTY DUE TO OCULAR MOVEMENT	ANTERIOR CHAMBER STABILITY	TIMETAKEN(mins)	BEST CORRECTED VISUAL ACUITY	6 WK
1	MMT	501605	50	M	1(i)	2	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	1	1	11.15		6/9
2	CBM	503991	54	M	1 (i)	2	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	1	1	13. 24		6/9
3	AHS	504023	72	M	2	2	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	16.2		6/9
4	GPG	503037	55	F	1 (ii)	2	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	11. 14		6/9
5	HHG	503016	65	F	2	2	+	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	1	1	1	1	2	22.14		6/9
6	HPN	470171	75	F	2	1	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	1	1	10.14		6/9
7	KBP	456199	63	M	1 (ii)	3	+	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	11.04		6/6
8	SBP	456202	58	M	1 (ii)	2	+	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	1	1	1	10.36		6/6
9	IAM	462832	68	M	2	1	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	1	1	11.56		6/9
10	MJD	463641	63	M	1 (ii)	1	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	1	1	12.04		6/9
11	BMD	456212	70	F	2	2	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	1	1	1	12.11		6/9
12	SKS	462316	72	M	2	1	+	+	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	2	2	1	1	11.16		6/12
13	BVS	464384	56	M	2	1	+	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	2	2	2	1	1	10.44		6/9
14	PSV	464428	52	M	2	1	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	11.38		6/9
15	BPP	465332	54	M	2	1	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	1	1	12.18		6/6
16	SMP	466645	56	M	2	2	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	1	1	11.26		6/9
17	KBM	466863	70	F	2	2	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	12.05		6/12
18	RYD	466032	65	F	2	1	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	0	1	1	1	1	10.18		6/9
19	BIP	475702	60	M	2	2	+	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	1	1	13.18		6/9
20	SRS	478717	65	F	1 (i)	2	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	1	1	13.14		6/12
21	PYL	482028	51	M	1 (i)	1	+	+	-	-	-	-	-	-	-	+	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	1	2	2	12.16		6/9
22	MGP	481648	60	M	1 (ii)	1	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	1	1	10.18		6/12
23	RGK	481609	75	F	1 (i)	2	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	11.14		6/9
24	BMN	482054	60	M	1 (i)	2	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	11.26		6/12
25	JNH	484331	50	F	1 (i)	2	+	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	10.12		6/9
26	PMP	485466	55	F	2	2	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	11.33		6/9
27	RAK	488426	60	F	2	2	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	1	1	11.15		6/12
28	YBS	489195	70	M	2	3	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	10.13		6/9
29	LSK	489171	65	F	2	1	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	1	1	11.44		6/6
30	SDG	489668	60	F	2	2	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	2	1	1	1	14.14		6/6
31	SBA	490028	68	M	2	3	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	2	1	2	1	12.2		6/9
32	UJM	487613	52	M	2	3	+	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	1	1	1	14.3		6/9
33	NSM	490808	50	F	1 (i)	2	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	15.53		6/12
34	BGD	490802	62	M	2	1	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	14.1		6/6
35	ARC	490821	60	M	3	1	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	11.19		6/9
36	LPS	441492	65	F	3	1	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	13.11		6/6
37	LYH	502371	55	F	2	2	+	+	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+	+	-	+	-	-	-	-	-	-	-	1	1	1	1	1	11.29		6/9
38	SNG	483455	70	F	2	1	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	10		6/12
39	BNG	527766	70	F	1 (i)	1	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	1	1	1	1	1	13.4		6/12
40	SPD	484379	65	F	1 (ii)	1	+	+	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	12.32		6/6
41	TDA	484593	64	M	1 (ii)	2	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	11.16		6/6
42	DMP	484582	80	M	2	2	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	1	1	1	1	1	14.13		6/9
43	HYT	483634	60	F	2	1	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	10.12		6/12
44	GBS	484807	72	F	1 (i)	2	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	12.13		6/6
45	SVS	484799	66	M	1 (i)	3	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	13.28		6/9
46	DBS	484810	60	F	3	2	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	1	1	1	1	1	12.44		6/9
47	STC	484797	58	F	2	2	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	1	1	12.34		6/6

SL. NO.	NAME	I.P. NO	AGE	SEX	DIAGNO	PRE-OPERATIVE																INTRA - OPERATIVE																			POSTOPERATIVE		SURGEON'S EXPERIENCE				VISUAL ACUITY	
						ANALGESIA PAIN DRUG ADMINISTRATION	LID AKINESIA	GLOBE AKINESIA	RETROBULBAR HEMORRAGE	GLOBBE PERFORATION	OPTIC NERVE INTURY	LOSS OF CONSCIOUSNESS	RESPIRATORY ARREST	CARDIAC ARREST	BURNING SENSATION	CHEMOSIS	SUB CONJUCTIVAL HEMORRAGE	CORNEAL ABRASION	GIDDINESS	SCLERAL INCISION	TUNELLING	INTRACAMERAL INJECTION	VISCOINJECTION	NUCLEUS DIALING	NUCLEUS EXTRACTION	IOL INSERTION	CORTICAL WASH	CAUTERISATION	BUTTON HOLING	PREMATURE ENTRY	ENDOTHELIAL TOUCH	DESCEMET STRIPPING	ANTERIOR CHAMBER SHALLOW	POSTERIOR CAPSULAR RENT WITH VL	POSTERIOR CAPSULAR RENT WITH OUT VL	BLEPHAROSPASM	0-1HOUR	4HOUR	PATIENT CO-OPERATION	DIFFICULTY DUE TO OCULAR MOVEMENT	ANTERIOR CHAMBER STABILITY	TIMETAKEN(mins)	BEST CORRECTED VISUAL ACUITY	6 WK
48	BCT	484811	75	M	2	1	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	1	1	16.34		6/9
49	SSI	485872	60	M	1 (i)	2	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	1	1	11.28		6/9
50	BYS	485677	58	F	2	1	+	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	12.11		6/6
51	PYT	486079	73	F	2	3	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	1	2	10.48		6/6
52	DAC	486062	56	F	1 (ii)	1	+	+	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	1	1	11.36		6/12
53	SCS	486037	62	F	1 (ii)	2	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	12.44		6/9
54	BTS	488686	60	M	2	2	+	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	0	0	1	1	1	11.32		6/9
55	MDS	488655	62	F	2	1	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	1	1	10.42		6/6
56	GTM	488592	88	F	1 (i)	1	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	10.23		6/6
57	SMS	488596	70	F	3	3	+	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	1	1	11.14		6/12
58	BMS	488591	80	M	2	2	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	1	1	12.33		6/9
59	YPB	488596	60	M	2	1	+	+	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	1	1	12.4		6/9
60	PBD	488619	70	F	1 (i)	2	+	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	1	1	10.16		6/9

TOPICAL

SL. NO.	NAME	I.P. NO	AGE	SEX	DIAGNOSIS	PRE-OPERATIVE														INTRA - OPERATIVE																	POSTOPERATIVE ANALGESIA		SURGEON'S EXPERIENCE				VISUAL ACUITY	
						ANALGESIA PAIN DRUG ADMINISTRATION	LID AKINESIA	GLOBE AKINESIA	RETROBULBAR HEMORRAGE	GLOBE PERFORATION	OPTIC NERVE INTURY	LOSS OF CONSCIOUSNESS	RESPIRATORY ARREST	CARDIAC ARREST	BURNING SENSATION	CHEMOSIS	SUB CONJUCTIVAL HEMORRAGE	CORNEAL ABRASION	GIDDINESS	SCLERAL INCISION	TUNELLING	INTRACAMERAL INJECTION	VISCOINJECTION	NUCLEUS DIALING	NUCLEUS EXTRACTION	IOL INSERTION	CORTICAL WASH	CAUTERISATION	BUTTON HOLING	PREMATURE ENTRY	ENDOTHELIAL TOUCH	DESCEMET STRIPPING	ANTERIOR CHAMBER SHALLOW	POSTERIOR CAPSULAR RENT WITH VL	POSTERIOR CAPSULAR RENT WITH OUT VL	BLEPHAROSPASM	0-1HOUR	4HOUR	PATIENT CO-OPERATION	DIFFICULTY DUE TO OCULAR MOVEMENT	ANTERIOR CHAMBER STABILITY	TIMETAKEN(mins)	BEST CORRECTED VISUAL ACUITY	6 WK
1	BSN	507886	60	M	3	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	2	2	1	13		6/9
2	RMH	484813	50	M	1(ii)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	1	1	15		6/9
3	DIH	506548	65	F	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	1	1	11		6/6
4	CYK	506537	75	M	1 (i)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	0	0	1	1	1	11		6/18
5	SRN	505774	62	M	1 (ii)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	1	1	11		6/12
6	NBD	500132	65	M	1 (ii)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	0	0	1	1	1	11		6/9
7	PBP	501608	62	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	1	1	17		6/6
8	YPP	500106	77	M	1 (ii)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	1	1	15		6/18
9	VGP	435353	71	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	2	1	10		6/9
10	SNG	444441	58	M	1 (i)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	1	0	2	2	1	12		6/9
11	KRP	437716	60	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	1	1	13		6/9
12	HMP	437709	68	F	3	0	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	2	1	14		6/9
13	LBS	437711	60	M	1(i)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	2	1	12		6/9
14	NKS	434115	56	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	2	1	2	2	1	14		6/9
15	BMP	440389	67	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	2	1	12		6/9
16	AHB	460502	50	F	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	3	2	2	1	1	11		6/6
17	ZVM	463308	76	F	2	0	-	-	-	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	2	1	1	2	1	13		6/9
18	BGH	463982	63	M	3	0	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	+	-	-	+	-	-	-	-	-	-	-	+	+	1	0	2	1	3	15		6/9
19	AGH	482167	50	F	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	1	0	1	1	1	12		6/6
20	BYM	478897	72	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	1	1	12		6/6
21	DBB	487331	70	F	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	2	2	2	18		6/9
22	BGP	488607	70	F	1 (i)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	1	1	17		6/9
23	DRP	488594	55	M	1 (i)	0	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	1	2	19		6/9
24	BBP	489645	55	F	1 (i)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	1	1	19		6/9
25	SSG	490501	54	F	1 (i)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	0	0	1	1	1	13		6/6
26	SMK	490471	50	F	1 (i)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	1	1	14		6/6
27	AHM	496394	70	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	+	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	18		6/12
28	GDP	499361	72	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	1	1	12		6/9
29	SSS	499349	74	F	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	1	1	14		6/9
30	BNG	527766	70	F	1 (i)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	1	1	3	2	2	18		6/12
31	LGP	527740	70	F	1 (i)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	1	1	13		6/9
32	PMD	517140	65	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	1	1	20		6/9
33	FKM	516143	61	M	1 (i)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	1	1	1	1	1	18		6/12
34	SNK	517144	65	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	1	1	1	3	21		6/12

SL. NO.	NAME	I.P. NO	AGE	SEX	DIAGNOSIS	PRE-OPERATIVE																INTRA - OPERATIVE														POSTOPERATIVE ANALGESIA		SURGEON'S EXPERIENCE				VISUAL ACULTY	
						ANALGESIA PAIN DRUG ADMINISTRATION	LID AKINESIA	GLOBE AKINESIA	RETROBULBAR HEMORRAGE	GLOBE PERFORATION	OPTIC NERVE INTURY	LOSS OF CONSCIOUSNESS	RESPIRATORY ARREST	CARDIAC ARREST	BURNING SENSATION	CHEMOSIS	SUB CONJUCTIVAL HEMORRAGE	CORNEAL ABRASION	GIDDINESS	SCLERAL INCISION	TUNELLING	INTRACAMERAL INJECTION	VISCOINJECTION	NUCLEUS DIALING	NUCLEUS EXTRACTION	IOL INSERTION	CORTICAL WASH	CAUTERISATION	BUTTON HOLING	PREMATURE ENTRY	ENDOTHELIAL TOUCH	DESCEMET STRIPPING	ANTERIOR CHAMBER SHALLOW	POSTERIOR CAPSULAR RENT WITH VL	POSTERIOR CAPSULAR RENT WITH OUT VL	BLEPHAROSPASM	0-1HOUR	4HOUR	PATIENT CO-OPERATION	DIFFICULTY DUE TO OCULAR MOVEMENT	ANTERIOR CHAMBER STABILITY	TIMETAKEN(mins)	BEST CORRECTED VISUAL ACUITY	6 WK
35	TSP	488610	68	F	1 (i)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	1	1	18		6/9
36	SGJ	482819	75	F	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	2	1	14		6/6
37	TJS	482302	58	F	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	2	0	1	1	1	12		6/12
38	MIS	482291	56	M	1 (i)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	+	1	0	2	1	2	18		6/9
39	KEO	482296	50	F	1 (i)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	1	1	17		6/9
40	SSG	482482	69	F	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	0	0	1	1	1	16		6/9
41	HSS	482151	68	F	1 (ii)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	1	1	15		6/6
42	KJS	482496	64	F	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	3	1	2	1	1	14		6/6
43	DVP	482150	60	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	17		6/12
44	MSD	483168	61	F	1 (i)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	13		6/9
45	BOS	482490	54	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	1	1	14		6/9
46	SPS	480933	60	M	3	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	-	-	-	-	-	-	-	-	+	-	-	1	1	2	2	1	14		6/6
47	GRP	481137	65	M	1 (ii)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	1	1	16		6/9
48	SNT	481138	75	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1	1	1	1	13		6/9
49	YLB	481293	65	F	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	1	1	1	1	1	14		6/9
50	BKB	481304	60	F	1 (ii)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	+	-	-	-	-	-	-	1	2	2	1	1	16		6/6
51	PJM	481509	60	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	0	1	1	1	16		6/12
52	IIN	481501	65	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	1	1	1	1	20		6/18
53	YMO	481503	75	M	3	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	+	2	1	2	1	2	19		6/9
54	CIT	481161	55	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	1	0	1	2	1	17		6/9
55	STB	481462	62	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	1	0	1	1	1	18		6/9
56	BCA	481263	74	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0	2	1	1	13		6/6
57	ADT	481632	63	M	3	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	-	-	-	-	-	1	0	1	1	1	14		6/6
58	BPS	481734	65	M	1 (ii)	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	-	-	-	-	-	2	0	1	1	1	14		6/9
59	AVP	481633	70	M	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	2	1	2	2	1	18		6/9
60	MST	481638	72	F	2	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	+	-	+	3	1	3	2	1	20		6/12