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Study on peribulbar versus topical anaesthesia in subjects undergoing phacoemulsification

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***Abstract*---**Introduction: Phacoemulsification was first introduced by Charles Kelman in 1967. IOL implantation is done according to the power of lens calculated using various intra ocular lens (IOL) calculation formulae. By customizing the IOL during cataract surgery, we can provide patients with best refractive outcomes, even in high myopes and hypermetropes. Aim and Objective of the study: The objective of the study to compare the efficacy of topical Anaesthesia versus peribulbar anesthesia among the subjects undergoing phacoemulsification. Materials and Methods: Subjects included in the study were conveniently assigned into either peribulbar group (Group P, n = 100) and topical group (Group T, n =100). Group P received 4-5 mL of local anesthetic (equal amounts of 2% xylocaine and 0.5% bupivacaine) into peribulbar space with 1 inch 25-gauge needle. Group T, received 0.5% proparacaine eye drops instilled every 5 minutes half an hour before surgery. No sedation was given. All the patients under went phacoemulsification with IOL implantation. A four-point verbal pain scale was used for analgesia. Patients were asked to grade the pain during different stages of surgery. Akinesia was also assessed on four-point scale. Results: We compared akinesia between the two groups, we found that in Group P, 48 had no movement, 32 had slight movement, 18 had moderate movement and 2 had full movement. Similarly, in Group T, 3 had no movement, 15 had slight movement, 44 had moderate movement and 38 had full movement. The comparison was done using chi-square test, the p value was <0.05 which is statistically significant. We compared analgesia between the two groups, we found that in Group P, 50 had no pain, 39 had slight pain, 9 had moderate pain and 2 had severe pain. Similarly, in Group T, 42 had no pain, 41 had slight pain, 11 had moderate pain and 6 had severe pain. The comparison was done

using chi-square test, the p value was >0.05 which is not statistically significant. Discussion and Conclusion: Topical anaesthesia is an effective and reliable method for phacoemulsification. It has many benefits over retrobulbar and peribulbar anaesthesia and a high level of patient satisfaction. The technical difficulty as a result of eye mobility is not a problem for the surgeons experienced in this technique. As trend of less invasive cataract surgery is rapidly growing, topical anaesthesia should replace the other methods of anaesthesia in most cases.

***Keywords*---**topical anaesthesia, peribulbar anaesthesia, phacoemulsification, intra ocular lens, analgesia, akinesia.

Introduction

Phacoemulsification was first introduced by Charles Kelman in 1967. IOL implantation is done according to the power of lens calculated using various IOL calculation formulae. By customizing the IOL during cataract surgery, we can provide patients with best refractive outcomes, even high myopes and hypermetropes. Most of the modern IOL power calculation formulae are based upon the theoretical equation given by Fyoderov and its modifications. The only variable which cannot be determined preoperatively is effective lens position (ELP), so the modern formulae try to calculate it more accurately. Retrobulbar block remained popular for ages. But each time with a needle introduced into the orbit there is definite risk of complications. Since 1986, peribulbar anaesthesia has replaced retrobulbar as a safe and effective method of block.[1-3]

However, injection related complications such as orbital bleeding, ocular perforation, optic nerve trauma, intra vascular injection of anaesthetic agent and extra ocular muscle dysfunction have been reported. Although these blocks provide excellent anaesthesia but risk of vision threatening and even life threatening complications is always there. These complications can be avoided by using topical anaesthesia. Topical anaesthesia is not new. In 1984, Knapp described the use of cocaine eye drops. Advances in the techniques of phacoemulsification, self-sealing incisions and foldable IOLs renewed interest in topical anaesthesia. Fichman reported the use of topical anaesthesia for the first time for modern cataract extraction in 1927. Since then the use of this technique has increased tremendously.[4-6] We have taken up this study to evaluate the efficacy of the peribulbar versus topical anaesthesia for cataract surgery.

Aim and objectives of the study

The objective of the study to compare the efficacy of topical Anaesthesia versus peribulbar anesthesia among the subjects undergoing phacoemulsification.

Materials and Methods

Source of data: "Study on Peribulbar versus topical Anaesthesia in subjects undergoing phacoemulsification" was conducted at Dept. of Ophthalmology, Prasad Institute of Medical Sciences, Lucknow, UP
Study population: We included a total of 200 subjects in the age group of >40 years and <80 years both males and females.
Inclusion criteria: subjects who were willing to give consent with senile cataract.
Exclusion Criteria: the following subjects were excluded from the study.

- Subjects refusing informed consent
- Subjects with communication difficulty
- Subjects suffering from dementia
- Subjects with nystagmus
- Subjects unable to understand pain scale
- Subjects with hazy cornea

Techniques and data collection

They were conveniently assigned into either peribulbar group (Group P, n = 100) and topical group (Group T, n =100). Group P received 4-5 mL of local anesthetic (equal amounts of 2% xylocaine and 0.5% bupivacaine) into peribulbar space with 1 inch 25-gauge needle. Group T, received 0.5% proparacaine eye drops instilled every 5 minutes half an hour before surgery. No sedation was given. All the patients under went phacoemulsification with IOL implantation. A four-point verbal pain scale was used for analgesia (no pain, mild pain, moderate pain and severe pain). Patients were asked to grade the pain during different stages of surgery. Akinesia was also assessed on four-point scale (no movement, slight movement, moderate movement and full movement). All surgeries were done by same surgeon to avoid inter-observer bias. Convenient sampling of patients was done to avoid bias in selection.

Statistical Analysis

The data was analysed by SPSS version 17. Standard errors and standard deviation for all variables were calculated, where necessary. Data of anaesthesia and akinesia was compared between two groups using chi-square test.

Results

We included a total of 200 subjects with senile cataract based on inclusion and exclusion criteria in the age group of 40-80 years.

Table 1: Shows descriptive statistics of the subjects

VARIABLES	Group P (n = 100)	Group T (n = 100)
Age	66 ±13.67	66.3±12.8
Males/Females	68/22	62/28
Akinesia	0.72±0.78	2.34±0.78

Analgesia	0.61±0.73	0.88±0.92

Table 2: Shows comparison of Akinesia between Group P and Group T

	Group P (n = 100)	Group T (n = 100)
No movement (0)	48	3
Slight movement (1)	32	15
Moderate movement (2)	18	44
Full movement (3)	2	38

It is evident from the above table that in Group P, 48 had no movement, 32 had slight movement, 18 had moderate movement and 2 had full movement. Similarly, in Group T, 3 had no movement, 15 had slight movement, 44 had moderate movement and 38 had full movement. The comparison was done using chi-square test, the p value was <0.05 which is statistically significant.

Table 3: Shows comparison of Analgesia between Group P and Group T

	Group P (n = 100)	Group T (n = 100)
No pain (0)	50	42
Slight pain (1)	39	41
Moderate pain (2)	9	11
Severe pain (3)	2	6

It is evident from the above table that in Group P, 50 had no pain, 39 had slight pain, 9 had moderate pain and 2 had severe pain. Similarly, in Group T, 42 had no pain, 41 had slight pain, 11 had moderate pain and 6 had severe pain. The comparison was done using chi-square test, the p value was >0.05 which is not statistically significant.

Discussion

In our study, we included a total of 200 subjects divided into two groups, Group P and Group T. Group P received 4-5 mL of local anesthetic (equal amounts of 2% xylocaine and 0.5% bupivacaine) into peribulbar space with 1 inch 25-gauge needle. Group T, received 0.5% proparacaine eye drops instilled every 5 minutes half an hour before surgery. No sedation was given. All the patients under went phacoemulsification with IOL implantation. A four-point verbal pain scale was used for analgesia. Patients were asked to grade the pain during different stages of surgery. Akinesia was also assessed on four-point scale (no pain, mild pain, moderate pain and severe pain). In group P 68 were males and 22 were females and in Group T 62 were males and 28 were females.

We compared akinesia between the two groups, we found that in Group P, 48 had no movement, 32 had slight movement, 18 had moderate movement and 2 had full movement. Similarly, in Group T, 3 had no movement, 15 had slight movement, 44 had moderate movement and 38 had full movement. The comparison was done using chi-square test, the p value was <0.05 which is statistically significant. We compared analgesia between the two groups, we found

that in Group P, 50 had no pain, 39 had slight pain, 9 had moderate pain and 2 had severe pain. Similarly, in Similarly, in Group T, 42 had no pain, 41 had slight pain, 11 had moderate pain and 6 had severe pain. The comparison was done using chi-square test, the p value was >0.05 which is not statistically significant.

Previous reports have indicated that topical anesthesia is as safe and as effective as peribulbar anesthesia for cataract surgery. However, conflicting results have been presenting regarding pain, anxiety, patient discomfort and patient satisfaction postoperatively. These studies have assessed the degree of pain experienced by the patient during surgery in a subjective manner by asking the patients to use a Visual Analog Scale. Results of these studies show that most patients who received topical anesthesia do not feel major pain, similar to patients who underwent surgery under peribulbar or retrobulbar anesthesia. However, other reports have shown that patients under topical anesthesia alone were more likely to experience discomfort during iris manipulation and zonular stretching. Results from several studies show that there is higher patient satisfaction if postoperative pain is well controlled.[7-11]

Complications of retrobulbar and peribulbar anaesthesia are numerous. Ptosis, conjunctival or eyelid bruising, orbital hemorrhage, globe perforation, optic nerve damage, CRVO, CRAO, brain stem anaesthesia and even death have been reported. Topical anaesthesia eliminates these risks and has several other benefits like: the return of vision is more rapid, it is less costly, patients can have surgery without discontinuation of systemic anticoagulants or aspirin and there is more patient satisfaction. [12-15.] The main disadvantage of topical anaesthesia is lack of akinesia which can make surgery technically difficult. But with good patient selection, proper counselling and patient cooperation this problem can be avoided. During capsulorrhexis, the patient should be asked to particularly keep the eyes still.[16]

However, during phacoemulsification and irrigation and aspiration, the instruments placed in the main tunnel and side port incisions immobilize the eye. It is best to slightly lower the bottle height while inserting the phaco tip because this can cause less stretch on zonules due to posterior lens migration. This might cause pain as ciliary body is not anesthetized. The surgeon should avoid touching iris, especially during IOL implantation. This can be achieved by having widely dilated pupil. Pain killers and acetazolamide tablet after surgery would minimise pain and maintain IOP. Up till now we have mostly been able to achieve these goals with good patient satisfaction. The key to successful cataract surgery with topical anaesthesia is surgeon-patient communication. Patients with hearing or language problems or dementia are poor candidates.

Conclusion

Topical anaesthesia is an effective and reliable method for phacoemulsification. It has many benefits over retrobulbar and peribulbar anaesthesia and a high level of patient satisfaction. The technical difficulty as a result of eye mobility is not a problem for the surgeons experienced in this technique. As trend of less invasive cataract surgery is rapidly growing, topical anaesthesia should replace the other methods of anaesthesia in most cases.

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