



Original Article

To Compare the Efficacy of Analgesia in Single Site and Double Site Peribulbar Anaesthesia in Phacoemulsification with Intraocular Lens.

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Objective: To compare the efficacy of analgesia in single site and double site peribulbar anaesthesia in phacoemulsification with intraocular lens.

Methods: 400 eyes of patients were studied in the Department of Ophthalmology, Fatima Jinnah Medical College/Sir Ganga Ram Hospital Lahore. It was a quasi experimental study. Two groups were made of 200 eyes each that underwent phacoemulsification with intra ocular lens. Local anesthesia was given as single site (inferotemporal) peribulbar anaesthesia, while the other 200 eyes received double site (inferotemporal and superonasal) peribulbar anesthesia. Verbal pain score of 4 levels was used immediately after surgery to assess each patient's overall severity of pain.

Result: In group A (single site peribulbar anaesthesia), 180 (90.0%) patients experienced complete analgesia (pain score = Zero), 12 (6.0%) patients felt mild pain (pain score= 1), 8 (4.0%) patients felt moderate pain (pain score= 2), and none of the patients experienced severe pain. In group B (double site peribulbar anaesthesia), 156 (78.0%) had no pain (pain score = Zero), 36 (18.0%) patients had mild pain (pain score= 1), 8 (4.0%) patients experienced moderate pain (pain score=2) and none of the patients experienced severe pain. Efficacy of analgesia, in group A was 90.0% (180 patients) while in group B the efficacy of anaesthesia was 78.0% (150 patients). Pearson Chi-square test showed statistically significant difference in efficacy of anaesthesia in the groups ($p=0.014$).

Conclusion: The single-injection technique is more suitable than double site peribulbar anaesthesia in providing analgesia for cataract surgery.

Keywords: Peribulbar, single site, double site, analgesia, phacoemulsification.

Introduction

Cataract accounts for almost 50% of blindness globally and remain leading cause of visual impairment in all region of world. Cataracts are not preventable, but surgical treatment is one of the most cost effective interventions¹. Age related cataract surgery is done under different forms of anaesthesia i.e. local anaesthesia with or without sedation, topical anaesthesia and general anaesthesia, local anaesthesia being the commonest. Different techniques have been used to administer the local anaesthesia like retrobulbar injection, peribulbar injection and sub-tenon blockade.

Local anaesthesia involves infiltration of the area around the nerve that will block a nerve sub-serving a given part of the body.⁷ Retrobulbar and peribulbar are the two main approaches in the eye for local anaesthesia. Effective and safer anaesthesia for cataract surgery requires a debate whether the peribulbar approach provides more block than retrobulbar approach.² Different techniques of local anaesthesia are popular but still peribulbar anaesthesia is widely accepted and practiced.³ Rare but serious complications are associated with blind needle insertion while giving the peribulbar anaesthesia. These include globe perforation, brain stem anaesthesia, retrobulbar hemorrhage, optic nerve injury, post operative strabismus and intravascular injection etc. These complications are inevitable even in experienced hands.⁴ An adequate block can be achieved with a single peribulbar injection placed either inferotemporally or medially, and there is no evidence that a second primary injection decreases the rate of supplemental injection required.

The efficacy in conventional double site peribulbar block and single site peribulbar block was found to be 40 % and 72% respectively. Scores for globe anaesthesia and surgeon's satisfaction were all comparable without any significant statistical difference⁵. In another study, the efficacy in conventional double site peribulbar block and single site peribulbar block was found to be 94.11% and 88.29% respectively⁶. As there is conflict in the results of above mentioned studies and also the first study has used smaller sample size as compared to our study so this study will be more authentic and reliable. As cataract surgery is being performed on large scale under local anaesthesia, so this study will be helpful to find a better technique with lesser complications.

Materials and Methods

We studied 400 cataractous eyes of the patients at Department of Ophthalmology, Fatima Jinnah Medical College/Sir Ganga Ram Hospital Lahore. It was quasi experimental study. Non Probability purposive sampling was done. We divided our sample of 400 patients into two equal

groups of 200 patients each, Group A received single site whereas Group B had double site peribulbar anaesthesia sample size was calculated with 80% power of test, 1% level of significance and taking expected percentage of efficacy (in terms of no pain) in both groups i.e. 40% in double site peribulbar versus 72% in single site peribulbar anaesthesia in phacoemulsification with intraocular lens.

Patients of age 45 years to 65 years with cataract were planned to undergo phacoemulsification with intraocular lens. Inclusion criteria was cooperative patients, both male and female, whereas all mentally handicapped persons, with language barrier, those who had taken pain killer six hours before surgery and with systemic diseases like diabetes mellitus (known diabetic or fasting blood sugar level > 126mg/dL, and ischemic heart disease (known or on ECG) were excluded from the study.

We did the assessment of both groups before the operation by talking to the patients to evaluate their level of education, co-operation, hygiene, and answered any question from the patients. A 4 level verbal pain score was chosen (0 = no pain, 1= mild pain, 2 = moderate pain which needs more analgesic, 3 = severe pain which is not tolerated and needs to stop the procedure). A visual analogue scale like the Steven Scale was difficult to apply for our patients for social reasons and poor vision in old patients and some difficulties to assess further steps in the procedures of surgery. We modified the verbal score in order to enable us to speak to the patient at any time.

Data Collection Procedure

We included 400 cataractous eyes of patients who were admitted in the eye ward for cataract surgery. Patients' personal profile including name, age and sex were recorded. In ophthalmological record, visual acuity both uncorrected and corrected were noted. Ocular adnexa was examined for dacryocystitis, blepharitis, lid abnormalities like ptosis, entropion, ectropion etc. and tear film abnormalities were ruled out in order to prevent any ocular infection which may lead to the disastrous situation of endophthalmitis. Extra ocular movements were checked, and cover uncover test was done to rule out any squint.

Biomicroscopy with a slit lamp was done to check the corneal status, with AC depth and activity. Pupil reaction to light and near was checked to rule out retinal problems, macular function tests, which could influence the final visual outcome. Intraocular pressure was checked with the Goldmann applanation tonometry. The lens changes were categorized into dense cataract, posterior polar, nuclear sclerosis. A fully dilated fundus evaluation was done. Biometry was done to calculate power of intra ocular lens. Preoperative measures like consent for surgery, antibiotic eye drops, dilatation of pupil was done. Peribulbar anaesthesia was

given as follows:

Patients were randomly assigned to a single site or double site peribulbar anaesthesia group using a random number table. All the patients were briefed about the pain score. In group A, patients single site (inferotemporal) peribulbar anaesthesia was given after aseptic measures, 5 ml anaesthetic solution (2.5ml 2% xylocaine mixed with 2.5ml of 4% bupivacaine) in a 5cc syringe (23 gauge needle) was injected. In group B, patients double site peribulbar anaesthesia (inferotemporal and superonasal). 3 ml of the anaesthetic solution was injected inferotemporal area and 2 ml of the anaesthetic solution was injected superonasally. Digital pressure was given to the orbit for 5 minutes in both the groups. Phacoemulsification with intraocular lens implantation was then done and once the procedure was completed, the patient was taken to the recovery area and was asked about the pain he or she felt during surgery. Analgesia was assessed by a verbal pain score of 4 levels (0 = no pain, 1= mild pain, 2 = moderate pain which needs more analgesic, 3 = severe pain which is not tolerated and needs to stop the procedure) was recorded.

Data Analysis

The collected data was analyzed by using software SPSS version 20. The variables analyzed included demographic information and efficacy of analgesia. The quantitative variables like age were presented as mean \pm standard deviation. The qualitative variables like gender and efficacy were presented in the form of frequency and percentage. Efficacy was compared between the two groups by applying chi-square test. p value equal to 0.05 or less was considered as significant.

Results

Demographic data show that in the distribution of patients by sex, there were 203 (50.8%) male and 197 (49.3%) female patients (figure 1) and the mean age of the patients was 56.36 ± 5.91 years with a range of 45-65 years. 119 (29.8%) were in range of 45-50 years, 42 (10.5%) were in range of 51-55 years, 176 (44.0 %) were in 56-60 years' and 63 (15.8%) were in 61-65 years' range (figure 2).

In the group A i.e. single site peribulbar anaesthesia, out of 200 patients, 180 (90.0%) experienced complete analgesia (pain score = Zero). 12 (6.0%) patients felt mild pain (pain score= 1), 8 (4.0%) patients felt moderate pain (pain score= 2), and none of our patients in this group experienced severe pain which has a score of 3 in our grading of analgesia (Table 1).

In group B, with double site peribulbar anaesthesia, out of 200 patients, 156 (78.0%) experienced complete analgesia (pain score = zero), 36 (18.0%) patients had mild

pain, 8 (4.0%) patients experienced moderate pain (pain score=2) and again in this group not a single patient experienced severe pain (Table 1).

The efficacy of analgesia, (figure 4) in group A, the single site peribulbar anaesthesia was effective in 180 (90.0%) patients and only 20 (10.0%) patients showed failure or ineffective anaesthesia in this group. In group B, in which the double site peribulbar anaesthesia technique was used, only 156 (78.0%) showed complete effectiveness and in rest of the 44 (22.0%) patients this method of anaesthesia did not prove to be effective.

Figure 1: Distribution of Patients in Age Groups (N=400)

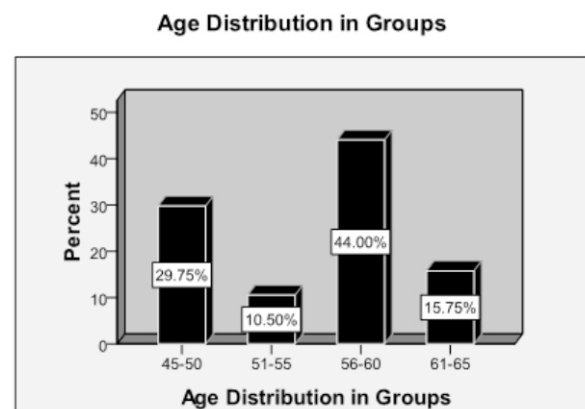


Table1: Grades of Analgesia in Patients with Single Site Versus Double Site Peribulbar Injection

| Grading of Analgesia | Type of Anesthesia | | Total |
|----------------------|--------------------|----------------|-------|
| | A: Single Site | B: Double Site | |
| No Pain | 180 (90%) | 156 (78%) | 336 |
| Mild Pain | 12 (6%) | 36 (18%) | 48 |
| Moderate Pain | 8 (4%) | 8 (4%) | 16 |
| Total | 200 | 200 | 400 |

Chi Square test: p = 0.014

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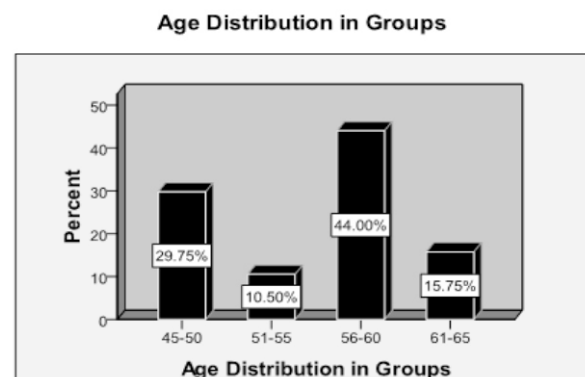
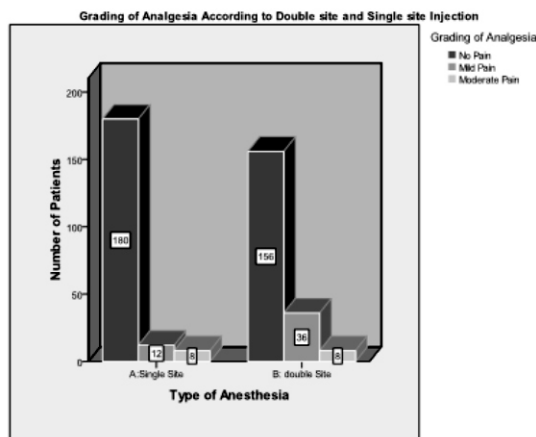


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Figure 2: Grades of Analgesia in Patients with Single Site Versus Double Site Peribulbar Injection



Discussion

Since the first introduction of peribulbar anesthesia in 1986, many modifications have been observed in its technique. The spread of local anaesthesia can be achieved by peribulbar anaesthesia which can be established by using a single or double injection technique. The techniques are based on the volume of the orbit, degree of akinesia required, experience of the ophthalmologist and preference of the anesthesiologist to choose between single or double site⁸. For dual injection technique; the most popular site for first injection is infero-temporal and for second injection is superomedial³.

We used analgesia in this study to assess the efficacy of anaesthesia as pain is the most important factor as pain free patients are more relaxed and cooperative during the surgery. A requirement of supplementary injection is an indicator of inefficient

block³.

The total volume of anaesthetic solution that is injected for peribulbar anaesthesia was equal in both techniques, in single site there was only one needle entry while in double site technique needle entry was twice one inferior and one superior. This is also an important factor while considering the risk of blind penetration of orbit for giving the injection. Rare but serious complications are associated with blind needle insertion while giving the peribulbar anaesthesia. These include globe perforation, brain stem anaesthesia, retrobulbar hemorrhage, optic nerve injury, post operative strabismus and intravascular injection etc. These complications are inevitable even in experienced hands.⁴ For single site technique the risk is obviously much less as compared to double site technique. Ball *et al.*⁹ found that a single peribulbar injection can achieve adequate block that is placed either inferotemporally (classic technique)¹⁰ or medially (single percutaneous technique)¹¹ and there is lack of evidence that a second primary injection decreases the rate of supplemental injection required. In a study, Singh *et al.*⁶ found that after respective peribulbar injection, 90 (88.29%) in single site and, 96 (94.11%) patients in double site had adequate globe akinesia. 14 (13.72%) in single site and, 11 (10.8%) patients in double site required supplemental injections.

On comparison of scores for globe akinesia and lid akinesia, globe anaesthesia and supplemental blocks, pain on injection and surgeon's satisfaction were all comparable without any significant statistical difference. It was noted that during the eye camp surgeries, single injection peribulbar block was as effective as standard two injection peribulbar block, and can be used instead of two injection technique to avoid possible globe injury. In our study group A, the single site peribulbar anaesthesia was effective in 180 (90.0%) patients and only 20 (10.0%) patients showed failure or ineffective anaesthesia in this group. While in group B, in which the double site peribulbar anaesthesia technique was used, only 156 (78.0%) showed complete effectiveness and in rest of the 44 (22.0%) patients this method of anaesthesia did not prove effective which is comparable.

Said *et al.*⁵ demonstrated that in twenty out of 50 (40%) patients of group I (classic peribulbar) and 36/50 (72%) of group II (single percutaneous technique) there was no pain during the anaesthesia. Globe akinesia and anaesthesia score were less satisfactory in group I and supplemental blocks required in 8% of the patients while in group II all the patients (100%) showed proper globe akinesia and anaesthesia. Subconjunctival haemorrhage, chemosis and ecchymosis were more frequent in group 1 however there was significant elevation in mean IOP following injection in both groups.

For experienced ophthalmologist while performing phacoemulsification, akinesia is not required.³ A sound

knowledge of orbital anatomy, physiology and pharmacology of anesthesia and ophthalmic drugs is, however, needed for this sophisticated art of ophthalmic regional anesthesia. To perform a safe technique adequate training under expert supervision is required.

Conclusion

We conclude that globe analgesia is necessary during surgery and the single-injection technique for peribulbar anaesthesia is more effective and safe than the conventional double site injection technique in providing analgesia for cataract surgery. We, therefore, propose that as there is an increased risk of globe perforation in a second peribulbar injection, it should only be used when required.

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