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## Research Article

### COMPARITIVE EVALUATION OF PERIBULBAR v/s MEDIAL CONAL BLOCK FOR PHACOEMULFICATION CATARACT SURGERY

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#### ABSTRACT

**Background:** Peribulbar block is the most common type of local anaesthesia administered for cataract surgery, and continuous efforts are on to minimize the patient discomfort along with achieving good akinesia.

**Aims & Objectives:** A double-blind, prospective and randomized study was carried out in our institute to compare the anaesthetic effects of Lignocaine+Bupivacaine+Hyaluronidase injected for peribulbar block vs medical conal block for phacoemulfication cataract surgery.

**Materials and Methods:** A total of 100 patients of both sexes aged 50-80 years of American Society of Anaesthesiologists grade 1 and 2, scheduled for phacoemulfication cataract surgery under monitored anaestesiocare, were enrolled for the study. Patients were assigned into two groups of 50 each, Peribulbar block group (P) and medial conal block group (M). Group P received 10 ml of LA solution containing 5ml of 2% lignocaine, 5ml of 0.75% bupivacaine and 100 units of hyaluronidase through peribulbar route while group M received the same LA solution 2.5ml through medial conal route. Heart rate(HR), mean arterial pressure (MAP), pulse oximetry (SpO<sub>2</sub>), respiratory rate (RR), intraocular pressure (IOP), eye muscle movements score and quality of block were observed and recorded throughout the study period at regular interval. At the end of research project, the data was compiled systematically and was subjected to statistical analysis using the ANOVA test with post hoc significance for continuous variables and chi-square test for qualitative data. Value of P<0.05 was considered significant and P<0.0001 as highly significant.

**Results:** Demographic characteristic, SpO<sub>2</sub> and RR were comparable in both the groups. Mean HR and MAP were also comparable after a significant variation in the first 2-3 minutes (p<0.05). Onset and establishment of sensory and motor blocks were significantly earlier in P group (p<0.05). IOP decreased significantly during the first 6-7 min in the P group after administration of block. Duration of analgesia was prolongs in the P group as compared to M group. The side effect profile revealed a higher incidence of nausea, vomiting, headache, dry mouth and dizziness in group P.

**Conclusions:** Administration of medial conal block not only decreases the total volume of LA to be used but also increases patient comfort level and sensory analgesia achieved is comparable to peribulbarblock. It also provides smooth operating conditions with a good sedation level as well by providing a wider safety margin of LA as side effects of LA are drastically reduced.

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## INTRODUCTION

Life expectancy has increased over the last few years due to advanced medical diagnostic and therapeutic techniques. The trend is shifting towards a better quality of life by taking advantage of these medical advancements. As a result, an increasing number of patients are coming to the hospital for various therapeutic and diagnostic procedures. The increasing popularity of phacoemulfication day care cataract surgery has

started drawing a huge proportion of the population to the ophthalmological outpatient department. Majority of these patients belong to the geriatric age group and are invariably suffering from various systemic diseases including hypertension, cardiac disease, diabetes, etc. Surgery in this population group is always challenging and is associated with various risks, whether it is performed under general anaesthesia or regional anaesthesia.<sup>1,2</sup>

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Peribulbar block is the most common and safe technique employed worldwide for the operative treatment of cataract, specifically in the phacoemulsification procedure. Bupivacaine and lignocaine have been the traditional mainstay in administering peribulbar block. Medial conal is relative a new site gaining popularity on account of its favourable cardiovascular and neurologic pharmacological profile as very low LA solution is used. Even through safety margin of peribulbar block is quite high, a higher volume is used in achieving the desired anaesthetic effect thus raising the concerns of systemic toxicity.

Keeping this in mind, we carried out a doubleblind randomized study in the department of Ophthalmology of our institute for comparing the peribulbar block vs medial conal block for phacoemulsification cataract surgeries. The chief aims of this comparison were to observe the effects on hemodynamic parameters, intraocular pressure (IOP) changes, duration of analgesia, and patient comfort.

## METHOD

The permission from institute's ethical committee was sought after submitting the protocol of research methodology to the appropriate authorities. Thereafter, 100 patients of both sexes, aged 50-70 years, of American Society of Anaesthesiologist (ASA) grade 1 and 2, scheduled for phacoemulsification cataract surgery under monitored anaesthesia care were enrolled in the study. A written informed consent was obtained from all the patients after explaining to them the nature of the study. A through pre-anaesthetic evaluation was carried out and patients received a 150mg tablet of ranitidine a night before and 2 h before on the morning of surgery with a sip of water. All the patients were given written instructions and were called directly from the home on the day of surgery in a fasting state.

Patients with cardiac disease, active ocular infection, single eye, receiving any anti-coagulants, anti-epileptic drugs, anti-psychotic, anti-glaucoma drugs and patients allergic to amide-type LAs were excluded from the study.

Patients were assigned two groups, Peribulbar group (P) and medial conal (M), comprising of 50 patients each, and the randomization sequence table kept centrally by a research staff nurse. Group P received 0.75% bupivacaine and 2% lignocaine in an equimixture ratio of 1:1 with a total volume of 10 ml, while group M received a similar mixture of 2ml at medial conal site.

The peribulbar & medial conal both were performed by a senior resident of the ophthalmology department who had a vast experience in the regional blocks. For peribulbar block, the drug was injected at two places : at medial 2/3<sup>rd</sup> and lateral 1/3<sup>rd</sup> of the lower eyelid and at the lateral 2/3<sup>rs</sup> and medial 1/3<sup>rd</sup> of upper eyelid. To promote the spread of LA solution and to decrease the IOP, orbital mechanical compression was exerted using a "pinkie" rubber ball. For medial conal block, the drug was injected between caruncle and medial cantal fold straight and perpendicular to base 90 degree with 26G needle. In the pre-operative room, all the baseline parameters were observed and recorded, which included heart rate (HR), mean arterial pressure (MAP), pulse oximetry (SpO<sub>2</sub>), respiratory rate (RR), IOP and eyelid movement scores, and these parameters were

observed every minute and recorded at fixed time intervals as per protocol. IOP was measured using a Schiotz tonometer and ocular movement score was also evaluated during the same time period as IOP using a 3-point scoring system in all the four quadrants (Grade 0=akinesia: Ocular movements <1mm; Grade 1=moderately reduced ocular movements: >1mm and <3mm, and normal ocular movements, i.e. greater than 3 mm were assigned to Grade 2). Sedation scores were measured using a subjective grading scale (0= no sedation; 1=calm and compose; 2=opening eyes with verbal command; 3=opening eyes on gentle tactile stimulation; 4=opening eyes with vigorous shaking; 5=not arousable).

After the administration of peribulbar blocks, HR, MAP, RR and SpO<sub>2</sub> were observed and recorded at regular intervals of 5 min during the surgical period. Oxygen was also administered through bi-nasal prongs with an oxygen flow of 3L/min. Quality of block was assessed both by the surgeon and by the patient. Post-operatively patients were kept in a recovery ward and were observed for the return of ocular movements and the timing of the first rescue analgesia. All the patients were discharged on the next morning of surgery. At the end of the study, the data was compiled systematically and was subjected to statistical analysis using SPSS version 10.0 for windows and using ANOVA with post hoc significance for continuous variables and chi-square test for qualitative data. Value of  $p < 0.05$  was considered significant and  $P < 0.0001$  as highly significant.

## RESULTS

For all the patients who underwent cataract surgery, a proper record was maintained regarding the demographic characteristics, block characteristics and hemodynamic and respiratory parameters. The following results were obtained, which were analysed using statistical methods, and the value of  $P < 0.05$  was considered significant and  $P < 0.0001$  was considered highly significant.

The mean age in group P (62.8±6.8 years) was very much comparable to the mean age in group M. Duration of surgery in both the groups were comparable and non-significant on statistical analysis. To summate, all the demographic characteristics like age, weight, ASA grade, side of the eye operated and duration of surgery were comparable in both the groups, and were found to be statistically non-significant ( $P > 0.05$ ).

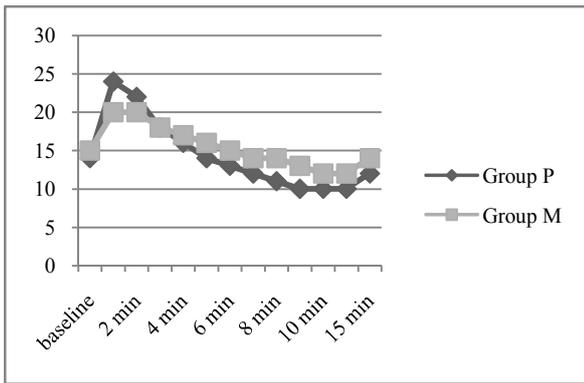
Demographic profile of patients

Demographic characteristics	Group P N=100	Group M N=100
Age (years) (mean ± SD)	64 ± 10	62 ± 8
Weight (kg) (mean ± SD)	61 ± 9	59 ± 10
Gender M/F	38/62	52/48
Side of eye R/L	44/56	58/42
ASA grade 1/2	34/66	42/58
Duration of surgery in minutes (mean±SD)	23 ± 8	22 ± 7

ASA = American society of anaesthesiologist, P = peribulbar group, M = medial conal group.

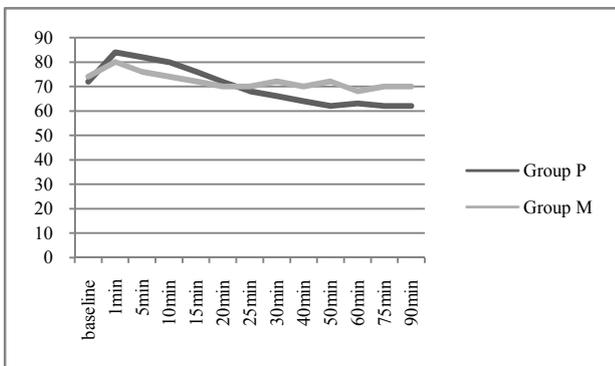
IOP increased transiently during the first 1-2 min after the administration of the block in both the groups, which came to the baseline value over the next 1 min, and the comparative

change was not significant on statistical analysis. Overall, the IOP remained on lower side in P group.

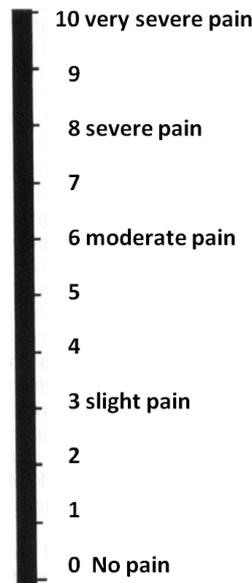


The onset of sensory anaesthesia and motor blockade was much earlier in P group as compared to M group but the quality of sensory anaesthesia was statistically not significant. The consumption of LA solution was significantly lower in M group, but the blockade characteristics were comparable with the P group. The duration of first rescue analgesia was significantly prolonged in P group and the post-operative period was perceived as smooth and pain free by both the groups.

After the administration of block, patients in both the group had a transient increase in HR, which came to baseline within the next 1 min. The HR showed minimal variation in M group during the entire surgical period, but was significantly lower than the HR in P group. MAP also projected a similar picture as mean HR.



Pain assessment was carried out on return to the daycare ward by the same member of the nursing staff (YT.-R.), who had not met any of the patients before. The patients were asked to grade any pain felt on a standard 10 cm visual analogue scale, 0 representing no pain at all, 10 representing the most severe pain imaginable (Fig. 1). All patients were asked to grade pain perceived at three stages of the procedure: at induction (i.e. medical conal /peribulbar injection), per-operatively, and 1 hour post-operatively at the time of assessment in the ward. Any analgesia given was also recorded. The questions were phrased identically to all patients. Additionally the surgeon was asked to report any difficulty encountered attributable to the operating conditions. The pain scores for each group were compared using the Mann-Whitney U-test for nonparametric statistics.



The patients exhibited some remarkable statistical difference during the post-operative period. 30 percent of patients in the P group experienced nausea and 5 % has episodes of vomiting as compared to those in M group, with a significant statistical incident of 2% and zero respectively. Headache was the chief complaint by 20% of the patients in the P group as compared with only 5% of the incidence in the M group. Another interesting finding was the statistically significant and higher incidence of dry mouth in the patients of P group as compared to only 1 % in M group.

Incidence of side effects			
Side effects	Group P	Group M	P
Nausea	30	2	<0.001
Vomiting	5	0	<0.001
Headache	20	5	<0.001
Dizziness	15	0	<0.001
Dry mouth	25	1	<0.001

P = Peribulbar group, M = medial conal group

## DISCUSSION

Regional anaesthesia has gained massive popularity for day care phacoemulsification cataract surgery as it avoids complications as untoward events associated with general anaesthesia.<sup>3</sup> This study demonstrated that patients were more anxious and felt more discomfort or pain in the eye that received peribulbar block. This resulted in statistically greater satisfaction with the eye that underwent a medial conal block compared to the others that received peribulbar block during phacoemulsification. In our study surgical pain, pressure and discomfort were higher with peribulbar block. In contrast, surgery under medial conal block was almost completely painless. Patients felt comparatively more pain, pressure and discomfort during the injection in peribulbar than medial conal blocks. Speculum-related discomfort, presence of akinesia and tolerance of the microscope light during surgery was very much comparable and non-significant with the needle block. The usage of supplementary anaesthesia during ophthalmic surgeries is reported to be as high as 54 %.<sup>4</sup>

Results from several studies show that there is higher patient satisfaction if postoperative pain is well controlled.

The ideal anaesthetic technique should produce an adequate level of analgesia for the proposed surgical procedure, inflict the minimum pain or toxicity on the patient and be performed easily<sup>5</sup>. This study shows that topical anaesthesia results in adequate analgesia for phacoemulsification, although a slightly higher level of per-operative discomfort is perceived. However, since this is described as less than 'slight pain' on a visual analogue scale, its clinical significance has to be weighed against the complete absence of sight- or life-threatening complications with this technique.

No significant difference in surgeon's assessment of akinesia and anesthesia was found. No significant difference in patient assessment of comfort was found. The efficacy of medial conal blocks appears to be comparable to that of peribulbar blocks.

## CONCLUSION

Regional anaesthesia is a safe form of local anaesthesia in routine phacoemulsification cataract surgeries. Medial conal blocks are considered a good alternative between peribulbar block and topical anaesthesia. Patients uncooperative or not favourable can be tried medial conal block as it decreases total volume of LA used and having favourable side effects profile widening the safety margin of LA blocks.

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