



## EFFECT OF USING FENTANYL AS AN ADDITIVE WITH THE LOCAL ANAESTHETIC MIXTURE IN PERIBULBAR BLOCK FOR CATARACT SURGERIES- A PROSPECTIVE RANDOMIZED CONTROL STUDY

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### ABSTRACT

**INTRODUCTION:** Cataract surgery is one of the most commonly performed surgery in the elderly patients. Regional anesthesia is safe, reliable, provide adequate akinesia and analgesia of the eye, a good postoperative pain relief and a shorter hospital stay. The various regional anesthetic techniques used in ophthalmic surgeries are peribulbar block, retrobulbar block, sub tenon's block, subconjunctival block and topical corneo-conjunctival anesthesia. Due to its safer approach, the peribulbar block is most commonly. Addition of an opioid like fentanyl to the anesthetic preparation will provide a faster onset of lid and globe akinesia, faster onset of sensory blockade, increase the duration of analgesia and reduce the need for rescue analgesia postoperatively.

**AIM OF THE STUDY:** To evaluate the effect of addition of fentanyl to the local anesthetic mixture in peribulbar block in cataract surgery.

**MATERIALS AND METHODS:** This study was done in the Department of Anesthesiology in collaboration with the Department of Ophthalmology in Kanyakumari Government Medical College from January 2019 to December 2019. Patient posted for cataract surgery were allocated into two groups by randomization (30 each). Group S – 4ml of 2% lignocaine with adrenaline premixed with hyaluronidase + 1ml of 0.5% Bupivacaine + 0.5ml normal saline. Group F – 4ml of 2% lignocaine with adrenaline premixed with hyaluronidase + 1ml of 0.5% Bupivacaine + 25 mcg Fentanyl (0.5 ml). The Parameters related to the study such as Onset of lid akinesia, Onset of globe akinesia, Onset of sensory blockade, Duration of analgesia by VAS score, Level of sedation by Ramsay sedation score, vital parameters – SpO<sub>2</sub>, pulse rate, respiratory rate, blood pressure and any Complications were recorded.

**RESULTS:** We found that the demographic parameters were comparable and statistically insignificant. The preoperative hemodynamic parameters like the systolic and diastolic blood pressure, pulse rate, SpO<sub>2</sub>, respiratory rate were statistically insignificant and comparable. The mean onset of lid akinesia was  $5.8 \pm 1.76$  mins and  $3.13 \pm 1.25$  mins in Group S and Group F respectively. The mean onset of globe akinesia was found to be  $7.46 \pm 2.22$  mins and  $4.2 \pm 1.60$  mins in Group S and Group F respectively. The mean onset of sensory blockade was  $6.8 \pm 1.24$  mins and  $4.93 \pm 1.63$  mins in Group S and Groups F respectively. Thus the onset of globe and lid akinesia and the onset of sensory blockade was faster in Group F compared to Group S. The mean VAS scores were statistically significant ( $P < 0.001$ ) between both the groups at 1 hour, 1.5 hour, 2 hour, 4 hour, 6 hour postoperatively and it was found that Group F has a lower VAS score when compared with Group S. The VAS score at 8 hour and 10 hours postoperatively were statistically insignificant ( $p > 0.05$ ) in both the groups. The mean duration of analgesia was  $4.56 \pm 1.65$  hours in Group S and  $7.63 \pm 2.55$  hours in Group F and was found to be statistically significant ( $P < 0.001$ ).

**CONCLUSION:** Based on this study, we can conclude that there is a faster onset in the lid akinesia, globe akinesia, in the onset of sensory blockade and a substantial increase in the duration of analgesia when fentanyl is used as an additive along with the local anesthetic mixture in peribulbar block for cataract surgery.

### KEYWORDS :

#### INTRODUCTION:

Cataract surgery is one of the most commonly performed surgery in the elderly patients. Though it is considered a low risk surgery as they do not cause significant physiological disturbances, the patients often have a high prevalence of coexisting illness like diabetes, hypertension, chronic obstructive pulmonary disease, coronary artery disease. Hence intense motor and sensory blockade intraoperatively and adequate postoperative pain relief with appropriate analgesic is mandatory. Cataract surgeries have now evolved from the older intracapsular cataract extraction (ICCE) to the now practiced extracapsular cataract extraction (ECCE) which include phacoemulsification and small incision cataract surgery (SICS). Ophthalmic surgeries are generally short in duration and regional anesthesia is preferred unless there is any contraindication. Regional anesthesia is safe, reliable, provide adequate akinesia and analgesia of the eye, a good postoperative pain relief and a shorter hospital stay. The various regional anesthetic techniques used in ophthalmic surgeries are peribulbar block, retrobulbar block, sub tenon's block, subconjunctival block and topical corneo-conjunctival anesthesia. Due to its safer approach, the peribulbar block is most commonly. Addition of an opioid like fentanyl to the anesthetic preparation will provide a faster onset of lid and globe akinesia, faster onset of sensory blockade, increase the duration of analgesia and reduce the need for rescue analgesia postoperatively.

#### AIM OF THE STUDY:

To evaluate the effect of addition of fentanyl to the local anaesthetic mixture in peribulbar block in cataract surgery.

#### MATERIALS AND METHODS:

This study was done in the Department of Anaesthesiology in collaboration with the Department of Ophthalmology in Kanyakumari Government Medical College during the period of January 2019 to December 2019 after approval from the institutional ethical committee and the Department of Ophthalmology and with written informed consent from the patients.

#### Sample Size:

Sample size formula,  $n = 2 (Z_{\alpha} - Z(1-\beta) \times S \div d)^2$  based on the study done by Poonam nehra et al in J Pharmacol Pharmacother 2017 Jan-Mar and with duration of analgesia as the effect size. Assuming 95% confidence interval, the power of the study as 90% and with  $\alpha$  of 0.05, the sample size was calculated to be 30 cases in each group with a total of 60 cases.

#### Blinding:

Double blinded study

**Randomization:** The patients were allocated to two group (30 each) randomly by the closed envelope technique.

**Group Allocation:** Group S – 4ml of 2% lignocaine with adrenaline premixed with hyaluronidase + 1ml of 0.5% Bupivacaine + 0.5ml normal saline

Group F – 4ml of 2% lignocaine with adrenaline premixed with hyaluronidase + 1ml of 0.5% Bupivacaine + 25 mcg Fentanyl (0.5 ml)

**INCLUSION CRITERIA:**

Elective cataract surgery, Age of > 30 years of either sex

**EXCLUSION CRITERIA:**

Patient refusal, Coagulation abnormalities, Systemic Hypertension, Posterior staphyloma, Axial length > 28mm, Vitreous haemorrhage, Dropped nucleus, Retinal detachment, Known allergic reactions, Infection at site of local injection, Failure of block.

**Intervention:**

All the patients were kept nil per oral for 8 hours. Baseline vital parameters were recorded. Peribulbar block performed and the vitals were monitored and watched for any complications. The eye was examined for every 2 minutes to monitor the parameters – onset of globe and lid akinesia and the onset of sensory blockade.

**Parameters Monitored:** Onset of lid akinesia, Onset of globe akinesia, Onset of sensory blockade, Duration of analgesia by VAS score, Level of sedation by Ramsay sedation score, Vital parameters – SpO2, pulse rate, respiratory rate, blood pressure, Complications, if any.

**Primary Outcome:** Duration of analgesia

**Secondary Outcome:** Onset of lid akinesia and onset of globe akinesia, Hemodynamic parameters.

**Definition of Study Parameters:**

For **assessment of the onset of lid akinesia**, the patients were asked to open their eyelids and then squeeze them maximally. They were then scored as: 0 – complete akinesia, 1 – partial movement of either or both the eyelid margins, 2 – normal movement of either or both the eyelid margins. This was assessed from the time of removal of the needle after the block till the development of lid akinesia.

For **assessment of the onset of globe akinesia**, the movement of the extraocular muscles in all the four cardinal directions was examined. They were then scored as: 0 – 0 to 1mm movement in 1 or 2 main directions, 1 – 1mm movement in more than 2 main directions or 2mm movement in any main direction. 2 – more than 2mm movement in any direction or 2mm movement in 2 or more main direction. This was assessed from the time of removal of the needle after the block till the development of globe akinesia

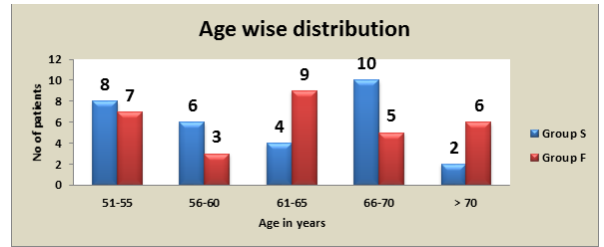
**Onset of sensory analgesia** was assessed by a gentle touch on the conjunctiva with a cotton swab.

**Assessment of duration of analgesia** was calculated from the time of the peribulbar block to the VAS score of > 4 when the rescue analgesia was given.

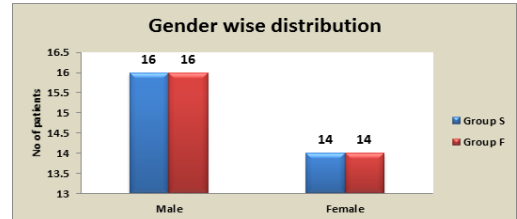
**STATISTICAL ANALYSIS AND INTERPRETATION:**

60 patients underwent peribulbar block for cataract surgery in which 30 patients received a mixture of fentanyl and local anaesthetic agent when compared to other who were the control group receiving only local anaesthetic mixture. The continuous variables of the study subjects were analysed and interpreted between the two groups by the student independent “t” tests. The continuous variables of the study subjects within the group were analysed by the student paired “t” test. The categorical variables were analysed and

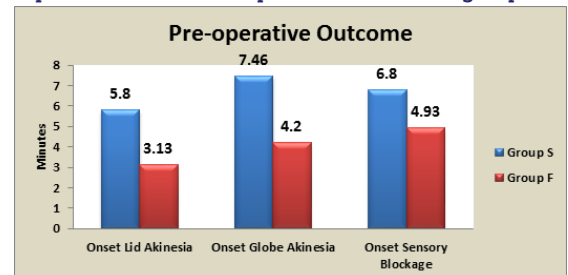
interpreted by the Chi-square test. The statistical procedures were done with the statistical package IBM SPSS statistics-20.



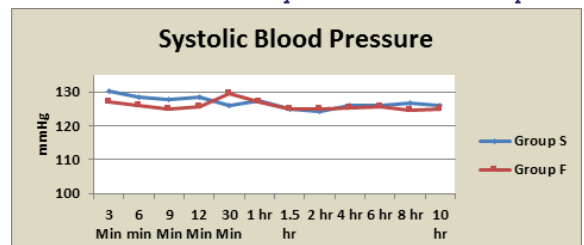
**Graph 1: Comparison of the groups based on the age distribution**



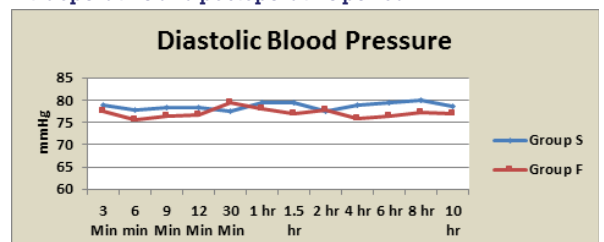
**Graph 2: Gender wise comparison between the groups**



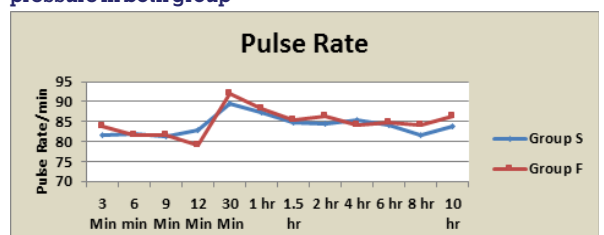
**Graph 3: Comparison of onset of lid akinesia, onset of globe akinesia and onset of sensory blockade in both Groups**



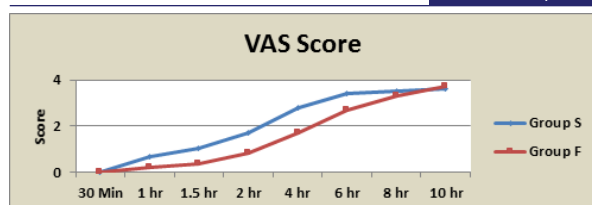
**Graph 4: Comparison of systolic blood pressure in the intraoperative and postoperative period**



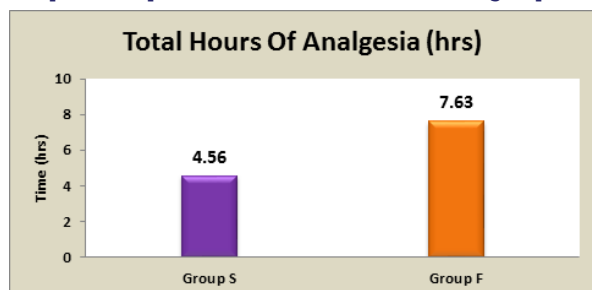
**Graph 5: Intraoperative and postoperative diastolic blood pressure in both group**



**Graph 6: Comparison of intraoperative and postoperative pulse rate in both Groups**



Graph 7: Comparison of VAS score between both groups



Graph 8: Comparison of the duration of analgesia in both the groups

### DISCUSSION:

Peribulbar block is a commonly used nerve block for ophthalmic surgeries preferred due to its easy procedure and due to the fact that it is relatively safe than the retro bulbar block. Though hyaluronidase and epinephrine are used as an additive to the local anaesthetic mixture commonly, they do not prolong the duration of analgesia postoperatively. We used fentanyl as an additive with the goal of prolonging the duration of analgesia and also observed its effect on the onset of lid akinesia, onset of globe akinesia and the onset of sensory blockade. We found that the demographic parameters were comparable and statistically insignificant ( $P > 0.05$ ). The preoperative hemodynamic parameters like the systolic and diastolic blood pressure, pulse rate,  $SpO_2$ , respiratory rate were statistically insignificant ( $P > 0.05$ ). The mean onset of lid akinesia was  $5.8 \pm 1.76$  mins and  $3.13 \pm 1.25$  mins in Group S and Group F respectively. The mean onset of globe akinesia was found to be  $7.46 \pm 2.22$  mins and  $4.2 \pm 1.60$  mins in Group S and Group F respectively. The mean onset of sensory blockade was  $6.8 \pm 1.24$  mins and  $4.93 \pm 1.63$  mins in Group S and Groups F respectively. Thus the onset of globe and lid akinesia and the onset of sensory blockade was faster in Group F compared to Group S. The intraoperative and postoperative hemodynamic parameters of systolic and diastolic blood pressure, pulse rate,  $SpO_2$ , respiratory rate were comparable in both the groups found to be statistically insignificant with P-value  $> 0.05$ . The mean VAS scores were statistically significant between both the groups at 1 hour, 1.5 hour, 2 hour, 4 hour, 6 hour postoperatively and it was found that Group F has a lower VAS score when compared with Group S. The VAS score at 8 hour and 10 hours postoperatively were statistically insignificant in both the groups. The sedation score as per the Ramsay sedation score was consistently found to be 2 among all the patients in both the group. The mean duration of analgesia was  $4.56 \pm 1.65$  hours in Group S and  $7.63 \pm 2.55$  hours in Group F and was found to be statistically significant ( $P < 0.001$ ).

### CONCLUSION:

Based on this study, we can conclude that there is a faster onset in the lid akinesia, globe akinesia, in the onset of sensory blockade and a substantial increase in the duration of analgesia when fentanyl is used as an additive along with the local anesthetic mixture in peribulbar block for cataract surgery.

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