MATERIAL AND METHODS
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The present study was undertaken in the Department of Ophthalmology, M.L.B. Medical College and Hospital, Jhansi during the period of October 2001 to January 2003.

SELECTION OF CASES

The cases for this study were selected from the indoor patients of M.L.B. Medical College and Hospital, Jhansi. The patients selected were those requiring surgery for age-related cataract. *(Age-related cataract was taken as lenticular opacities occurring in people 40 years and above without any evident cause).* All cases were subjected to routine pre-operative evaluation.

The exclusion criteria were –

- Patients with documented allergies to lignocaine hydrochloride.
- Patients with profound cognitive impairments who were unable to give informed consent.
- Patients with uncontrolled diabetes and hypertension.
- Patients with raised IOP.

STUDY DESIGN

After a written informed consent the 210 patients included in the study were randomly divided into 3 groups of 70 each.

Group 1 Subjects received 8 ml of 2% lignocaine with adrenaline + 50 IU/ml Hyaluronidase (pH = 3.45)
Group 2  Subjects received 8 ml of an alkanized solution of 2% lignocaine with adrenaline (pH = 6.5)

Group 3  Subjects received an alkanized solution of 2% lignocaine with adrenaline + 50 IU/ml Hyaluronidase (pH = 6.5)

Each solution was freshly prepared prior to injection and the pH determined by a digital pH meter. Alkalinization was done by adding the required amount of sodium bicarbonate 7.5% (wt/vol) to 2% lignocaine hydrochloride with 1:200000 adrenaline solution.

All blocks were performed by one person, who was unaware of the nature of mixture selected for use.

**Technique of Peribulbar Block:**

With the eye in primary gaze superior and inferior injections of 5 ml and 3 ml respectively are given with a 1 inch, 24 gauge needle.

The inferior injection was given at the junction of the outer one third and inner two thirds of the lower orbital rim. The needle was directed away from the eye and towards the floor of the orbit with the eye in primary gaze. The superior injection was given in the superonasal quadrant, nearer to the medial canthus. Both injections were placed outside the muscle cone. After the injections, each patient received digital massage over the eyelids with gauze, all by one person only. Extraocular muscle movement was evaluated in each quadrant at 2 minute intervals for 15 minutes. A block was considered
REQUIREMENTS FOR PERIBULBAR BLOCK
satisfactory when akinesia occurred. Supplement injection in the form of retro-bulbar block was given with the same mixture after 15 minutes in cases with persistent eye movement.

**Parameters assessed include** –

- **Time to onset of akinesia:**
  It is the time taken for total/adequate akinesia. This is measured from the time of injection till total or adequate (movement of less than 1 mm in any direction) akinesia occurs, to proceed for safe surgery. This includes akinesia of eyeball as well as of the lids. Following the peribulbar injection akinesia of the eyelids and globe is checked for every 2 minutes for 15 minutes. This is done by asking the patient to move the eyeball in various directions and to squeeze the eyes voluntarily.

- **Residual movements:**
  At the end of 15 minutes each patient was asked to move the eyeball in all the directions and if movement is there in any particular direction it is noted.

- **Supplementary Anaesthesia required:**
  If there was significant movement of the eyeball at the end of 15 minutes, the peribulbar block was supplemented with a retrobulbar injection with the same mixture. Such cases were noted.

- **Duration of Akinesia and Anaesthesia:**
  This is taken from the time of achievement of akinesia and anaesthesia till the completion of surgery or wearing-off of
anaesthesia or akinesia whichever is earlier of the two. The sign of wearing-off of akinesia is so much movement of the eyeball in any direction that it required supplemental injection and sign of wearing-off of anaesthesia is taken by the complaining of pain by the patient.

**Post Injection Thrust During Surgery:**
(Subjective to the Surgeon)
Thrust is the pressure applied by the vitreous as well as retro-orbital tissues on the anterior chamber of the eye when the eye has been opened for surgery. This is not synonymous with intraocular pressure since it has been seen that even though intraocular pressure may be low preoperatively, on opening the anterior chamber there is thrust of the vitreous. This is seen when too much (usually 10 ml) of anaesthetic solution has been deposited in the periorbital space or there is retrobulbar haemorrhage. Thrust was recorded as no thrust, minimal, moderate and a substantial thrust leading to difficulty in operation.

**Conjunctival Chemosis:**
This is more commonly observed after peribulbar injection due to more solution deposited. This was recorded as no chemosis, mild chemosis, i.e. chemosis in one quadrant, moderate = 2 quadrants, severe = >2 quadrants.
Lid Edema:

Edema of the lids following the peribulbar injection was taken note of as this may result in difficulty in opening of the palpebral aperture and consequently a pressure on the eye ball.

Pulse and BP:

This were monitored pre-operatively and 10 minutes after injection of the peribulbar block.

Post-operative Subjective Onset of Pain:

This is a subjective feeling and is assessed by asking the patient at 30 minute intervals for the initial 2 hours following surgery, whether he feels pain or not.