SUMMARY

A properly conducted regional technique is not only economical by it also provides good operative conditions and there is virtually no disturbance in various organ systems. On the contrary, role of regional anaesthesia in clinical practice is limited by the capabilities of the local anaesthetic drugs. Two practical disadvantages inherent with the agents currently available are, firstly, the drugs take a considerable time to work and secondly duration of anaesthesia is limited which may be inadequate for protracted operations.

Various pharmacological as well as technical advances have been advocated to increase the potency, quality, and to reduce toxicity of the local anaesthetic agents.

Bromage P.R. et al (1967) demonstrated improved quality of block when carbon dioxide enriched local anaesthetic was injected epidurally, and concluded that this was not due to greater concentration of anaesthetic cation at the nerve axon but due to direct stabilizing effect of carbon dioxide on excitable tissues.

Zahl K. et al (1989) undertook a prospective, double masked, randomized study to see if a pH adjusted mixture of lidocaine, bupivcaine and hyaluronidase had faster and more complete onset of neural blockade, when used for peribulbar anaesthesia. The authors concluded that pH adjustment of solutions of lidocaine / bupivacaine / hyaluronidase, with or without epinephrine improved the onset time of peribulbar anesthesia.
Roberts JE, Macleod BA and Holands RH (1993) carried out a double blind study to determine the effect of pH and the addition of hyaluronidase to a mixture of lignocaine and bupivacine on the efficacy of peribulbar anaesthesia. The solution containing hyaluronidase with pH adjusted to 6.7 was found to be the most effective. Presence of hyaluronidase without alkalization did not improve the efficacy and similarly, alkalization in the absence of hyaluronidase was ineffective.

Observations of different researches inspired us to conduct the study to evaluate the effect of alkalization and/or hyaluronidase with lignocaine hydrochloride + adrenaline on peribulbar block.

The present study was conducted on 210 patients ranging from 40 – 82 years of age and either sex; all with age–related cataract. The cases were randomly allocated into there groups of 70 each according to the drug they received.

Group 1- Subjects were given 8 ml of 2% lignocaine hydrochloride with adrenaline + 50IU / ml Hyaluronidase (PH= 3.45)

Group 2 - Subjects were given 8 ml of alkalinized solution of 2% lignocaine hydrochloride with adrenaline (pH= 6.5)

Group 3 – Subjects were given 8 ml of alkalinized solution of 2% lignocaine hydrochloride with adrenaline + 50IU/ml Hyaluronidase (pH=6.5)

Each solution was freshly prepared and the pH determined by a digital pH – meter. All blocks were performed by one person, who was unaware of the nature of mixture selected for use.
Superior and inferior injections of 5 ml and 3 ml respectively are given with a 1 inch, 24 gauge needle the parameters recorded were:

- Time to onset of 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.

- Residual movement: At the end of 15 minutes each patients was asked to move the eyeball in all the directions and movement in any direction was noted.

- Supplementary Anaesthesia required: significant movement of the eyeball at the end of 15 minutes 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 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.
Conjunction chemosis: This is more commonly observed after peribulbar injection due to more solution deposited.

Lid Edema: Edema of lids following the peribulbar injection was taken note of.

Post – operative subjective onset of pain: This is a subjective feeling and is assessed by asking the patient at 30 minutes intervals for the 2 hours following surgery whether is feels pain or not.

Pulse and BP of each patient was recorded pre-operatively and 10 minutes after injection of the peribulbar block.

On completion of the study and after analysis of the observed data it was concluded that.

Raising the pH of 2% lignocaine hydrochloride with adrenaline and hyaluronidase solution from 3.45 to 6.5 produced a definite reduction in the onset of akinesia.

Alkalinized lignocaine hydrochloride with adrenaline alone or lignocaine hydrochloride with adrenaline and hyaluronidase without alkalination were not as effective as a solution containing alkalinized lignocaine hydrochloride with adrenaline and hyaluronidase.

The duration of bock was comparable in all 3 groups.

More cases achieved complete akinesia in the alkalinized lignocaine hydrochloride with adrenaline + hyaluronidase group.
Alkalized lignocaine hydrochloride with adrenaline + hyaluronidase was more efficacious than the other two solutions. Therefore need for supplement injections was reduced in this group.

Vertical movements were the first to go; medial movement was the last to go.

Alkalized lignocaine hydrochloride with adrenaline solution, without hyaluronidase resulted in lid edema and conjunctival chemosis.

All solutions had comparable systemic safety profiles.

Therefore alkalized lignocaine hyaluronidase solution is found to be superior to the other two solutions. A solution as efficacious as this minimizes the likelihood of supplementary injections, thereby preventing the added risk with each prick. Alkalination is safe as no untoward systemic side effects were noted.

Also hyaluronidase can be used more effectively if the solution is alkalinized to near physiologic pH. Hyaluronidase can be excluded from the injectate avoiding its rare allergic complications, if the solution is not being alkalinized.