



DR JYOTI'S BANDAGE TECHNIQUE FOR CAPSULORHEXIS IN MATURE AND HYPERMATURE CATARACT DURING PHACOEMULSIFICATION

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ABSTRACT

We describe a novel technique known as “Dr Jyoti’s Bandage Technique” for capsulorhexis in mature and hypermature cataract during phacoemulsification. The technique is simple and easy to learn and highly effective in preventing the very well known and dreaded complication of sudden capsular tear also known as ARGENTINIAN FLAG SIGN. This technique is highly effective in preventing the anterior capsular tear due to sudden capsular tear and thereby ensuring good surgical outcome whatever be the grade of cataract.

KEYWORDS: Dr Jyoti’s Bandage technique, Hypermature cataract, increased intralenticular pressure.

INTRODUCTION

Mature and hypermature^[4] cataracts pose multiple challenges during phacoemulsification. Difficulty in doing capsulorhexis leading to sudden rhexis run-off causing tear (Argentinian flag sign)^[7] is one of the major complication during surgery. A number of techniques have been described for capsulorhexis. This new technique which is easy to perform has proved to be successful in avoiding this dreaded complication during capsulorhexis. This technique has been used in 61 cases with very encouraging results. It is called **Dr Jyoti’s bandage technique** for capsulorhexis in mature and hypermature cataract.

MATERIALS AND METHODS

61 Cases Of Mature And Hypermature cataract cases were included in the study where 35 eyes of females and 26 eyes of males from age group 54 yrs to 87 yrs.

Inclusion criteria

Mature and hypermature intumescent cataract with nucleus grade ranging from 4 to 5 were included in the study.

Exclusion criteria

Previous ocular surgery, any other ocular pathology, one eyed patients, severe physical deformity where lying down on OT table was not possible for patients, psychiatric patients were excluded.

Anaesthesia

Peribulbar anaesthesia with lignocaine and bupivacaine was given to all patients preoperatively.

SURGICAL TECHNIQUE

After cleaning and draping, self retaining speculum applied, sideport entry made with 15 degree sideport keratome and air bubble introduced in anterior chamber. Staining was done with trypan blue^[1] followed by anterior chamber wash.

The anterior chamber was filled with high viscosity visco-elastic substance like Sodium hyaluronate 1.4 % thus deepening the anterior chamber and flattening the anterior capsule. The anterior capsule was punctured with 26 gauge cystotome, the gush of whitish cortical matter^[2] was aspirated with hydro-dissection canula, and the intralenticular pressure was reduced.

Subsequently the capsulorhexis was completed with with 26 gauge cystotome. The rest of the Phacoemulsification^[5,6] was completed with stop and chop technique and foldable PCIOL implanted.

The viscoelastic substance was washed and the wound sealed with corneal hydration thus completing the phacoemulsification surgery.

RESULTS

In all the 61 eyes, not a single case developed capsular tear and argentinian flag sign was avoided. Due to this technique, the post op results were very gratifying and no complication occurred. 95% operated eyes had BCVA OF 6/6 and 4% had bcva6/6 (p) and one had 6/9.



Figure 1 (a) argentinian flag sign.



Figure 1 (b) Flag of Argentina.



Figure 2. Hypermature intumescent cataract.

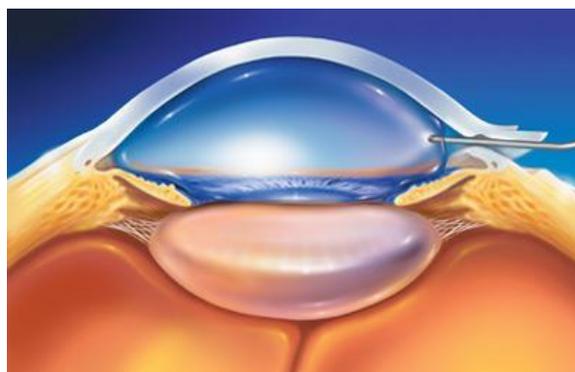


Figure 3. Flattening of anterior chamber using cohesive visco-elastic.

DISCUSSION

Argentinian flag sign^[7] is defined as a sudden capsular tear occurring in intumescent cataract^[3] during capsulorhexis and usually occurs in mature and hypermature cataract when the intralenticular pressure is very high.

Viscoelastic substances are used in cataract surgery to maintain the anterior chamber and to protect the endothelium from damage during. The dispersive viscoelastic spreads and hence protects the endothelium. The cohesive viscoelastic substance has a higher molecular weight and longer chains and maintains the space in ac. Due to its viscosity the cohesive ovd does not escape easily from AC. Cohesive OVDs: they are high-viscosity materials with intramolecular adhesion and entanglement that are particularly useful to create and maintain space in the anterior chamber for a long time. Cohesive OVDs form as a mass and they are easier to be removed as a kind of bolus at the end of the surgical procedure.

Dispersive OVDs: they are low-viscosity materials with good adherence properties to intraocular structures and instruments, providing special protection to the corneal endothelium during phacoemulsification. However, they are more fragile as a result of their short molecular chains and consequently are more difficult to be removed after finishing surgery. This may result in postoperative OVD residues in the anterior chamber, which can lead to an increase of intraocular pressure (IOP).

Bandage is an external device which prevents mobility of damaged tissue. In soft tissue injuries it prevents further damage and helps in preventing the tear.

The technique described here is called Dr Jyoti's bandage dual technique of capsulorhexis.

The high viscosity visco elastic substance injected into the anterior chamber acts as a pressure bandage and helps in flattening the anterior capsule. When the anterior capsule is punctured with 26 gauge cystotome, due to the presence cohesive ovd, the sudden deturgence is prevented. This is followed by quick aspiration of the liquefied cortical matter and the intralenticular pressure is reduced.

After this step the rest of the capsulorhexis is completed by the usual technique depending on surgeon's preference.

The rest of the phacoemulsification and PCIOL implantation are as usual.

It is a well known fact that sudden decrease of pressure in a pressurized container can cause blast. Like in a balloon filled with water or air, the rubber is stretched and the polymer chains are under a lot of tension. Every

point on the surface is being uniformly pulled in all directions by surrounding rubber molecules keeping the ballon stretched out. The moment tiny hole appears, the rubber around the hole is no longer being pulled with equal force in all directions. This causes a net force away from the hole and thereby tearing the rubber in a direction opposite to the hole. The whole process happens very fast in less than a second.

The same principle applies to the capsule of an intumescent lens where the intralenticular pressure is high. The capsule is made up of collagen type 4 and elastin. When the intra-lenticular pressure increases, the elastin fibres are under tremendous pressure. The moment the capsule is nicked with 26 g capsulotomy needle, the tension on the surface at the site of nick is less than the surrounding capsule and the hole enlarges till the tension on the capsular elastin is reduced causing a sudden tear (Argentinian flag sign).

By introducing the high viscosity viscoelastic substance, there is flattening of the anterior capsule, and distribution of intra-lenticular liquefied cortex to the equatorial region which is thicker than anterior capsule. When the cystotome is used to make the initial nick, the sudden tearing of capsule does not occur due to the bandage like effect of cohesive viscoelastic substance.

The next step involves the aspiration of liquefied cortex leaking out of the hole and the intralenticular pressure is further reduced. The rest of the capsulorhexis can be completed by the surgeon as per his or her convenience.

DR JYOTI'S BANDAGE TECHNIQUE uses the basic principles of physics like displacement and bandaging to prevent sudden decrease in pressure.

The biggest advantage is the ease of execution, not much learning curve is present. There are several techniques described like spiral capsulorhexis, puncho-rhexis using phaco tip, but all techniques require a very fast surgeon and still they may have instances of capsular tear if the intra-lenticular pressure is high. In our institute, we have reported a zero incidence of argentinian flag sign.

CONCLUSION

A very simple method of preventing sudden capsular tear during capsulorhexis has been discovered by the author. A larger patient base from multiple centres can be repeated so that it can be adapted as a norm.

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