

Nuclear management in manual small incision cataract surgery by snare technique

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Manual small incision cataract surgery has evolved into a popular method of cataract surgery in India. However, in supra hard cataract, bringing out the whole nucleus through the sclerocorneal flap valve incision becomes difficult. A bigger incision required in such cataracts loses its value action, as the internal incision and corneal valve slips beyond the limbus into sclera. Struggling with the supra hard cataracts through a regular small incision. Phaco fracture in the anterior chamber becomes a useful option in these cases. In the snare technique, a stainless steel wire loop when lassoed around the nucleus in the anterior chamber constricts from the equator, easily dividing the hardest of the nuclei into two halves. The wire loop constricts in a controlled way when the second cannula of snare is pulled. The divided halves can easily be brought out by serrated crocodile forceps. This nuclear management can be safely performed through a smaller sclerocorneal flap valve incision where the corneal valve action is retained within the limbus without sutures, and the endothelium or the incision is not disturbed. However, the technique requires space in the anterior chamber to maneuver the wire loop and anterior chamber depth more than 2.5 mm is recommended. Much evidence to this wonderful technique is not available in literature, as its popularity grew through live surgical workshops and small interactive conferences.

Key words: Manual small incision cataract surgery, supra hard cataract, wire loop vectis, snare technique

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Keener in 1983 was the first to snare the nucleus into two halves and bring the fragments out through a sclerocorneal flap valve incision.^[1] This alternative to phacoemulsification gave virtually a sutureless incision. As phacoemulsification became more acceptable over the open chamber extra capsular cataract surgery; the alternative methods of manual small incision cataract surgery also started gaining ground.^[2] Phacoemulsification is difficult in hard brown cataracts and not friendly to the corneal endothelium.^[3] In manual small incision cataract surgery, bringing hard cataracts out through a 6.5-mm incision with other alternative techniques is again rigorous and can cause damage to the cornea. A bigger incision requires extending the corneal valve beyond the limbus, which results in loss of the valve action. There is renewed interest in phaco fracture techniques, especially in India, where hard brown cataracts are frequently encountered. Phaco fracture with the bisector, trisector, or a second instrument has its followers, but the problem of accommodating two instruments in the anterior chamber requires skillful negotiation, and fracturing hard cataracts is again difficult.^[4,5] The wire loop stainless steel snare is a single instrument with two cannulas with the wire loop in the tip of the first cannula. While pulling the second cannula, the wire loop constricts. When the wire loop is lassoed around the nucleus and constricted, it divides the hardest

of nuclei into two. The aim of this article is to describe the technique of nucleus management by snare in manual small incision cataract surgery.

Technique

The surgery is performed under peribulbar or topical anesthesia with intracameral lignocaine. A standard 6.5-mm sclerocorneal tunnel flap valve incision is made. The extensive scleral pockets are not required in this phaco fracture technique. The external incision is made 1.5 mm behind the limbus. If the incision is made beyond 1.5 mm, then negotiating the wire loop into the anterior chamber becomes difficult [Fig. 1]. A big, round, centric 6.5-mm capsulorrhexis is performed, and the nucleus is hydrodissected and prolapsed into the anterior chamber. A viscoelastic substance (VES) is injected above and below the nucleus. The first cannula with the wire loop is held in the right hand and the globe is fixed using forceps with the other hand. The wire loop is passed into the anterior chamber between the nucleus and the cornea [Fig. 1]. Once the loop of the snare crosses the equator of the nucleus at 6 O'clock position, the snare is rotated backwards vertically to lasso around the nucleus [Fig. 2]. If this movement is done before the loop has negotiated the 6 O'clock nucleus, then both the loops will be in front of the nucleus, and the anterior wire loop will touch the endothelium. Now, the hands are changed, and tip of the first cannula is held in the left hand, which supports the upper equator of the nucleus, and the second cannula is held in the right hand, which is pulled to constrict the snare loop. The snare cuts the nucleus into two [Fig. 3] halves. The wire loop neither touches the endothelium nor does it disturb the posterior capsule (PC) if the dimensions of the loop are 11 mm × 5 mm, where 11 mm accommodates the diameter of the nucleus and

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Figure 1: Negotiation of the snare into the anterior chamber



Figure 2: Rotating the loop around the nucleus after crossing the equator



Figure 3: Snare cutting through the nucleus



Figure 4: Viscoelastic substance injected into the cut to facilitate easy separation



Figure 5: Removal of nucleus fragment with appropriate forceps along with depression of the posterior lip of the wound



Figure 6: Ready-to-use snare

length of the tunnel and 5 mm accommodates the thickness of the nucleus in the anterior chamber. The wire loop is now withdrawn, and the cut fragments may be waxed together.

Viscoelastic substance (VES) is injected in the central furrow facilitating easy separation [Fig. 4]. The fragments are held by stout angled serrated forceps and removed by depressing

the posterior lip of the incision [Fig. 5]. The nucleus may be snared twice into three pieces; however, this does not effectively shorten the incision size, as the diameter of the wire loop must be 5 mm wide to accommodate the thickness of the nucleus. During the introduction of the wire loop, undue pressure on the posterior lip of the incision causes inadvertent escape of VES protection from the anterior chamber, and the loop may touch the endothelium. If the diameter of the wire loop is smaller than the thickness of the nucleus, then it is difficult to rotate the loop around the nucleus, and undue forces may cause zonular dehiscence. If the wire loop diameter is too big in relation to the thickness of the nucleus and the anterior chamber depth, then the posterior loop may cause posterior capsule (PC) rent or iridodialysis, and the anterior loop may cause corneal endothelial damage.

Wire Loop Preparation

Two blunt tip 18 gauge cannulae are taken. Alternatively 20 gauge intravenous needles can also be used in which the sharp tip can be blunted by rubbing the tip on a sand stone. The side metal of the first cannula is rubbed on the sand stone 2 mm from the tip until a round opening is achieved. Now the side metal of the cannula on the other side, 2 mm from the tip is again rubbed to create a second opening opposite the first one. The A1 guitar string or 32 gauge stainless steel wire is taken and inserted through one opening of the cannula. The other end of the wire is threaded through the second opening. A loop of 11 mm × 5 mm is achieved at the tip of the first cannula, and the two free ends of the wire come out of the hub. The free ends of the wire are threaded through the second cannula and brought out through the hub. The second cannula is pinched in two or three places by pliers so that the wire is gripped by the cannula. Now when the second cannula is pulled, the wire loop in front of the first cannula constricts. The snare is now ready for use [Fig. 6]. However, this is a disposable instrument as the wire may break during use or loosen its shape after one snare.

Discussion

Manual small incision cataract surgery has become a popular method of cataract surgery in India. The safety of sutureless stable closed chamber during the operation and in the postoperative period contributes to this popularity. Hard brown cataracts can be 8 mm in diameter and 4.5 mm thick. Delivering such a supra hard nucleus as a whole through a 6–7.5-mm incision can damage the endothelium and the incision. However, in a bigger incision, the internal incision slips beyond the limbus into the sclera and the corneal valve action is lost. The incisional integrity has to be regained with sutures. To deliver a hard big nucleus, phaco fracture is a useful

alternative. This technique as described is not a method to bring down the incision size as the wire loop must be 5 mm broad and 11 mm long to accommodate the thickness and the diameter of the hard nucleus. Careful negotiation must be done to prevent the escape of VES from the anterior chamber during the introduction of the wire loop, which is best done by keeping the eye slightly downwards and not inadvertently pressing the posterior lip with the wire loop. The wire loop should be turned around to lasso the nucleus only when the loop crosses the lower equator or else the anterior wire loop damages the endothelium. The wire loop can only be lassoed around the nucleus if its dimension (11 mm × 5 mm) is greater than the dimension of the nucleus. If the external incision is beyond 1.5 mm from limbus, these negotiations become difficult. Similarly, if the anterior chamber depth is <2.5 mm, enough room to maneuver the wire loop in the anterior chamber is not available. This technique is unnecessary in regular or soft cataracts that cannot be effectively snared and tend to crumble when an attempt is made to bring out the fractured fragments with the forceps. This technique, with its limitation, is a very good approach to supra hard cataract management with adequate anterior chamber depth without the use of ultrasound (the requirement of which may be excessive in such cases). The technique reduces the incidence of striate keratopathy in the immediate postoperative period and can be performed through a regular 6.5-mm sclero corneal flap valve incision without damage to the endothelium and the incision.

References

1. Keener GT. The nucleus division technique for small incision cataract extraction. In: Rozakis GW, editor. *Cataract Surgery: Alternative small incision Techniques*. 1sted. New Delhi: Jaypee Brothers; 1995. p. 163-91.
2. Kimura H, Kuroda S, Mozoguchi N, Terauchi H, Matsumura M, Nagata M. Extracapsular cataract extraction with a suture less incision for dense cataracts. *J Cataract Refract Surg* 1999; 25:1275-9.
3. Singh R, Vasavada AR, Janaswamy G. Phacoemulsification of brunescient and black cataracts. *J Cataract Refract Surg* 2001;27:1762-9.
4. Fry LL. The phacosandwich technique. In: Rozakis GW, editor. *Cataract surgery: Alternative Small Incision Techniques*. 1sted. New Delhi: Jaypee Brothers; 1995. p. 71-110.
5. Kanas P. Phaco fracture. In: Rozakis GW, editor. *Cataract surgery: Alternative Small Incision Techniques*. 1sted. New Delhi: Jaypee Brothers; 1995. p. 45-70.

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