Abstract

**Aim:** To describe a new, low-cost, easy prolene snare technique for nuclear management in manual SICS.

**Materials:** 3-0 sterile prolene suture, 18 g disposable cannula.

**Method:** Snare prepared on the table by threading both ends of suture through the tip of cannula to emerge at the hub. Pulling the ends of suture at the hub will constrict and pushing will dilate the loop at the tip of cannula. Through a 3mm sclerocorneal tunnel, the constricted prolene loop at the tip of cannula is introduced into Anterior Chamber (once nucleus is prolapsed into AC). Now loop is enlarged by pushing the threads through the hub and passed further into AC between the nucleus and cornea to reach the equator of nucleus at 6 o’clock position and is rotated backwards vertically to lasso around the nucleus. Now, hub-end prolene threads are pulled to constrict the snare loop to cut the nucleus into 2 halves.

**Result:** Hand nuclei can be easily cut and removed through 3mm incision without endothelial damage. Post operative visual outcome is comparable to phacoemulsification procedures.

Introduction

Management of hard cataract is difficult through a small incision. Corneal endothelial damage, decompensation and injury to the tunnel are the problems. A bigger incision or conversion to ECCE becomes necessary for such cases. A bigger tunnel has no valve action, so suturing becomes necessary and post-operative astigmatism is more. Useful options in these cases are: Phacofracture, Akahoshi’s prechop Phacoemulsification and Snare techniques. But each technique has its own limitations. The original snare technique was described by Gerald T Keener in 1983. The procedure is easy but the metallic snare causes endothelial damage and posterior capsular rent (PC rent). This technique does not bring down the incision size.

So we thought of a size-adjustable snare that can be introduced through a smaller incision and can be enlarged in the anterior chamber to accommodate the nucleus. It must be a soft pliable material that will not disturb the endothelium or posterior capsule and at the same time sharp and taut enough to cut the hard nucleus easily. It must be cost effective.

**Aim:** To describe a new, low cost, easy and instant prolene snare technique for nuclear management in hard cataracts through a 3 mm incision.

**Materials and Methods:**

Materials used:

18G Cannula(Rs.1/-), 3-0 Prolene suture(Rs.90/-)

Snare Preparation: Snare is prepared on the table using sterile 18G cannula (made from 18G needle after removing its sharp tip) and a sterile 3-0 prolene suture. 3-0 prolene suture can be cut into 3 pieces of 15-20cm length and 3 snares can be made (Effective cost Rs.30/-). The 2 ends of one piece of prolene are threaded through the tip of 18G cannula to emerge at the hub. The ‘hub end’ sutures are tied to each other which ensures a firm grip for smooth pulling of snare. The prolene loop at the tip of cannula is the snare, size of which can be adjusted easily by pulling or pushing the tied ends at the hub.

![Figure 1: Prolene Snare Preparation](image1)

![Figure 2](image2)
A 3mm sclerocorneal tunnel is made 1.5mm behind the limbus. After anterior capsulotomy and hydro procedures, nucleus is prolapsed into anterior chamber (AC). Adequate viscoelastic substance is injected above and below the nucleus.

The prolene loop in its miniature size is introduced into AC through the tunnel (Figure 2). Now, loop is enlarged and passed between the cornea and nucleus by pushing the ‘hub end’ prolene. Once the loop crosses the equator of the nucleus at 6o clock position, snare is rotated backwards vertically to lasso around the nucleus (Figure 3). Now pull the ‘hub end’ prolene to constrict the loop, thereby cutting the nucleus into 2 halves (Figure 4). The nucleus may be snared into 3 or 4 pieces. They are separated by injecting viscoelastic into the cut. The nuclear fragments are removed with a serrated forceps or using 2 sinskey hooks held parallel on either side. AC is washed and foldable IOL implanted.

42 cases of uncomplicated nuclear cataract underwent SICS by this method. We analyzed these cases retrospectively. We specifically looked for complications like DM stripping, PC rent and corneal endothelial decompensation. Post-operative astigmatism and final visual outcome 3 months after surgery assessed. Results compared with that of standard SICS and phacoemulsification procedures.

**Result**

42 eyes of 42 patients (22 males and 20 females) with mean age of 66.10 years (range 59 to 82) underwent SICS with prolene snare method through 3mm superior sclerocorneal incision from December 2009 to April 2010 in our institution. Among these 22 patients (52%) were having NS grade 3, 15 patients (35%) grade 4 & 5 patients (11%) grade 5. Intraoperative and post-operative complications encountered were PC rent in one case (2.38%), mild striate keratopathy (SK) in 14 eyes (33%) and, moderate SK in one case (2.38%). Post-operative astigmatism over preoperative assessment ranged from 0.75 +/- 0.75 Dcyl. None of the cases showed Descemets membrane (DM) stripping, corneal endothelial decompensation, hyphaema, post-operative uveitis or post-operative endophthalmitis. Final visual outcome for all cases were satisfactory with visual acuity range from 6/12 to 6/6.

**Table-1 Complications encountered (N=42)**

<table>
<thead>
<tr>
<th>Complications</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM stripping</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PC rent</td>
<td>1</td>
<td>2.38</td>
</tr>
<tr>
<td>Mild striate keratitis (SK-1)</td>
<td>14</td>
<td>33.33</td>
</tr>
<tr>
<td>Moderate striate keratitis (SK-2)</td>
<td>1</td>
<td>2.38</td>
</tr>
<tr>
<td>Corneal decompensation</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Post-operative astigmatism above 1.5Dcyl</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Discussion**

This study shows our technique of adjustable prolene snare is a safe and easy method for extraction of hard nucleus through a smaller incision. According to the American Academy of Ophthalmology the proportion of eyes experiencing PC rent and vitreous loss during cataract extraction varies between 1.3% in European cataract outcome study and 4.4% in UK survey. That in metallic snare is 6.67%. In our study, occurrence of PC rent was 2.38%. Mild corneal endothelial damage leading to SK is a well accepted innocuous complication of cataract surgery. In our study, mild SK occurred in 33.33% of eyes which very well cleared in 3 days. Moderate SK occurred in one case of grade 5 cataract (2.38%) which is less than that of phacoemulsification, where it is 5.7%. Corneal endothelial decompensation is a well known but rare complication of all types of cataract surgery. The overall incidence is less than 1%. In our series, it is 0%. In one study, the post-operative astigmatism 90 days after
routine SICS through superior incision is 1.92+/- 0.53D and for phacoemulsification through scleral pocket showed 1.23 +/- 0.71D. In another study, keratometric corneal astigmatic power after phacoemulsification through superior scleral tunnel incision after 3 months is 0.94+/- 0.27. In our experience, the change was 0.75+/-0.75Dcyl which is very much comparable to Phaco through superior scleral tunnel incision. This may be attributed to the smaller incision size.

The metallic snare technique does not bring down the incision size as the wire loop must be 5mm broad and 11mm long to accommodate for the thickness and diameter of hard nucleus. It can damage the endothelium, PC and iris. In a study of non-Phaco SICS reducing the incision size using manual nucleus division technique (metallic wire snare or bisector), the intra-operative complications in the metallic wire snare technique were PC rent in 6.67%, DM stripping in 3.33%, hyphaema in 3.33%, moderate SK in 10% and uveitis in 6.67%. It is very cumbersome to prepare metallic wire loop snare and is a disposable instrument as the metallic wire loses its shape after one use.

With the help of prolene snare, incision size can be decreased as it can be easily manipulated to desired size. Prolene snare is easily prepared instantly on the table and can be reused after autoclaving as this does not impair the memory or consistency of prolene. Prolene is a smooth, pliable material which will not disturb the endothelium and posterior capsule. Prolene snare being less expensive and effective can be widely used in developing countries. This technique has the potential for use even in large scale cataract surgery camps and in peripheral centers.

This technique may not be suitable for people with shallow Anterior Chamber. Excessive manipulation even with prolene snare can damage the corneal endothelium. So it is better avoided in cases of poor endothelial count

**Conclusion**

Instant adjustable size prolene snare is a simple technique for management of hard cataract. A small 3mm incision with good post-operative visual outcome comparable to phacoemulsification with no added complications is its advantage. Our encouraging preliminary findings need further replication.

**Reference**