Intratunnel Phacofracture: A New Nucleus Management Technique of MSICS

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Abstract
The most commonly practiced MSICS techniques are Blumenthal, visco-expression, irrigating wire vectis and fish hook needle. These techniques require a 7 to 9 mm large incision, which leads to more astigmatism. Intratunnel phaco fracture is a new technique innovated by us, where the lens nucleus is broken inside the sub 6 mm sclerocorneal tunnel. We are going to demonstrate this technique in this article.

Keywords: MSICS; Intratunnel; Phacofracture

Introduction
The cataract remains the leading cause of avoidable blindness in the world. According to the latest assessment, cataract is responsible for 51% of world blindness, which represents about 20 million people (2010). Although cataracts can be surgically removed, in many countries barriers exist that prevent patients to access surgery. Manual small incision cataract surgery (MSICS) and phacoemulsification are the most popular methods of cataract extraction today. MSICS is significantly faster, less expensive and less technology-dependent than phacoemulsification. MSICS has been extensively practiced in developing countries like India. Intratunnel phaco fracture is a new nucleus management technique, where the lens nucleus is broken inside the sub 6 mm sclerocorneal tunnel and removed in contrast to other contemporary techniques. This is our original technique.

Intratunnel Phacofracture Technique
Intratunnel phaco fracture nucleus management technique was first described by author [1]. It’s a simple, inexpensive reproducible technique. Per case consumable expenditure of cataract extraction using this technique is given in Table 1.

First postoperative day visual outcome of 6 mm intratunnel phacofracture is given in Tables 2 and 3.


The mean uncorrected visual acuity and mean best corrected visual acuity at first post operative day were 0.367 (Snellen equivalent 20/46) and 0.226(Snellen equivalent 20/33) log MAR units respectively. No serious per and post-operative complication encountered [1].

Anesthesia
Manual small incision can be done performed under peribulbar or topical anesthesia.

Site of Incision
Site of incision is chosen according keratometry values (K1 and K2). The superotemporal quadrant for right eye and the superonasal quadrant for left eye should be chosen if K1 and K2 difference is equal or less than 1.0 diopter (Figure 1). If K1 and K2 difference is more than 1.0 diopter then incision should be on steeper axis made. If K1 is steeper than K2 then superior incision (Figure 2) and If K2 is steeper than K1 then temporal incision (Figure 3).

Surgical Steps
Cleaning and draping
The skin of the eyelids, lid margins and around the eye is cleaned with 10 percent solution of povidone-iodine solution. Drape is applied. Wire speculum is placed. Cul de sac is thoroughly washed with Ringer’s lactate solution or balanced salt solution.

Superior Rectus Bridle Suture
A 4/0 silk superior rectus bridle suture is placed beneath the tendon of the superior rectus muscle. It is helpful to positioning...
the scleral tunnel with a 15 degree knife temporally in right eye and nasally in left eye. With a 2.8 mm keratome, the anterior chamber was entered 1.5 mm into the clear cornea. Anterior chamber is entered with 1.5 mm in clear cornea with help of 3.2 mm keratome (Figure 6). The hydroxyl propyl methyl cellulose 2 % (HPMC) viscoelastics is injected into anterior chamber.

Central Circular Capsulorhexis

The central circular capsulorhexis is made with help of 26 gauze needle capsulotome. If glow is poor then capsule was stained with trypan blue dye under the air bubble. Then viscoelastics is injected and capsulorhexis is made. The size of capsulorhexis is depends on the size of the nucleus .It may vary from 5.5 mm to 7.5 mm (Figure 7). If nucleus size was anticipated large then two

Conjunctival Flap

A fornix based conjunctival flap at the limbus with a chord length of approximately 6.5 mm was made. After careful dissection of the Tenon’s capsule, light cautery was applied (Figure 4).

Sclera-corneal Tunnel

A 6 mm scleral frown incision, 1.5 mm from the limbus is made with a 15 number Bard Parker blade (Figure 5). A funnel shaped sclerocorneal tunnel incision is created with a steel crescent knife. One side port is made 90 degrees apart on either side of
the capsulorhexis margins at equidistance (Figure 9).

Nucleus Management

Up to this step all above mentioned steps are same as in other manual small incision techniques. Intratunnel phacofracture technique is different than other phacofracture techniques of anterior chamber. Enough viscoelsatics is placed between cornea and superior surface of the nucleus to protect endothelium; between nucleus and iris to keep away iris from nucleus. The nucleus is rotated within the capsule using a Sinskey hook. The globe was stabilized with tooth forceps and the small Lewis lens loop (AA 1915 from Appasamy Associate, India) is introduced through the tunnel and positioned between the iris and the nucleus. The nucleus is engaged in the lens loop and slowly withdrawn from the anterior chamber while the posterior lip of the tunnel is depressed. Once the nucleus got engaged in the tunnel, then the Lewis loop is pulled posteriorly and upwards. This causes breaking and removal of a part of the nucleus and other part remains engaged in the tunnel. By viscoelsatics the engaged part of the nucleus is pushed back into the anterior chamber and rotated so its longitudinal axis was coincided with longitudinal axis of the tunnel. Again viscoelsatics is placed between the cornea and superior surface of the nucleus and between the nucleus and iris. The lens loop is introduced through the tunnel and positioned between the iris and the remaining part of the nucleus. The remaining part of the nucleus is engaged in the lens loop and slowly withdrawn from the anterior chamber while the posterior lip of the tunnel was depressed. Most of the times remaining part of the nucleus comes out. If it still break down then remaining part again pushed in the anterior chamber with help of viscoelsatics and previous steps were repeated till it comes out (Figure 10).

Cortical Matter Clean Up

The remaining cortical matter clean up is done with direct 23 gauge Simcoe irrigating aspirating cannula. The anterior chamber is formed with Viscoelsatics (Figure 11).
Intraocular Lens Implantation

A single piece PMMA intraocular lens of 5.5-6.00 mm optic size and 12.5 mm total size is implanted into the capsular bag. The anterior chamber is washed out thoroughly by Simcoe irrigation aspiration cannula using Ringer’s lactate solution (Figure 11).

Conjunctival Flap Reposition

The conjunctival flap is reposited back and cauterized at the edges.

Main Ports and Side ports Sealing

Main port and side ports are sealed with stromal hydration using a 26 gauze cannula.

Subconjunctival Injection

A 0.5 cc subconjunctival gentamycin with dexamethasone injection is given. Eye is pad patched

Discussion

The most commonly practiced MSICS techniques are Blumenthal, visco-expression, irrigating wire vectis and fish hook needle. These techniques require a 7 to 9 mm large incision, which leads to more astigmatism. So if nucleus is managed to remove though a sub 6 mm incision at appropriate site would result approximately same astigmatism as 3.2 mm phacoemulsification [2-5]. Intratunnel phaco fracture is a new technique innovated by Sudhir Singh, where the lens nucleus is broken inside the sub 6 mm sclerocorneal tunnel and removed. As nucleotomy maneuvering taken place inside the corneo-scleral in contrast to other nucleotomy techniques where maneuverings take place inside the anterior chamber. By Intratunnel phaco fracture technique all
types of the cataracts were successfully taken out through sub 6 mm wide tunnel. The mean uncorrected visual acuity and mean best corrected visual acuity at first post operative day were 0.367 (Snellen equivalent 20/46) and 0.226 (Snellen equivalent 20/33) log MAR units respectively. No serious per and post operative complication encountered [2-8].

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The author has no financial interest in any product mentioned.
References


