Nucleus management with irrigating vectis

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The main objective in modern cataract surgery is to achieve a better unaided visual acuity with rapid post-surgical recovery and minimal surgery-related complications. Early visual rehabilitation and better unaided vision can be achieved only by reducing the incision size. In manual small incision cataract surgery (MSICS), incision is between 5.5 to 7 mm. Once the nucleus is prolapsed into the anterior chamber, it can be extracted through the tunnel. Nucleus extraction with an irrigating vectis is a very simple technique, which combines mechanical and hydrostatic forces to express out the nucleus. This technique is time-tested with good results and more than 95% of nuclei in MSICS are extracted in this way offering all the merits of phacoemulsification with the added benefits of having wider applicability, better safety, shorter learning curve and lower cost.

Key words: Irrigating vectis, manual small incision cataract surgery, nucleus extraction

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The transition from extracapsular cataract surgery to manual small incision cataract surgery (MSICS) with intraocular lens (IOL) implantation has led to a dramatic change in postoperative visual outcome, quality of life, and increased acceptance of surgical intervention by the community.[1] Hydroexpression of nucleus with an irrigating vectis is a simple technique of sutureless extracapsular cataract extraction which uses a combination of mechanical and hydrostatic forces to express out the nucleus.[2] The technique is especially suited for removal of softer cataracts, which will easily mould through smaller incisions. Harder cataracts are removed by increasing the size of the scleral tunnel. Scleral tunnel and self-sealing corneal valve combined with manual removal of a cataractous lens in MSICS has come up as an effective alternative to phacoemulsification. The purpose of the present communication is to describe in detail the nucleus delivery with the help of an irrigating vectis in MSICS.

Surgical Procedure

After retrobulbar and facial anesthesia the conjunctiva and tenon's capsule are minimally dissected over the intended scleral tunnel site. A 5.5-7 mm straight or frown-shaped scleral incision is placed 1.5 mm to 2 mm from the limbus on the steep axis and a sclerocorneal tunnel is fashioned using a bevel-up crescent blade. Paracentesis is made 75-90° to the right side of the tunnel. Viscoelastic is injected into the anterior chamber through the paracentesis to make the eye firm and facilitate entry of keratome into the anterior chamber. A sharp 3.2-mm bevel-down keratome helps create a self-sealing corneal valve which is 1.5 mm from the limbus and is larger than the external incision to facilitate delivery of nucleus. A 6-7mm capsulorrhexis is performed. In patients with advanced nuclear cataracts and with small pupils can-opener capsulotomy can be done.

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With capsulorrhexis, hydrodissection is performed until a part of the nucleus prolapses into the anterior chamber while in can-opener capsulotomy the surgeon engages the superior pole of the nucleus with a Sinskey hook and lifts the pole into the iris pupillary plane. Then, with the help of a Sinskey hook the nucleus is rotated clockwise or counterclockwise and prolapsed completely into the anterior chamber. The nucleus is then removed through the corneoscleral tunnel using a 5-mm wide irrigating vectis, which has one to three 0.3-mm forward irrigating ports and a gentle anterior concavity.

The irrigating vectis available in various shapes and sizes,[3] is attached to a 5-cc syringe containing BSS. Viscoelastic is injected above and below the nucleus to protect the endothelium and push the iris diaphragm and posterior capsule posteriorly. A bridle rectus suture, crucial for the success of this step is loosely held by the surgeon's left hand or by the assistant.

After confirming patency [Fig. 1], the irrigating vectis is insinuated with concave side anterior under the nucleus. Visualization of margins of the vectis through the nucleus except in very white and black nuclei avoids pinching of iris and consequent iridodialysis.

The subsequent movements should occur in synchrony. The irrigating vectis is withdrawn slowly without irrigating until the superior pole of the nucleus is engaged in the tunnel. The bridle suture is pulled tight thus stabilizing the eye. With the globe fixed, the irrigating fluid is injected slowly to build up the hydrostatic pressure inside the chamber and the vectis is slowly pulled out while depressing the scleral lip. This helps to open the wound and prevent the nucleus from rubbing on the endothelium [Fig. 2A and B]. The nucleus moulds through the tunnel and is extracted out of the eye [Figs. 3A and B].

The irrigation must be reduced when the maximal diameter of the nucleus clears the tunnel to prevent sudden shallowing of the anterior chamber.

According to Gogate *et al*.[1] using irrigating vectis technique in MSICS gives good uncorrected visual acuity in comparison to ECCE. Of the 348 patients operated by this technique 47.9%

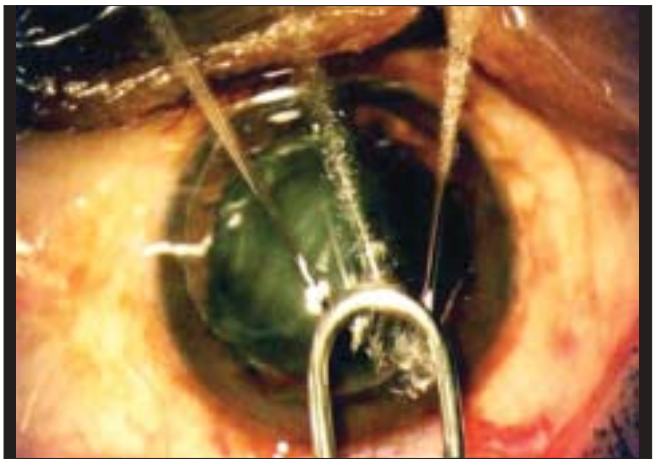

Figure 1: Irrigating Vectis with 3 ports

Figure 2a: Engaging the nucleus in the internal wound: Photo

Figure 2b: Engaging the nucleus in the internal wound

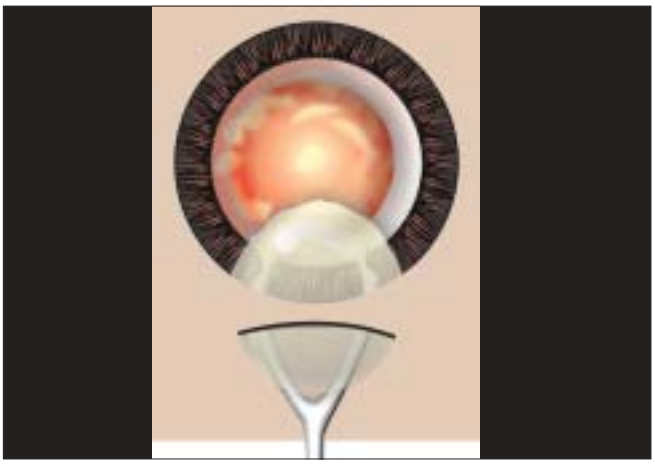

Figure 3a: Nucleus extraction with irrigating vectis

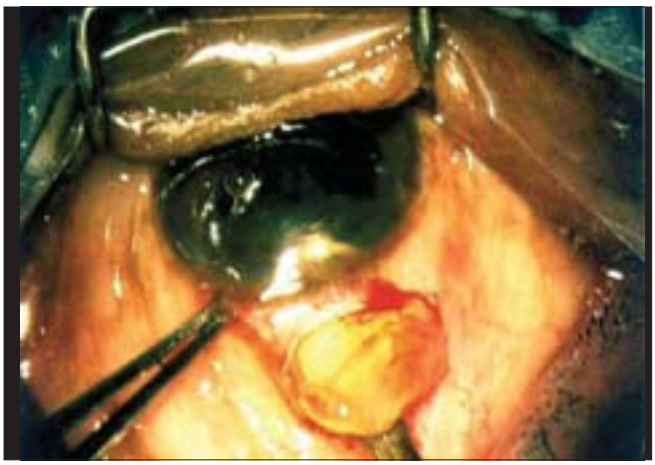

Figure 3b: Nucleus extraction with irrigating vectis: Photo

had uncorrected visual acuity better than 20/60 in comparison to 37.3% achieved by ECCE.

Venkatesh *et al*.[4] reported best corrected visual acuity (BCVA) of 20/60 or better in 99% of cases of which 94% achieved a BCVA of 20/30 or better.

Management of hard cataracts

Brunescent nuclei are typically extracted by increasing the incision size to 7.0 mm. Another option is to remove the nucleus through a smaller wound by fragmentation at the scleral pocket.[5] The remaining nucleus is then pushed into the anterior chamber, longitudinally oriented to the tunnel and removed using the irrigating vectis.

The cortex is aspirated using a Simcoe cannula and the IOL is implanted in the bag. The anterior chamber is formed and side port hydrated.

Advantages include use of a single instrument, formed anterior chamber throughout the procedure and retention of epinuclear shell leading to minimal corneal endothelial damage and clear corneas. Complications include risk of iridodialysis, posterior capsular rupture and zonular dialysis during insinuation of vectis and delivery of nucleus. Other minor complications are descemet membrane folds and striate keratopathy. The above complications can be prevented by liberal usage of visco and ensuring proper visualization.

Conclusion

Sutureless extracapsular cataract extraction provides rapid

visual recovery and return to normal life. MSICS by irrigating vectis is a good alternative to other techniques of nucleus management in terms of universal applicability, greater wound stability, reduced induced astigmatism, greater patient comfort with earlier visual rehabilitation and cost-effectiveness in the developing world.[6]

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