

# “Show me the way” - Endoilluminator-assisted manual small-incision cataract surgery in a case of corneal scar with a small pupil

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Cataracts with coexisting corneal opacities due to various causes present a daunting challenge to surgeons. Adding to the plight could be factors like shallow anterior chamber, small pupil and mono-ocular patient. A manual small-incision cataract surgery (MSICS) could be a saviour in such situations. We demonstrate a case of post perforation corneal scar secondary to Hansen’s disease with complicated cataract with non-dilating pupil in a bilaterally blind patient. Due to poor visualisation, there could have been difficulties in capsulorrhexis, cortex aspiration & many other intraoperative manoeuvres, but use of an endo illuminator providing oblique illumination was very useful, resulting in uneventful surgery with good visual outcome. MSCICS, a surgery with minimal instrumentation, short learning curve and comparable results to phacoemulsification is perhaps the preferred procedure, in India, for complicated cataracts with multiple pre-existing pathologies

**Key words:** Manual Small Incision Cataract Surgery, corneal scar, Endoilluminator

Manual small-incision cataract surgery (MSICS) is often labeled as the “poor cousin” of phacoemulsification by clinicians; however, its relevance in modern-day cataract surgery is beyond doubt. MSICS is the most widely performed procedure in India. It is a very rewarding surgery with a short learning curve, minimal instrumentation, low cost, and results equivalent to phacoemulsification. It is a procedure, which works well in hands of most surgeons with good outcomes. In certain situations during phacoemulsification, one may have to convert to small-incision cataract surgery (SICS). Moreover, there are certain complex situations like co-existing corneal diseases, hard cataracts, or subluxated lenses where MSICS can work better than phaco, with minimal complications and optimal surgical results. In hazy corneas due to corneal scars, adherent leucomas, corneal degenerations, etc., where visualization is greatly hampered, SICS with minimal surgical maneuvers, prevents undue trauma to the endothelium. Therefore, it is a preferred technique in cataracts with corneal co-morbidities. We describe a case of complicated cataract with corneal opacity secondary to corneal perforation, in a bilaterally blind patient where an endoilluminator-assisted MSICS resulted in good visual recovery.

## Surgical Technique

A 70-year-old male came to our hospital through an outreach camp. His vision was counting fingers close to face (CFCF) in the right eye and Perception of light, Projection of rays (PL PR) in the left eye. On examination, the right eye showed

post-perforation corneal scar, covering the lower half of the visual axis and inferior cornea, measuring 4 × 5 mm. The pupil was non-dilating. The left eye had a large adherent leucoma with no view of the anterior chamber (AC). The patient had a saddle nose deformity. On asking detailed history, he gave a history of some illness several years back, for which he had received multiple drugs from a government hospital for 12 months. A diagnosis of status post Hansen’s disease with a post-perforation corneal scar with complicated cataract was made and the patient was taken up for MSICS [Fig. 1].

A frown incision was made measuring 7 mm in length and a scleral tunnel was constructed. Two side port incisions were made with a 15° blade at 3 and 9 o clock. Trypan blue was used to stain the capsule. An iris reposer was used to break the posterior synechiae. Two Y-shapedinsky hooks (Ophtho India Inc, Mumbai) were used to stretch the pupil further. A light pipe/endoilluminator was placed at the inferior limbus and capsulorrhexis was started from an area in the superior quadrant. After half rrhexsis, the endoilluminator was moved to the nasal quadrant to complete rrhexsis. The pupil was mechanically retracted to confirm completion. An incision was made with a 2.8 mm keratome and extended with a 5.5 mm blade. After hydrodissection, using ainsky hook, the temporal pole of the nucleus was lifted out of the bag and then the rest of the nucleus was prolapsed. Nucleus delivery was in one go with wire vectis. (Ophtho India Inc,

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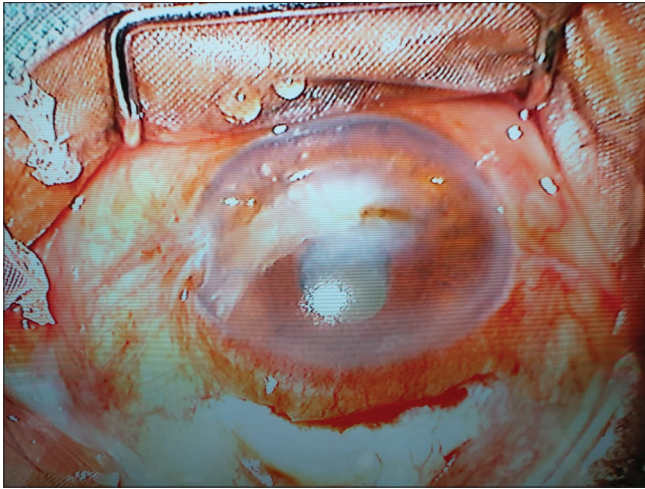
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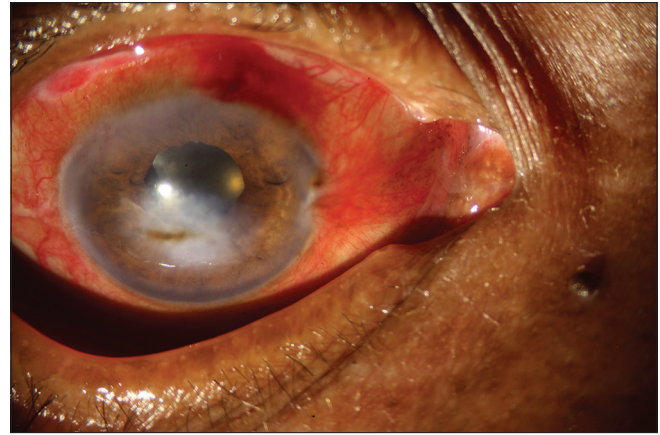
**Figure 1:** Preoperative corneal scar post-perforation in Hansens disease. (source- H.V. Desai Eye Hospital, Pune, Maharashtra)

Mumbai). Again, the endoilluminator was of great help to remove the cortex completely from the periphery of the bag, which could have been nearly impossible due to the very poor view. A polymethylmethacrylate intraocular lens (PMMA IOL), 6 mm in optic diameter was placed in the bag, sideports were hydrated, a subconjunctival dexamethasone-gentamycin injection was given, and the case was closed. On first day postoperatively, the patient had an unaided vision of 6/24 which improved to 6/12 P after 4 weeks [Fig. 2].

## Discussion

Cataracts with co-existing corneal pathologies are always challenging cases mainly because of poor visualization, annoying reflexes, and scattering of light from the scarred cornea and also because of factors like a small pupil, hard cataract, monocular patient, etc., which add to the complexity. The first decision that needs to be taken is whether a cataract alone would suffice or a corneal transplant is needed. This depends on the location and depth of opacity, the expertise of the surgeon, access to donor corneas and visual status, and the requirements of the patient. In opacities occupying only part of the visual axis, the decision is usually in favor of cataract surgery alone, more so in monocular patients who need ambulatory and rapid visual recovery and patients from underprivileged backgrounds for whom, postoperative care of corneal grafts is very difficult.

The next decision is whether to do phacoemulsification or SICS. Several randomized controlled trials (RCTs) have shown no significant cell loss in either surgery in age-related cataracts,<sup>[1,2]</sup> but in compromised corneas, this may not hold true. Phaco is a closed chamber procedure, during which there may be mechanical and thermal damage to the corneal endothelium. Irregular or shallow ACs in adherent leucomas, lead to less working space and increased proximity of the phaco tip to the endothelium.<sup>[3]</sup> Ultrasound vibration, effective phaco time and power, irrigating fluid turbulence, and nuclear fragment shattering in the AC can cause endothelial cell loss even in healthy corneas,<sup>[4]</sup> and are liable to cause significant damage in already compromised corneas. MSICS can be a safer option in these cases. Avoidance of excessive fluid turbulence and ultrasound energy into AC may be beneficial in protecting



**Figure 2:** Post-operative appearance of the same patient following endoilluminator-assisted MSICS. (Source- H.V.Desai Eye Hospital, Pune, Maharashtra)

the endothelium. A sclerocorneal tunnel incision is better than a clear corneal incision for wound integrity.<sup>[5]</sup> Shorter surgical time and minimal instruments in AC also contribute to better surgical outcomes.

Certain modifications are recommended in SICS surgery for corneal scars. Putting viscoelastic on the cornea clears the view at least temporarily. Some surgeons put a contact lens filled with viscoelastic on the cornea for the same purpose. Staining the capsule is mandatory. Capsulorrhexis should be started from the quadrant opposite of corneal opacity and under the opacity, it should be completed in one go. Judicious use of dispersive viscoelastic at every step offers better endothelial protection. In cases with small pupils, pseudoexfoliation, etc., mechanically stretching the pupil or making multiple small sphincterotomies helps in enlarging the pupil. If the nucleus is big, two to three relaxing incisions should be put in the visible part of the capsulorrhexis border. Nucleus prolapse and nucleus delivery should be without much manipulations in AC, to avoid postoperative corneal edema.<sup>[6]</sup> Endoilluminator can be held at the limbus so that oblique illumination gives a better view of intraocular structures. Usual co-axial illumination of the microscope causes scattering of light with troublesome reflexes and poor visualization of intraocular structures. With the microscope light switched off and the endoilluminator placed externally at the limbus at an angle, better visualizations were achieved, especially in critical steps like rrhexis and cortical wash. It can minimize complications and can be an effective supportive measure.<sup>[7]</sup> Thus endoilluminator-assisted MSICS is an excellent technique for cataracts with corneal co-morbidities.

## Conclusion

MSICS can be the surgery of choice in challenging scenarios like pre-existing corneal scars or haze due to various pathologies. Certain modifications in the basic technique make the surgery a safe and good outcome procedure.

### Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients

understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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#### Conflicts of interest

There are no conflicts of interest.

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