

TECHNIQUE

Isoexpansile sulfur hexafluoride gas to repair near-total iris disinsertion

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Iridodialysis is commonly encountered after blunt trauma to the eye. Most iris detachments are small, superior, and asymptomatic and require no surgical intervention. However, large areas of iridodialysis require early surgical repair to prevent the onset of iris necrosis, pigment dispersion, and secondary glaucoma. Suture fixation of iris to the sclera is the most commonly used method for iris repair; however, this technique becomes difficult in cases of near-total

iris disinsertion, even in expert hands. We describe a case of post-traumatic near-total iris disinsertion with subluxated cataract managed with phacoemulsification and iris preservation with the help of intracameral injection of isoexpansile sulfur hexafluoride.

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Iridodialysis is one of the common sequelae of blunt traumatic injury to the eye. Various techniques have been described using a nylon or polypropylene (Prolene) suture to fixate the disinserted iris to the sclera.¹⁻⁶ These techniques are useful in cases with limited areas of iridodialysis. In cases with near-total iris disinsertion, alternative techniques have been described; these include removal of entire iris tissue followed by replacement with an artificial iris⁷⁻¹⁰ or an aniridic intraocular lens (IOL).¹¹⁻¹³ We report a case of near-total iris disinsertion with posttraumatic subluxated cataract that was managed with phacoemulsification and retention of iris tissue with the help of isoexpansile sulfur hexafluoride (SF₆) gas in the anterior chamber.

The case involved a 58-year-old man who presented to the outpatient department with a clinical history of a fire-cracker injury to the left eye that had occurred 1 month previously. This was followed by decreased vision in that eye. At presentation, the uncorrected distance visual acuity (UDVA) in the left eye was 20/200, improving to 20/80 with refraction. The UDVA in the right eye was 20/20. Slitlamp examination showed a near-total iris disinsertion from the root extending from 3 o'clock to 12 o'clock clockwise (~270-degree dialysis) and superotemporal subluxation of the cataractous lens (extending from 5 o'clock to 9 o'clock) with vitreous prolapse in the anterior chamber from the site of deficient zonular fibers (Figure 1). The intraocular pressure (IOP) in the left eye, measured by

noncontact tonometry, was 12 mm Hg. An indirect ophthalmoscopy examination of the fundus was within normal limits. The following surgery was planned for left eye: phacoemulsification with in-the bag placement of an IOL supported by a capsular tension ring (CTR) and suture repair of iridodialysis using the guide needle-assisted technique of iris repair.¹

SURGICAL TECHNIQUE

The surgery was performed under peribulbar block using 4.0 mL of lidocaine hydrochloride (Xylocaine 2.0%) and 2.0 mL of bupivacaine hydrochloride 0.5% (Sensorcaine) by an experienced surgeon (T.A.) using the guide needle-assisted technique of iridodialysis repair as previously described.¹ A localized nasal peritomy was performed extending from 7 o'clock to 11 o'clock. Two partial-thickness scleral flaps were raised 2.0 mm from the limbus diagonally opposite the area of dialysis to enable the passage of 9-0 polypropylene sutures. This was followed by creation of a temporal clear corneal main incision and a side-port incision. Three additional clear corneal stab incisions were made for the placement of iris hooks. The iris was gently stroked, stretched out, and secured with nylon iris hooks.

A limited anterior vitrectomy was performed at the site of zonular fiber deficiency using the Centurion Vision System (Alcon Laboratories, Inc.), after which the area was plugged with a dispersive ophthalmic viscosurgical device (sodium hyaluronate 3.0%-chondroitin sulfate 4.0% [Viscoat]).

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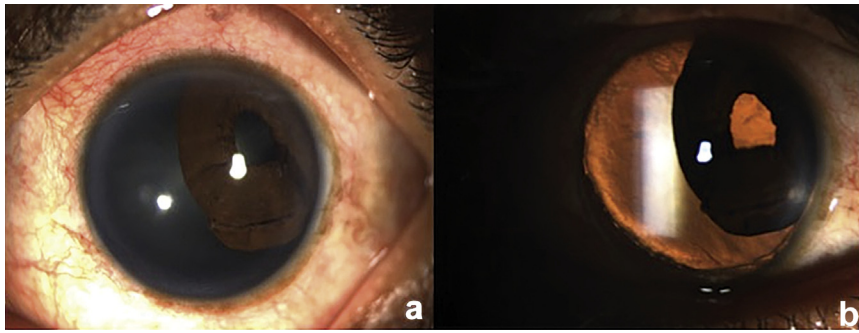


Figure 1. *a:* Posttraumatic near total iridodialysis extending from 3 o'clock to 12 o'clock (clockwise). *b:* Retroillumination view highlighting the iridodialysis with posttraumatic superotemporal subluxated cataractous lens with deficient zonular fibers from 5 o'clock to 9 o'clock.

Phacoemulsification was performed using the primary chop method, and when the cortical matter was aspirated. A CTR (type 4, Madhu Instruments Pvt Ltd.) and then a foldable IOL (Acrysof SN60WF, Alcon Laboratories, Inc.) were placed in the capsular bag. The iris hooks were removed, keeping the iris unfolded over the capsulorhexis margin.

The guide needle–assisted technique of iris repair was attempted using 9-0 polypropylene and a 26-gauge needle; however, passage of sutures through the detached iris tissue became exceedingly difficult as the case proceeded. Multiple attempts were made to pass the needle through a different area of detached iris; however, this led to an extension of iridodialysis, worsening the near-total iris disinsertion. This occurred because of the absence of countertraction force from the small portion of the attached iris; such force is required for smooth passage of the suture through the disinserted iris tissue.

At this stage, the suture-assisted iridodialysis was abandoned. The iris was gently unfurled and spread to position it over the peripheral anterior capsule. Next, 0.2 mL isoexpansile SF₆ (18.0%) was injected through the side port, filling the entire anterior chamber. This flattened the iris tissue and pressed the iris tissue against the anterior capsule rim. Partial decompression of the anterior chamber was performed to leave a two-third fill of the gas at the time of closure of the incisions. The corneal incisions were hydrated, and the patient was advised to maintain a prone position for 3 days postoperatively. The surgical steps are shown in [Video 1](http://jcrcjournal.org) (available at <http://jcrcjournal.org>).

Results

One day postoperatively, the SF₆ bubble was visible in the anterior chamber with a normal IOP. The iris was flattened

against the capsule, leaving a 4.0 mm pupil in the center ([Figure 2, a](#)). One month postoperatively, the UDVA improved to 20/40 with corrected distance visual acuity (CDVA) of 20/20 with $-0.50 -0.50 \times 180$. The iris tissue had adhered to the anterior capsule rim, leaving it in a nearly normal anatomic state with a central clear pupil ([Figure 2, b](#)).

DISCUSSION

Blunt trauma to the eye can cause injury to all the intraocular structures, with iridodialysis being one result. Several techniques for the repair of localized iridodialysis have been described¹⁻⁶; however, there are few case reports of the management of near-total or total iris disinsertion.¹⁴⁻¹⁷ Such cases can be managed with the aid of artificial irises⁷⁻¹⁰ or aniridic IOLs.¹¹⁻¹³ Artificial irises require extensive planning. They must be custom manufactured for each patient and are costly, which might be prohibitive in developing countries. Aniridic IOLs require a large incision (~ 9.0 mm) for their insertion and are known to cause complications such as raised IOP, corneal decompensation, limbal stem cell failure, uveitis–glaucoma–hyphema syndrome, and high astigmatism.¹⁸

Suturing subtotal iridodialysis with a single suture, as in localized iridodialysis, has been attempted; however, it can lead to highly irregular pupils in the postoperative period. The guide needle–assisted technique of iris repair using a polypropylene suture and 2 needles was attempted in our case but was unsuccessful because of the lack of the countertraction force required for suture passage.¹ The sewing-machine technique of iridodialysis repair has recently been described for repairing large iris defects⁶; however, it requires a large scleral groove in

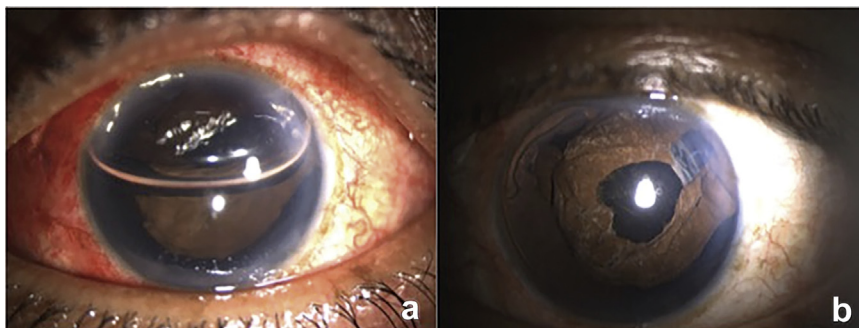


Figure 2. *a:* One day postoperatively, the anterior chamber is filled with sulfur hexafluoride gas and the iris is in place; the uncorrected distance visual acuity was counting fingers close to the face. *b:* At 1 month, the eye has healthy iris tissue, an intraocular lens in place, and pupil size of approximately 4.0 mm; the corrected distance visual acuity was 20/20. Note the anterior and posterior capsule opacification, which further reduces the glare.

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