Surgical Technique

Spatula scaffold: An iris-sparing technique for lensectomy

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Lensectomy with vitrectomy is often performed for crystalline lenticular subluxation. We report a new technique and a practical approach that involves the placement of a spatula beneath the iris tissue that facilitates retroiridial removal of subluxated lens and acts as a scaffold by protecting the iris tissue from being accidentally trapped into the vitrectomy cutter port. Our technique facilitates management of the lens and vitreous without any trauma to the iris and secondarily obviates the need to perform an iris repair procedure that may arise due to iatrogenic reasons.

Key words: Ectopia lentis, lens subluxation, lensectomy, scaffold, spatula scaffold, vitrectomy

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Lensectomy with vitrectomy is an established mode of treatment in cases with ectopia lentis that causes unstable or progressive refractive error with associated reduction of best-corrected visual acuity or glaucoma.[1] In cases with massively subluxated lenses where lensectomy is performed, the surgical intervention involves complete removal of lens that lies covered by the iris tissue as retained lens fragments can give rise to secondary glaucoma. The iris tissue often gets traumatized during the procedure of lensectomy [Fig. 1] due to accidental aspiration into the cutter probe.[2] The modern vitrectomy machines provide a special feature where the surgeon can chose between the cutter, suction, or a combined cutter-suction mode, thereby allowing "only suction mode" to be ON while working close to the iris tissue. Thus, vacuum can be applied without cutting to facilitate followability and removal of lens material. This requires timely intervention and inability to do so leads to iatrogenic trauma to the iris. Moreover, this functionality is often not available with many of the phaco machines employed by anterior segment surgeons that have an additional vitrectomy module. Many studies have reported secondary removal of lens matter from the periphery following lensectomy-vitrectomy. This situation is encountered probably due to nonvisibility and reluctance to venture in the extreme periphery to prevent any posterior segment secondary complications.[3,4] We hereby put forward a technique that helps prevent the iris from being entrapped into the vitrectomy cutter probe, thereby retaining the normal shape of pupil and its anatomical function along with enhanced peripheral visualization for anterior segment surgeons that is applicable to all machines irrespective of the type and generation of machine used by the surgeon.

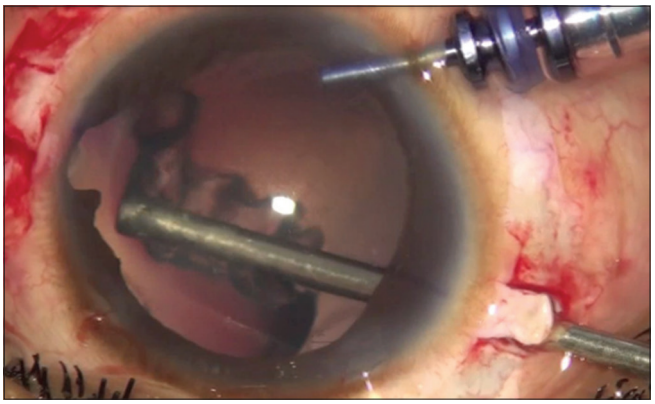

Figure 1: Iris tissue entrapped and accidentally cut with the vitrectomy cutter probe while performing lensectomy

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All the surgeries were performed under peribulbar. As in a glued intrascleral fixation of an intraocular lens (IOL) procedure, two partial-thickness scleral flaps were made 180° opposite to each other, and a trocar anterior chamber

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maintainer (ACM)[5] or a trocar cannula at pars plana was introduced for fluid infusion inside the eye [Fig. 2a]. Alternatively, an ACM can also be placed at limbus for fluid infusion. Two sideport corneal incisions were made that provided easy accessibility to the subluxated lens according to its relative position of decentration. Sclerotomy was performed with a 22-G needle about 1–1.5 mm from the limbus beneath the scleral flaps, and a 23-G vitrectomy cutter was introduced from the sclerotomy site [Fig. 2b] with a slight rotating movement. The cutter was slowly pushed into the eye until the tip was visible in the pupillary area. The cutter mode was switched ON and the tip of the cutter was constantly monitored. Initially, vitrectomy was performed around the visible margin of the subluxated lens to cut down any vitreous traction followed by lensectomy. The parameters for vitrectomy were set at the cutting rate of 1000–1200 cuts/min with a vacuum of 100–150 mm Hg and the flow rate of around 20cc/min. Initially, the entire lens portion that was visible from the pupillary edge was cleared off. As the cutter approached the pupillary margin, it was essential to take care that the pupillary margin did not get accidentally trapped into the cutter port. A spatula was introduced from the sideport incision and was carefully placed beneath the iris [Fig. 2b and c] in a way that the iris tissue was lifted a bit and the cutter did not come in proximity of the iris. Lensectomy with vitrectomy was then performed beneath the iris tissue with the spatula continuously guiding the path of the cutter and simultaneously protecting the iris from getting chewed, thereby acting as a scaffold [Fig. 2d and Video 1].

Iris hooks were employed in cases where the peripheral margin of the lens was not clearly visualized or the iris became miotic due to touch with the spatula. Once the view of lens was enhanced beneath the iris tissue, lensectomy was again resumed and spatula was employed to shield the iris. Triamcinolone was injected into the anterior chamber (AC) to detect the presence of any vitreous in AC. If vitreous was detected, vitrectomy was again performed in the pupillary zone to clear off the vitreous. Secondary IOL fixation was then considered and in all our cases, glued intrascleral fixation of an IOL was performed.

Results

The technique was performed in nine eyes of five patients as most of the cases had a bilateral involvement with ectopia lentis. No case of accidental iris tissue entrapment or cut with the vitrectomy cutter port was reported. No patient required any additional surgery and no other complication was observed.

Discussion

Lensectomy with vitrectomy is often performed in cases with progressive zonulopathies and massive lens subluxation. Standard vitrectomy module that accompanies most of the phaco machines has a preset function of vitrectomy that allows cutting at foot-pedal position 2 and cutter with vacuum at position 3. During the procedure of performing lensectomy, both cutter and vacuum function are needed as the lenticular material needs to be aspirated after the capsule is cut. Many machines have a manual override that switches the function of foot positions 2 and 3, so that vacuum can be applied without cutting to facilitate followability of the residual cortical lens material. The ideal and basic principles of vitrectomy are to never switch on the cutter mode and not to perform vitrectomy

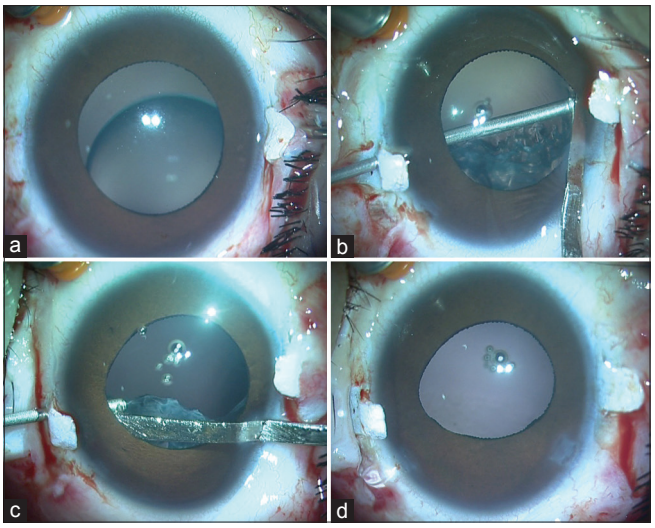

Figure 2: Spatula scaffold for lensectomy. (a) Two partial-thickness scleral flaps made as in a glued intraocular lens surgery and fluid infusion is introduced. (b) Lensectomy is performed and iris spatula is introduced. (c) Iris spatula guides the path of lensectomy. (d) Lensectomy with vitrectomy is complete

blindly behind the iris tissue, as visibility is often an issue. The surgeons switch from cutter-vacuum mode to only vacuum mode when performing lensectomy behind the iris tissue. The peripheral lens matter is sucked at vacuum mode and is dragged into the central pupillary area where it can be clearly visualized and then aspirated. The cutter mode is then switched ON and the lens matter can then be aspirated with cutter. This can be achieved only when the plane of the cutter is proper. Often when the cutter port is not in the right plane and no lens matter goes in, the cutter mode is switched ON to churn up the tissue. It is at this juncture that iris can be accidentally chewed up. In addition, inability to switch over to only vacuum mode due to any reason can lead to accidental trapping of the iris tissue into the cutter port that can create an iris defect that may need a subsequent iris repair procedure to prevent glare and photophobia.

Scleral indentation is often performed on the side of lens subluxation to drag it down and away from the iris. This also serves to enhance the visibility of the lens lying behind the iris tissue while performing vitrectomy. In spite of this, the iris entrapment in the vitrectomy probe can be encountered clinically. It has been noted that while the cutter is employed to remove the lens capsule, it can damage the iris and cause miosis, bleeding and often residual lens matter can incite inflammation.[6] With our technique of spatula scaffold, no case was reported to have retained lens matter as the visibility due to upward lift of iris was enhanced and also the fear of iris or peripheral tissue was obviated. Our technique serves in many ways to overcome this issue. The constant presence of spatula behind the iris tissue shields it from being caught up in the vitrectomy probe, serves as an endpoint of indicator that the lens has been completely eaten away behind the spatula by the cutter probe and also prevents all the issues that may arise from irregular pupil shape and size postsurgery. It also prevents the second attempt of surgical intervention where pupilloplasty is performed to optimize the pupil size and shape to overcome the phenomenon of glare, thereby limiting the incidence of enhanced inflammatory reaction that may arise due to iris manipulation.

Postlensectomy, it is essential to perform a secondary IOL fixation for optical rehabilitation, and in all the cases, glued intrascleral fixation of IOL was performed.[7,8] This technique can also be employed in cases with glued IOL scaffold where the peripheral cortex is yet to be removed [Fig. 3].[9] It is essential to state that in all our cases, vitrectomy probe was employed for lensectomy as all the cases were young and had crystalline lens subluxation.

Conclusion

Combined procedures, such as simultaneous cataract extraction, pars plana vitrectomy, and IOL implantation, have been described before; however, to the best of our knowledge, information on the procedure to shield and protect the iris with spatula acting as a scaffold has not been reported hitherto. Our technique helps maximize the surgical output of vitrectomy by protecting the iris when lensectomy with vitrectomy is performed either from the pars plana or from the limbal route.

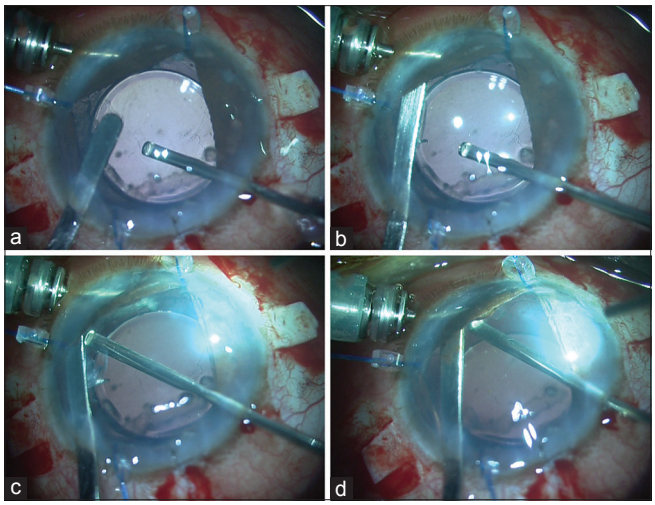

Figure 3: Spatula scaffold in glued intraocular lens scaffold. (a) Glued intraocular lens scaffold technique is performed and peripheral residual cortex is observed. (b) The iris spatula is placed beneath the iris before the vitrectomy is begun. (c) The spatula acts as a guide for the movement of the vitrectomy probe. (d) Peripheral cortical matter removed

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Conflicts of interest

There are no conflicts of interest.

References

1. Peyman GA, Raichand M, Goldberg MF, Ritacca D. Management of subluxated and dislocated lenses with the vitrophage. Br J Ophthalmol 1979;63:771-8.
2. Pearson RV, Aylward GW, Marsh RJ. Ocutome lensectomy: Results and complications. Br J Ophthalmol 1991;75:482-6.
3. Hakin KN, Jacobs M, Rosen P, Taylor D, Cooling RJ. Management of the subluxed crystalline lens. Ophthalmology 1992;99:542-5.
4. Halpert M, BenEzra D. Surgery of the hereditary subluxated lens in children. Ophthalmology 1996;103:681-6.
5. Agarwal A, Narang P, Kumar DA, Agarwal A. Trocar anterior chamber maintainer: Improvised infusion technique. J Cataract Refract Surg 2016;42:185-9.
6. Charles S, Calzada J, Wood B. Vitrectomy techniques and technology for anterior segment problems. In: Vitreous Microsurgery: Surgical Technology and Techniques. 5th ed. USA: Lippincott Williams & Wilkins; 2012. p. 76-97.
7. Agarwal A, Kumar DA, Jacob S, Baid C, Agarwal A, Srinivasan S, *et al.* Fibrin glue-assisted sutureless posterior chamber intraocular lens implantation in eyes with deficient posterior capsules. J Cataract Refract Surg 2008;34:1433-8.
8. Narang P, Agarwal A. The "correct shake" for "handshake" in glued intrascleral fixation of intraocular lens. Indian J Ophthalmol 2016;64:854-6.
9. Narang P, Agarwal A, Kumar DA. Glued intraocular lens scaffolding for soemmerring ring removal in aphakia with posterior capsule defect. J Cataract Refract Surg 2015;41:708-13.