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CATARACT

Device focus **Hooks and expanders ease difficult cataract surgery**

by Michelle Dalton EyeWorld Contributing Writer



This eye, which had a small pupil even after the instillation of mydriatic drops, underwent cataract extraction with toric intraocular lens implantation.



Insertion of a 6.25 mm Malyugin ring greatly facilitated the view during surgery.

Source (all): Kevin M. Miller, MD

Pupil expanders can help to reduce potential problems surgeons face when patients have small pupils. There is no one singular cause for small pupils— they can be caused by medication use (i.e., pilocarpine, tamsulosin), fibrosis due to other conditions, uveitis, posterior synechiae, or trauma; sometimes the patient’s iris shows no sign of an unusual condition, but it does not dilate. Some cataract surgeons may prefer stretching the pupil, using multiple dilating drops, using epinephrine (phenylephrine tends to be preferred in Europe), or using viscosurgical devices (OVDs) to produce viscomydriasis. Those techniques are usually enough to get a pupil up to 2 mm to 3 mm, and in some cases may even enlarge it to 4 mm. But in cases where the pupil is not expanding, most will turn to hooks and expanders to make cataract surgery a bit less difficult. “The last thing you’d want to do if there’s intraoperative floppy iris syndrome (IFIS) is stretch the pupil,” said Kevin M. Miller, MD, Kolokotronis professor of clinical ophthalmology, UCLA Stein Eye Institute, Los Angeles. “But for situations where there’s fibrotic bands, the pupil stretch works well.” Dr. Miller finds it necessary to use a pupil expander in about 1 out of every 10 IFIS cases he performs. Technology advances in both instruments and devices resulted in a “tremendous change in the size of the pupil needed to perform cataract surgery today,” said Todd Fladen, MD, founder of The Fladen Eye Center, Canton, Ohio. Iris hooks “are quite useful, and many people still use them,” said

Boris Malyugin, MD, professor of ophthalmology and deputy director general, S. Fyodorov Eye Microsurgery Institution, Moscow, Russia, noting these are most effective in patients with small pupils associated with weakened zonules. “In those cases, I will recommend using the hooks for the purpose of supporting the bag and expanding the pupil at the same time.” He prefers special capsular hooks (by MicroSurgical Technology, Redmond, Wash.) with elongated portions; instead of “resting in the capsulorhexis, they help with capsular support. This is very important because when there’s too much pressure on the edge of the capsulorhexis, the capsulorhexis can break and create radial tear,” Dr. Malyugin said. Although there are several devices capable of expanding the pupil, in the U.S. the Malyugin ring (MicroSurgical Technology) is considered a favorite. Others include the Graether Pupil Expander (EagleVision, Memphis, Tenn.), Morcher Pupil Dilator (Morcher, Stuttgart, Germany), the Oasis Iris Expander (Oasis Medical, Glendora, Calif.), and the Perfect Pupil (Milvella, North Sydney, Australia). Dr. Fladen said the groove in the Graether device was “a little cumbersome,” and he prefers the taper-foot concept of the Malyugin ring. Dr. Malyugin said one advantage of the ring is its 8 points of iris fixation. The increased number of fixation points means surgeons won’t “over-stress or over-stretch the pupil as tends to happen with iris hooks,” he said. The latter creates sphincter tears and causes atonic pupil postoperatively that may occur in up to 15% to 20% of cases when the iris hooks are used, he added. Dr. Miller said identifying those patients with small pupils in the office (during routine dilations) is relatively easy, so he has a “relatively low threshold for doing an injection-type of anesthetic rather than a topical anesthetic. Placing these rings or hooks under topical anesthesia is just a little bit more challenging because they feel the stretch.”

Surgical

techniques

Stabilizing the pupil (and possibly expanding it) with intracameral phenylephrine or epinephrine is recommended first, Dr. Malyugin said. During the cataract surgery itself, he recommends using a “highly viscous OVD; many surgeons prefer using a viscoadaptive OVD like Healon5 [Abbott Medical Optics, Santa Ana, Calif.],” he said. The benefits include deepening the anterior chamber, which also helps expand the pupil. On the negative side, Dr. Malyugin noted OVDs do not last very long in the anterior chamber, rendering them unreliable for the full procedure unless they’re helped with a ring or other pupil expansion device. “Or you can reinject the OVD several times during the surgery,” he said. Dr. Miller said that when the patient is already on the table, “and you’re already in the eye, then I would recommend more lidocaine to make sure the eye is fairly numb” before stretching, he said. “Be very gentle and do not suddenly stretch the iris.” Dr. Malyugin said when using iris expanders, “always inject lidocaine intracamerally” to decrease sensations of the patient. Dr. Miller puts the distal scroll of the Malyugin

device in first, rocks the two side rings in, and “just injects” the last ring into the eye. “Then we’ll take the ring manipulator and hook the last ring over the pupil margin,” he said. If the pupil gets pushed to one side, Dr. Miller said an advantage of the Malyugin ring design allows surgeons to recenter the pupil. Dr. Malyugin advises surgeons “not to overfill” the chamber because that presses the iris toward the anterior capsule. Positioning the injector tip close to the iris margins can be helpful to engage the first scroll as well, he said, and recommends slowly withdrawing the inserter back as that makes it easier to get the ring out. If the pupil “is very small and there are posterior synechiae present, before implanting the ring I like to separate these adhesions with a spatula or some other instrument to free the edge of the pupil so it will be much easier to manipulate the ring in place,” he added. Dr. Fladen cautioned to be wary of not stripping Descemet’s membrane. He uses a thicker OVD to avoid the issue. In cases of “very strong and fibrotic pupils (usually due to uveitis),” posterior synechiae can be complicated by retropupillary membranes and stretching the pupil before implanting a ring can help, Dr. Malyugin said. Dr. Miller said extracting these devices may be more difficult than inserting them. With the Malyugin ring, for instance, the “trick” is to release the distal scroll first, as popularized by Thomas Oetting, MD. “Reach across the eye to take that one off first,” he said. “Push the distal portion all the way into the opposite corner of the anterior chamber. That pushes the entire ring a little farther away from the incision, which makes it so much easier to grab. Then you release the proximal loop. You don’t have to release the other two. Go in with the insertion device and hook the proximal loop,” he said.

Other

possibilities

There are other expanders in development, including the APX (Assia Pupil Expander, APX Ophthalmology Ltd., Haifa, Israel) and the disposable square and hexagonal Bhattacharjee pupil expansion rings (Madhu Instruments, New Delhi, India). Dr. Malyugin called the APX “a great idea” as it helps to reduce the number of paracenteses needed to insert the iris hooks from 4 to 2. The APX achieves pupil expansion by using two devices inserted through two 19G (1.1 mm) sideport incisions located opposite to each other. The curved distal tips are inserted behind the pupil and when the forceps are released, the device opens, developer Ehud Assia, MD, wrote in EyeWorld last year.¹ “The APX goes into a slightly enlarged paracentesis,” Dr. Miller said, which may explain the reduced number needed. The Bhattacharjee device is a ring made from 5-0 black monofilament polyamide, with the end butt joined with glue, said Suven Bhattacharjee, MS, DO, DNB, in his technique article.² The device has been designed in both square and hexagonal versions ranging in size from 6.0 mm to 7.0 mm; the size recommended for use is dependent upon the white-to-white corneal diameter. According to the study results, the device can be inserted in incisions as small as 0.9 mm.

References

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Editors' note: Dr. Malyugin has financial interests with MicroSurgical Technology. Drs. Miller and Fladen have no financial interests related to their comments.

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