

FELLOWS' FOCUS

HOW TO APPROACH PEDIATRIC VITREORETINAL SURGERY



Tips on managing and performing surgery on our youngest patients.

AN INTERVIEW WITH YOSHIHIRO YONEKAWA, MD

BY MATTHEW STARR, MD

Pediatric vitreoretinal surgery is perhaps as challenging as it gets in ophthalmology. This interview focuses on how to approach and manage pediatric vitreoretinal surgery and provides pearls for vitreoretinal surgeons performing these delicate retina surgeries.

Matthew Starr, MD: How do you decide when to operate on a pediatric patient with vitreoretinal pathology? What are the most common types of pathologies you see?

Yoshihiro Yonekawa, MD: Deciding to operate or not is an important question when working with children. The stakes are high, and the surgeries should never be approached in a casual “just a vit” type of mindset.

The therapeutic goals are similar to those in adult surgeries: to improve or preserve vision, and in some cases to salvage the globe. However, the surgical and anatomic goals can be quite different. The decision tree is unique for each pediatric vitreoretinal diagnosis, but we ultimately want to improve the quality of life for the many years that these young patients have ahead of them.

There’s no dull moment in our ORs. This coming Monday in the OR, I’m working on kids with optic disc pit maculopathy, stage 4 retinopathy of prematurity, and siblings with von Hippel-Lindau disease, in addition to numerous adult patients. I personally take well over 100 children to the OR in a year, and all of my 19 surgical partners at Wills Eye Hospital and Mid Atlantic Retina operate on pediatric patients also.

Common pathologies that we routinely fix in our practice also include Coats disease, persistent fetal vasculature, familial exudative vitreoretinopathy, X-linked retinoschisis, rhegmatogenous retinal detachment, traumatic macular hole, combined hamartoma, retinoblastoma-related vitreous

hemorrhage and retinal detachment, trauma-associated complications, and many others.

Dr. Starr: Do you approach pediatric cases differently depending on the age of the child? How do you come up with your surgical plan when approaching a pediatric case?

Dr. Yonekawa: It’s important to consider the pediatric patient holistically. We need to consider not just the eye, but also the child’s age, maturity, family support, whether they play high-risk sports, and their systemic medical status and genetic conditions.

For example, if you have a pseudophakic 60-year-old with a superior retinal detachment, most surgeons in the United States would recommend a straight vitrectomy. However, kids with any rhegmatogenous detachment should be considered for a primary buckle, even if there’s proliferative vitreoretinopathy or vitreous hemorrhage. The younger they are, even more so. Sticklers, giant retinal tear, or self-injurious behavior? Then I would prophylactically laser the fellow eye. Will it be hard to examine the patient in clinic, or will the family have difficulty following up? I might consider a prophylactic buckle in the fellow eye depending on the etiology and pathology. Does the child play contact sports? I would counsel the family and patient about the risks and how to protect their eyes.

Here are a few specific examples of age-related considerations for surgical entry into the eye, which can make or break the case.

- We make pars plana incisions in adults at 3.5 to 4.0 mm from the limbus, but we must not do that in very young children. The pars plana may not be fully developed, and we could go right through the retina if we do that.
- For older kids, 3 to 4 mm is OK.
- For a neonate, 1 mm.

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- If the retina is up against the lens or you have no view in an eye with a peripheral tractional detachment, go limbal, including the infusion.

Think carefully about each incision you make, and make sure to do a good examination under anesthesia first to determine the anatomy. In some eyes, the three cannulas may be in three totally different entry planes. You also may need to sit temporally or even nasally depending on where the pathology is located and where you can safely enter. Maximize your surgical creativity to tackle these cases optimally.

Dr. Starr: What are your rules to live by when performing pediatric vitreoretinal surgery?

Dr. Yonekawa: Preoperative rules:

- Whatever it is, make sure it's not retinoblastoma.
- Think about the entire patient holistically to optimize outcomes.
- Consider widefield fluorescein angiography depending on the differential diagnosis.
- Examine family members if you suspect inherited vitreoretinopathies.
- Make sure to examine the fellow eye well.
- Form a therapeutic alliance with the family.

Intraoperative rules:

- Never make an iatrogenic break in a tractional or exudative retinal detachment. You might lose the eye.
- Scleral buckles are your best friends.
- For vitrectomy cases in which separating the hyaloid is an essential step, use triamcinolone copiously as you will be fooled otherwise.
- No need for tamponade if it's a tractional retinal detachment (retinopathy of prematurity, familial exudative vitreoretinopathy, etc.). Just release the traction without creating breaks. The retinal pigment epithelium will pump the fluid out.
- Know when to *stop* operating. Less is more.

It's also important to communicate well with referring pediatric ophthalmologists. This alliance is key to aggressively address amblyopia and aphakia to optimize visual outcomes.

Dr. Starr: How do you see the future of gene therapy integrating with pediatric vitreoretinal surgery? Is there a specific delivery approach that you think may offer more promise than others?

Dr. Yonekawa: Gene therapy was science fiction a generation ago but is now an FDA-approved reality. Earlier treatment makes sense to optimize long-term outcomes, so I think we will gravitate toward intervening at younger and younger ages.

Gene therapy studies, including those for adult conditions, have been examining subretinal delivery via vitrectomy, subretinal delivery via suprachoroidal catheterization, intravitreal injection, and suprachoroidal injection. There are pros and cons to each of these approaches, but the less invasive ones will be advantageous in minimizing potential complications, assuming that the treatments are equally safe and efficacious.

Dr. Starr: What is your best piece of advice to fellows for performing pediatric vitreoretinal surgery?

Dr. Yonekawa: Helping kids and their families is very rewarding. There's nothing more satisfying than a pediatric vitreoretinal surgery that goes well. You'll often be met with hugs and happy tears of relief from mom and dad. The most common surgical pediatric pathology that young retina surgeons will encounter is rhegmatogenous retinal detachment. Buckle, buckle, buckle. And then buckle some more! ■

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