Floaters, Flickers and Flashes — Oh my!

Let's Review Treatments in Retinal Detachment

by Elisa DeMartino

Pictured above is an extreme example of a detached retina.

Kidding, of course. Human retinas obviously don't detach quite to that extent and are considerably more complicated fix than just a needle and thread. In fact, *PIE* interviewed two vitrectomy experts from across the world to delve into just how intricate treatment for retinal detachment is underneath the surface. Before we hear from them, let's briefly look at the fundamentals.

There are three main types of retinal detachment: Rhegmatogenous, the most common, for which the primary cause is the vitreous separating from the retina due to aging; tractional, in which poorly maintained diabetes causes scar tissue to separate the retina from the back of the eye; and exudative, where fluid accumulates beneath the retina as a result of trauma or age-related macular degeneration.[1]

More rarely, retinal detachment can be caused by other conditions. According to the American Academy of Ophthalmology (AAO), a detached retina can be caused by inflammatory conditions such as uveitis and retinal necrosis, as well as Vogt-Koyanagi-Harada disease, the latter of which is more common in Asia for genetic reasons. Signs of retinal detachment begin with the patient seeing floaters or flashes in their vision.

Naturally, with different problems come different solutions. The most common surgical treatment for a detached retina is vitrectomy, during which vitreous humor gel is removed for better access to the retina and then replaced with saline, a gas bubble, or silicone oil. Vitrectomy is a straightforward procedure for both complicated and uncomplicated, albeit serious, retinal detachments. Other reasons for the vitrectomy's prevalence are that it prevents complications and has a 90% success rate.[2]

Inverted vitrectomy

Dr. Hudson Nakamura, is an ophthalmologist at the Eye Bank Foundation of Goiás, Goiânia, Brazil, with some 25 years of experience. He devised his own unique version of this surgery. Many people are familiar with Brazilians' cool football tricks, but this doctor has a cool trick with eyes!

"I don't know anybody that performs inverted vitrectomy. I am probably the only one in the world." You might ask: What's an inverted vitrectomy? It's exactly what it sounds like! "Everybody starts the surgery and they have in the microscope a small piece that is called the inverter. The lens inverts the image … I don't need this piece. That's why I call it inverted vitrectomy." Dr. Nakamura posts heaps of fascinating videos to the YouTube channel *Retinawesome Retina and Vitreous International and to EyeTube* to demonstrate his surgical method.

"People get crazy when they follow me," he said. "'How can you operate without the inverted image?' Because I learned it. My brain just learned to do the surgery that way." It's worth noting that Dr. Nakamura prefers a wide-angle contact system over the popular non-contact alternative.

Pneumatic retinopexy and scleral buckling

After vitrectomies, the next common surgery is pneumatic retinopexy, a minimally invasive procedure during which a gas bubble is injected into the

vitreous cavity to push the retina into position. It's ideal for retinal breaks or tears but can also be applied in retinal detachment. While a 90% success rate can be achieved if conditions are optimal, this method is not as common as a vitrectomy for a number of reasons: It's argued that it doesn't relieve vitreoretinal traction in aged eyes; it requires more preoperative attention to locate retinal breaks; and the postoperative requirement of the patient to hold their head in position for a week is, frankly, not always realistic![3]

Scleral buckling, our third option, is pretty much what it sounds like. A belt, usually of silicone, encircles the eye and relieves the force of the vitreous tugging on the retina. By itself this procedure will be permanent, but if used in conjunction with another surgery the buckle may be removed later on.

Combined surgical methods of treatment are common. Cryopexy or laser surgery are often paired with pneumatic retinopexy or scleral buckling, for instance, to create scarring that holds the retina in place. The two on their own are really only applied to retinal tears, however.

Combination treatment

Dr. Manish Nagpal, a vitreoretinal ophthalmologist with over 30,000 surgeries under his belt (or should we say "scleral buckle?") describes an interesting way to combine surgical methods in his practice. Scleral buckling, he offers, is being given up to a larger extent because it doesn't keep up with modernizing practices.

However, he prefers them for young people with indications of a localized detachment with only one break. "We do external repair, we don't go in and do a vitrectomy. What we've done is that we've tried to use both together. We use vitrectomy visualizing systems to view inside but then we do buckling surgery from outside," Dr. Nagpal explained. "Then we get the advantage of both. The buckling surgery is good for young people because vitrectomy can lead to early cataract formation and has its own complications."

Dr. Nagpal explained that selecting this or an alternative treatment varies with the type of break they see, alluding to small tears, small holes, giant tears or lattice degeneration with breaks. Still, he reports that 95% of his cases call for vitrectomies.

The "downside" to silicone oil

Dr. Nagpal has authored an expansive list of publications, but one complication source stands out among them: silicone oil-based surgeries. "We've looked at how silicone oil affects the vision while it's inside the eye, and when we remove it the quality of vision improves," he explained. "It's only causing a refractive error difference." Past studies have also shown that particulate matter in the silicone oil can negatively affect vision while the oil is inside, but similarly, vision improves once the oil was removed and those particles went away.

He also discussed the possibility of redetachment in silicone oil-based surgeries. "At times when we remove oil there is a small group of patients who re-detach." Dr. Nagpal describes everything with detailed clarity. "So, we've looked at factors which reduce the chances of redetachment post-oil … in the primary surgeries before putting oil, if you do a 360 barrage laser and remove the oil after 3 months, 6 months, the chances of reattaching are much less as opposed to those who don't have a 360 barrage done on them in the primary surgery." Using a belt buckle with silicone oil also results in less chances of redetachment.

Are your eyes greedy for more material on detachment complications? These doctors are, too: interesting cases fuel them.

"Regular detachments and all are fun, but what I particularly like is complex cases … we get a lot of detachments which are already operated on, when there's a failure the patient comes to us and we reoperate." Dr. Nagpal smiles fondly, saying "and those are the challenges I love."

"We see complicated retinal detachments, that means retinal detachments with proliferative vitreoretinopathy, complicated retinal detachments with epiretinal membranes, complicated retinal detachments together with macular holes," our inverted vitrectomy expert Dr. Nakamura relates. "Of all this stuff I have videos to show." We recommend the videos too!

References:

1. *Retinal Detachment - Symptoms and Causes. Mayo Clinic Website. Available here: https://www.mayoclinic.org/diseases-conditions/retinal-detachment/symptoms-causes/syc-20351344 Accessed on March 17, 2021.*
2. *Vitrectomy. The American Society of Retinal Specialists (ASRS) Website. Available here: https://www.asrs.org/patients/retinal-diseases/25/vitrectomy Accessed on March 17, 2021.*
3. *Stewart S, Chan W. Pneumatic retinopexy: patient selection and specific factors. Clin Ophthalmol. 2018;12:493-502.*

Contributing Doctors

Dr. Hudson Nakamura is an ophthalmologist specializing in the retina and vitreous. He completed his medical degree from School of Medicine at the Federal University of Goiás, UFG and residency from the Base Hospital of the Federal District, Brasília, DF. Presently, Dr. Nakamura is a member of the AAO, Brazilian Council of Ophthalmology, Canadian Society of Ophthalmology and ARVO. He currently works as a professor in the Department of Retina and Vitreous Course of Medical Residency in Ophthalmology at the Bank of Goias Eye Foundation. Dr. Nakamura holds a vitreoretinal disease fellowship from the University of Toronto Canada and the Brazilian Center for Eye Surgery.

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Dr. Manish Nagpal is a vitreoretinal consultant at the RetinaFoundation in Ahmedabad, Gujarat, India. He has been recognized for his development and presentation of surgical videos and educating the ophthalmic community of advancements in information technology within the field

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