Retinal detachment surgery revolution

Groundbreaking new treatment promises speedier recovery and less discomfort

Chris Atchison

Dr. Robert Devenyi has pioneered a new treatment for vision-saving vitrectomies. Patients like North Bay's Phil Rauch, right, urge others not to delay assessment.

It typically starts with a small, dark spot, light flashes or blurred vision at the corner of one's peripheral vision. The symptoms typically intensify and spread, sometimes even emerging in multiple parts of one eye – or both.

It's a frightening condition known as a retinal detachment, when the retina – which sits at the back of the eye and captures light much like camera film, before triggering nerve impulses that create an image for the brain to process – detaches from the eyeball due to small tears or holes, or due to a separation of the vitreous, a gel-like fluid inside the eye.

Phil Rauch knows these symptoms all too well.

Since 2013, the 55-year-old production manager from North Bay, Ont., has experienced five separate retinal detachments in multiple areas of each of his eyes.

"The very first time it caught me off guard because I started seeing a dark spot on my eye; it was like having something on the side of your nose, but nothing was there," he recalls.

According to the Canadian National Institute for the Blind, about half of the population experience vitreous separation by age 50. Nearsightedness, trauma, a family history of retinal detachment and eye diseases, tumours or diabetes can all cause a detachment.

The condition occurs in roughly one person out of every 10,000 in the general population, but is far more common following cataract surgery, when that rate jumps dramatically to one in 100 patients. The condition will eventually lead to blindness, if untreated.

Phil had no idea what was happening the first time he experienced his symptoms. A retinal detachment can permanently impair vision in a matter of days. Indeed, Phil has lost some vision in his left eye, simply because he was unaware of the symptoms.

"I left it for a day before I saw my optometrist, and they told me I had a retinal detachment. They sent me to Toronto right away, to start the process."

According to Dr. Robert Devenyi, a clinician investigator at the Krembil Research Institute and co-director of the Donald K. Johnson Eye Institute – and the doctor who performed Phil's surgeries – that process is called a vitrectomy, a procedure in which the vitreous jelly is removed from a patient's affected eye. In its place, a liquid called perfluorocarbon is injected.

As he explains, the liquid flattens the retina like a steamroller, at which point a laser is used to seal the tear. A reattachment can involve multiple steps, including removing the perfluorocarbon liquid, replacing it with a gas and injecting a silicone oil into the gas-filled eye to help keep the retina in place. Because that oil can only stay in the eye for about three months, a subsequent surgery is required to remove it.

It's a time-consuming process that compromises the patient's vision in the affected eye until the oil is removed. In Phil's case, that meant missing about six weeks of work on more than one occasion during the recovery period.

But if a revolutionary new treatment pioneered by Dr. Devenyi and his Toronto Western Hospital colleagues is approved, the vision-saving vitrectomies of today could soon become obsolete.

While he conducts multiple vitrectomies each week, Dr. Devenyi, who is also the Karen and William Barnett Chair in Ophthalmology, has long been troubled by the discomfort and inconvenience the procedure can cause.

So about three years ago, he began looking for ways to streamline the process. He contacted University of Toronto biomedical engineer Dr. Molly Shoichet, and the two began working on a vitreous substitute.

The result is a groundbreaking hydrocarbon gel, still in experimental trials, that essentially replaces the multiple, complex stages of a vitrectomy with a one-step process.

Here's how it works: When a patient has a retinal detachment, doctors conduct a vitrectomy to remove the vitreous in the individual's eye. But instead of using silicone oil, they inject hydrocarbon gel into the eye to help reattach the retina.

That gel remains in the patient's eye for several months and dissolves on its own, negating the need for a gas injection, the use of silicone oil or subsequent operations.

Perhaps most importantly, the hydrocarbon gel is made with the same optical density as the human eye, so patients maintain their vision while healing. Another benefit: postoperative patients with gas in their eye wouldn't be forced to lie in awkward positions as they recover.

"If they have a gas in their eye, and the tear is in the lower portion of their retina, they'd have to lie with their feet above their heads often for days, a week or more," Dr. Devenyi explains. "But with our vitreous substitute, none of that is necessary. They can be in a normal position."

The promising new procedure would not only mean a more comfortable recovery for patients, but also markedly faster healing times, up to several months less than with the established vitrectomy procedure.

"It's really very exciting to think that if this pans out as we suspect it will, it will change how these procedures are done around the world," Dr. Devenyi says, adding that he's expecting an improvement on the 5 per cent failure rate and 10 to 20 per cent reoperation rate with current retinal detachment methods.

With the hydrocarbon gel now in its seventh (and likely final) laboratory trial version, Dr. Devenyi hopes the procedure will be put into widespread use in about a year.

That development would be welcome news for patients such as Phil, whose lives are temporarily upended by retinal reattachment surgery. In the meantime, he offers this advice to others: don't delay treatment.

"The vision I have lost in my left eye is minimal, but my recommendation is to get to the doctor as soon as you start experiencing something that doesn't look right," he says. "The other times I realized what it was, I reacted right away." ■