

Pars Plana Vitrectomy: Beyond the OR

A Brazilian perspective on why socioeconomic factors might influence how a retina surgeon approaches surgery.

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Pars plana vitrectomy (PPV) is a widely performed operation, and its techniques are well understood. A large number of intraoperative steps and techniques can be adjusted, which will effect the result, outcome, and success of surgery. Something that is not often considered, however, is how influential extrasurgical issues may be in affecting PPV surgical outcomes.

One perhaps underappreciated aspect of surgery is the environment in which it is performed. For instance, every country or region has its own unique health care delivery model, and, when compared to other nations, each of these models has particularities and limitations. In this article, the aim is to discuss how the eye care delivery demands of southern Brazil demonstrate this principle and how an appreciation of these factors may alter the surgeon's approach to surgical planning.

ACCESS TO CARE

A key concept when thinking about world-class medical care is access. In Brazil, for example, the population totals approximately 200 million. One-quarter of the population has health insurance and is able to make use of private practices, while the remaining three-quarters are dependent on government-based public care. According to the World Health Organization, the Brazilian government spent the equivalent of \$466 USD on health care per capita in 2010. By comparison, that is approximately one-fifteenth what Norway spent (\$6875 USD) and one-eighth less than what the United States spent (\$3967 USD).¹

Approximately 6% of the Brazilian population has diabetes; among individuals age 65 and over, 19% have diabetes.² In reality, however, the number of patients with diabetes is likely much higher. In our practice, it is common to see a patient with proliferative diabetic retinopathy who has never had a diabetes test or who was never positively diagnosed.

The publicly funded health care system in Brazil has a unique organizational flow. Every patient seeking medical care is assigned to a basic health unit; from there, a general practitioner routes the patient to a secondary level attention (or specialist) center. Due to high demand and limited supply of specialists, patients may experience extraordinarily long wait times; in the state of Rio Grande do Sul, patients might wait 2 years in an online queue for a vitrectomy. Some smaller regions collaborate with federal, state, and municipal governments to expedite the process, but long wait times continue to plague patients who need immediate intervention.

Nonmedical factors sometimes aggravate the time from diagnosis to surgical intervention. Many patients seen in our surgical center are 60 years old or more, are field workers in the agriculture industry, and have low levels of education. Often, these factors prevent them from arriving at their scheduled appointment times. They may not appreciate the severity of their problem or the need for intervention, they may not be able to take time from work, or they may not have access to appropriate transportation.

Given these circumstances, the word *access* takes on slightly different implications. Due to high patient demand and limited supply of qualified

At a Glance

- Retina surgeons in developing nations must consider socioeconomic factors when planning to perform pars plana vitrectomy in certain patients.
- Surgeons may consider changes in OR equipment and surgical approach given the specifics of a patient's condition.
- The specific steps of surgery, such as the amount of endolaser to apply or the type of tamponade to use, should be decided on a case-by-case basis.

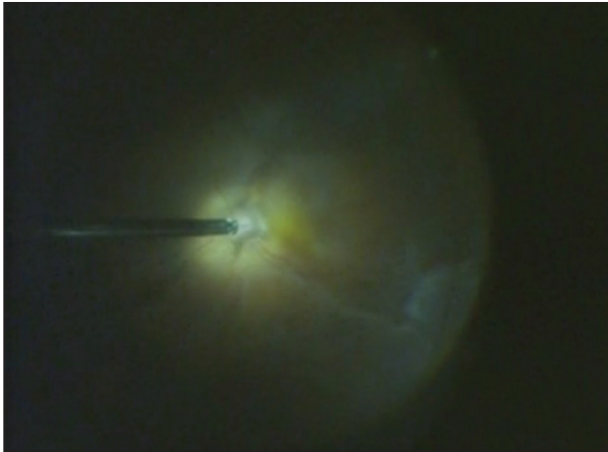


Figure 1. Presence of disease near the posterior pole requires surgeons to take extra steps to ensure patients' safety.

surgeons, Brazilian retina surgeons can define the frequency with which they wish to operate, which in turn affects the number of cases with proliferative vitreoretinopathy (PVR).

EQUIPMENT

The two centers where we perform most of our surgeries are equipped differently. One center has a Möeller-Wedel microscope and a Stellaris PC vitrector (Bausch + Lomb), which is able to perform 5000 cuts per minute (cpm). The other center has a Zeiss microscope and an Accurus vitrector (Alcon), which performs 2500 cpm. In both locations, a 23-gauge, nonvalved trocar system is used almost exclusively.

Visualization systems in retina surgery are paramount. After previously using a contact lens system for a number of surgeries, we now prefer the noncontact WAV system (Oculus BIOM ready). In regions of the world that experience frequent employee turnover and a lack of skilled labor (such as where we practice), choosing a noncontact system avoids having to train assistants on a contact system.

A second illumination source is helpful for visualization. A chandelier illumination fiber can be useful when indenting the eye to check the peripheral retina, and it is indispensable for treating PVR via a bimanual technique.

High cut rate systems and probes with excellent aspiration flow provide the ability to perform a safer vitrectomy and to shave the peripheral retina. In cases in which a retinal detachment persists for at least 90 days, all possible traction should be relieved. In these patients, one can expect the presence of PVR and subretinal fibrosis (SRF), which may also be present at the posterior pole (Figure 1; Video, eyetube.net/?v=oohif). These conditions make surgery more challenging and often require the



Figure 2. Endolaser from a 532-nm probe is applied in three concentric circles. To account for low levels of patient compliance, extra laser may be necessary to reduce the likelihood of redetachment.

retina surgeon to reconsider the surgical strategy. Shaving the periphery decreases the chances of redetachment, an important consideration in a region where patient backlog sometimes interferes with emergency intervention.

CONVENTIONAL PPV SURGERY

Perfluorocarbon (PFC) is not conventionally used in PPV cases, but is used for cases of giant retinal tears or extreme PVR. We tend to perform fluid/air exchange after tension on the retina from the vitreous is relieved. Then, during the fluid aspiration, the probe is introduced inside the retinal tear or close to it to aspirate the maximum subretinal fluid possible. The probe's port is aimed toward the anterior part of the hole to avoid having retinal tissue aspirated into the probe. After this is done, the probe is moved to the optic nerve to drain the rest of the liquid inside the cavity. Then, a silicone-tip cannula is connected to the aspiration system of the machine to perform an active aspiration and reduce the likelihood of damaging the retina.

Video



Following the removal of almost all fluid, laser is applied using a retractable 532-nm endolaser probe (Figure 2). Three concentric laser circles are applied around the tear. Due to the low level of patient compliance, a bit more photocoagulation is done than necessary to prevent a redetachment.

The first choice as tamponade is C_3F_8 gas because it lasts longer than SF_6 and does not need to be removed. However, the patient's level of education and activity are factors when deciding which tamponade to use. In our experience, a low level of education correlates with patients not adhering to postoperative treatment, and frequently, a patient will return to manual labor 30 days following surgery. There may also be difficulty with maintaining postoperative face-down positioning. Given these circumstances, there is a high risk of redetachment. Thus, 5000 cs silicone oil is frequently used instead of 1000 cs, as the former emulsifies quicker.³

After the tamponade, it is important to check the sclerotomy wounds. Leakage sometimes occurs following one-step valved incisions, requiring the surgeon to suture the wound. If there is no intraocular pressure elevation, silicone oil remains in the eye as long as the eye supports it.

CONCLUSIONS AND OUTREACH

Even with improvements and precautions, there are still cases with poor recovery, but changes we have made in our OR protocols and procedures (such as moving from a noncontact lens to a contact lens system) have resulted in improved surgical results. Currently, we are developing a program to educate patients on the importance of postsurgical positioning. We also encourage our patients to educate their respective communities on the importance of eye care, which will hopefully improve self-screening and reduce the number of advanced and/or complicated cases presenting for the first time in the retina specialist's office. ■

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1. World Health Organization. World Health Statistics 2013. Published 2013. Accessed May 14, 2015. http://apps.who.int/iris/bitstream/10665/81965/1/9789241564588_eng.pdf?ua=1.

2. Brazilian Health Ministry. Health Portal. Published December 10th, 2014. Accessed May 18th, 2015. <http://portalsaude.saude.gov.br/index.php/cidadao/principal/agencia-saude/15974-57-4-milhoes-de-brasileiros-tem-pelo-menos-uma-doenca-cronica>

3. Gabel VP, Kampik A, Gabel CH, Spiegel D. Silicone oil with high specific gravity for intraocular use. *Br J Ophthalmol*. 1987;71:262-267.