The 25-gauge transconjunctival sutureless vitrectomy: advantages and limits

Dr. F. Patelli MD, Italy. (International executive editor)

Correspondence address:
Dr. Fabio Patelli, Retina Research Center – Carones Ophthalmology Center, Milan, ITALY.
Email: f.patelli@tiscali.it

Since the introduction of pars plana vitrectomy in the early 1970s by Machemer,[1] advances in the field of vitreoretinal surgery have been dramatic. Machemer initially performed pars plana vitrectomy with the use of 17 gauge cutter (1.5 mm diameter).[2] In 1974 O'Malley designed a smaller vitreous cutter with the diameter of 0.9 mm (20-gauge).[3] This system is still used today. Recently de Juan and colleagues designed a 25-guage system for a transconjunctival sutureless vitrectomy.[4,5] The aim of this new technique is to reduce the surgical trauma and the surgical time with the same anatomic results comparing to the traditional 20 gauge system.

The advantages of the 25-gauge technique are considerable. The surgical trauma is dramatically reduced thanks to the absence of conjunctival peritomy and scleral incisions. Scleral and conjunctival sutures are not required. This permits also a reduction or absence of postoperative patient's discomfort.

The vitreous base is protected by the trocars during the introduction and removal of the instruments. The intraocular fluid exchanges are extremely reduced up to 90% compared with the 20 gauge system. This permits a more stable intraocular pressure during surgery with a consequent reduction of the eye wall trauma. The surgical time is reduced in several pathologies because all the time is spent surgically, and only few seconds are needed to access the vitreous cavity or close the surgical procedure. All these factors consent a less postoperative inflammation and a quicker visual recovery.

This new technique presents at now several limits. Most of them are related to the instrumentation that is still not well designed. The presence of the trocar and the flexibility of the instruments make the surgical maneuvers more difficult and limited. The vitreous base is difficult or impossible to remove, the entry sites are difficult to control during surgery because of the presence of the trocar and the silicone oil exchange is not possible to be performed. The cutter capability and the aspiration rate are much higher in 20 gauge system thanks to a larger cutter port, and with the 25-gauge system a complete vitrectomy takes more time and it cannot be completed.

At the end of surgery the entry sites are closed by the vitreous. For this reason postoperatively hypotony is possible, but it dose not compromise the final result. The presence of the vitreous in the entry sites and subconjuctivally increases the risk of postoperatively endophthalmitis, but the recent statistic presented by de Juan at the American Academy of Ophthalmology meeting in 2004 is 0.2%, as in cataract surgery.

Nowadays cases are recommended for 25-gauge transconjunctival sutureless vitrectomy include epiretinal membranes, uncomplicated retinal detachment, macular hole, branch retinal vein occlusion, Terson and Valsalva syndrome, persistent diabetic macular edema, diabetic vitreous hemorrhage, pediatric surgery. These cases do not require extensive intraocular tissue dissection and therefore are likely to benefit from a less invasive procedure, as much of the surgical trauma in those cases may be

related to the conjunctival and scleral incision procedures.

I believe that one of the principles that guide the development of any given surgical procedure is the desire for less invasive approaches that will achieve same or better outcomes. Many companies are now studying and designing new 25-gauge instrumentation to eliminate the limits of this new technique. The use of 25-gauge has given the vitreoretinal surgeon, for the first time, the opportunity to reduce the surgical trauma with a faster recovery and less postoperative discomfort for the patients. I believe that indications for this new system will expand shortly, and its place in vitreoretinal surgery will soon be established.

REFERENCES

1. Machemer R, Buettner H, Norton EW, Parel JM. Vitrectomy: a pars plana approach. *Trans Am Acad Ophhtalmol Otolaryngol* 1971; 75(**4**): 813-820.
2. Machemer R, Parel JM, Buettner H. A new concept for vitreous surgery. I. Instrumentation. *Am J Ophthalmol* 1972; 73(**1**): 1-7.
3. O'Malley C, Heintz RM, Sr. Vitrectomy with an alternative instrument system. *Ann Ophthalmol* 1975; 7(**4**): 585-594.
4. Fujii GY, de Juan E Jr, Humayun MS *et al*. A new 25-gauge instrument system for transconjunctival sutureless vitrectomy surgery. *Ophthalmology* 2002; 109(**10**): 1807-1812.
5. Fujii GY, de Juan E Jr, Humayun MS *et al*. Initial experience using transconjunctival sutureless vitrectomy system for vitreoretinal surgery. *Ophthalmology* 2002; 109(**10**): 1814-1820.