20-Gauge Sutureless Vitrectomy Trocar System

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Core Message

- Sutureless surgery is available in 25- and 23-gauge.
- Many restrictions are present with those systems.
- 20-gauge sutureless sitrectomy offers the advantages of 20-gauge conventional vitrectomy in a sutureless setting.
- There is a steep learning curve to get acquainted with the trocars.
- It is possible to perform a fast and well-controlled sutureless vitrectomy with the 20-gauge trocar system, with good access to the periphery during vitreous base shaving.
- Almost every pathology can be treated with the use of this system.

22.1 Introduction

Over the past decade, the 20-gauge three-port pars plana vitreoretinal surgery started to trace a path towards sutureless surgery. Starting with Chen [1] and his 20-gauge self-sealing tunnels and all the complications related to them [2–7], and continuing with the smaller-gauge surgeries like the 25-gauge described by Fujii et al. [8, 9] and the 23-gauge described by Eckardt [10], we ended up with many questions on sizes, types of incisions and fluidics parameters.

At this moment, much has already been told about 25- and 23-gauge surgeries, but we can still make some comments. The use of trocars for sutureless vitrectomy was first described by Fujii et al. [8, 9]. A scleral perpendicular 25-gauge incision was used, and they suggested that the holes would be closed because they were small and the conjunctiva would also cover it, serving as a protection. But, is it safe to leave vitreous closing the wound? It might increase the risk of incarceration and secondary retinal detachment, but if this peripheral vitreous were removed, leakage would happen. In our concept, no leakage should be present after peripheral vitrectomy.

Thorough peripheral vitrectomy is almost impossible with the flexible and fragile 25-gauge instruments [11] and also less controllable with its low infusion and aspiration volumes [8].

An alternative method with less, but still flexible instruments was described by Eckardt [10] using a 23-gauge system. He used a 30°–40° tunnel incision made with a stiletto, and inserted the cannulas using a blunt inserter. The fluidics are still different from the 20-gauge we have always been used to, and it still requires a whole new set of instruments what would increase surgical costs and still limit indications.

In 2007 we introduced a new 20-gauge transconjunctival trocar system (DORC, Zuidland, Holland) [12] that allows the use of the conventional 20-gauge vitrectomy in sutureless surgeries. It is analogous to the 23-gauge system; a tangential tunnel is made with a bend stiletto and the trocars are introduced with a blunt inserter in a two-step technique.

22.2 Instrumentation and Technique

The first-generation trocars were designed 3 years ago, but the intense leakage of infusion fluids through those gaping 20-gauge ports caused severe conditions of hypotony at various moments during the surgery. To solve this problem, different types of disposable valves (Fig. 22.1) were developed. The valves keep the eye sealed after retraction of the instruments, and allow the surgeon to have complete control of the intraocular pressure. In addition, they reduce the consumption of infusion fluids. They fit the distal trocar tip and are easily removable (Figs. 22.2 and 22.3). A set (Fig. 22.4) includes: (1) one infusion inserter that...
Fig. 22.1 Valve

Fig. 22.2 Trocars in place with valves

Fig. 22.3 Trocars in place without one valve

Fig. 22.4 A complete set