Chapter 5

23-Gauge One-Step Instrumentation

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5.1 Introduction

Over the past few years, the manufacturers of surgical instruments have tried to combine 25-gauge user-friendlyness and micro-invasiveness with 20-gauge performance when creating 23-gauge surgery.

5.2 Trocar

We have made the transition from a “two step” surgery, which required sclerotomy followed by trocar insertion, to a “one step” surgery with direct trocar insertion into the sclera as done in 25-gauge surgery.

Alcon proposes a “one step” device consisting of a solid stiletto with a trapezoidal cutting section and a cutting diameter of 0.74 mm compared with 0.61 mm for the 25-gauge. The cutting shape was optimized to obtain a better resealing of the edges.

The length of the stiletto is 9.6 mm compared with 9 mm for the 25-gauge. The trocar is in titanium and not in polyamide as is the case for the 25-gauge, and is subdivided into the part out of the sclera, block length 1.5 mm, and a bulbar part of 4 mm compared with 3.51 mm in the 25-gauge, which facilitates a safer oblique insertion. The titanium trocar causes less friction between the surgical instrument and the wall of the trocar itself, which ensures more precise control; the opening of the trocar is funnel-like to facilitate the introduction of the instruments. The trocar section measures 0.75 mm, with an internal lumen of 0.65 mm (Fig. 5.1).

DORC offers a “two-step” to “one-step” device which consists of three stilettos with a closing valve (Fig. 5.2); the valve mechanism prevents vitreous leakage out of the trocar, thereby reducing the possibility of entrapment in sclerotomy, and at the same time the possibility of contamination of the internal part of the bulb by external pathogenous agents. DORC proposes a stiletto with an elliptic section tip (Fig. 5.3) on which a metallic trocar has been fixed to reduce friction.

The universal infusion cannula has an internal diameter of 0.56 mm, compared with 0.42 mm in the 25-gauge, and can be used, like the Alcon infusion cannula, indifferently with any of the three trocars; the insertion of the tube is facilitated by the presence of a central guiding tube (Fig. 5.4).

5.3 Vitrectome

The new 23-gauge Alcon vitrectome functions with a pneumatic mechanism which is based on the pressure difference created on a diaphragm positioned within the instrument, which compresses and decompresses a control spring in the blade in a cyclic manner (Fig. 5.5).

Maximum cutting rate equals 2,500 cuts per minute with enhanced performance compared to a 20-gauge, and compared to 1,500 cuts per minute with a 25-gauge. A high cutting rate reduces the possibility of retinal traction caused by the instrument.

The 23-gauge entry port lies closer to the tip of the instrument than is the case with the 20- or 25-gauge (0.229 mm 23-gauge, 0.356 mm 25-gauge, 0.457 mm 20-gauge), which facilitates a safer and more efficient approach of the retinal surface (Fig. 5.6). Moreover, by adjusting the vacuum parameters appropriately, we can...
Fig. 5.1 Measure characteristics of 23 gauge alcon trocar and stiletto

Fig. 5.2 The one-step Dorc stiletto with closing valve

Fig. 5.3 The elliptic section tip of Dorc one-step stiletto

Fig. 5.4 The 23 gauge alcon infusion cannula can be used for all the 3 trocars

Fig. 5.5 The pneumatic mechanism of Alcon 23 gauge vitrectome