A SIMPLE AND SAFE CAPSULAR STAINER

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Abstract

Continuous curvilinear capsulorhexis (ccc) in cataracts without red reflex offers a difficulty and challenge to the cataract surgeons due to poor visibility. Different techniques have been developed to solve the problem. The capsular staining using different stains like fluorescein sodium, Indocyanin green, trypan blue and gentian violet helps in better visualization. However, the toxicity of these dyes has not been completely excluded.

So, in order to minimize these effects, the minimal amount of these dyes with the least concentration must be used.

A new capsular stainer has been developed which utilizes the idea of a simple dropper is presented by which a microdrop of the stain is relieved above the anterior capsule before dispersing it forming a homogeneous layer of stain.

This newly designed instrument has the advantages of being completely controllable, using only one hand with the least amount of dye(s) and best quality capsular staining preventing the unavoidable excessive staining of the ocular tissues met with when an ordinary insulin syringe has been used.

Introduction

Continuous curvilinear capsulorhexis (ccc) in cataracts without red reflex (e.g. with dense cataracts, heavily pigmented fundi, vitreous diseases or a combination of two or more of these) offers a difficulty and challenge to the cataract surgeons due to poor visibility. Capsulorhexis under air had been tried by Brusini in 1992. The 2-step ccc method which involves creating a small ccc followed by a second one to enlarge the initial capsular opening has been developed for these eyes (Gimbel and Willerscheidt, 1993). These techniques however require
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a substantial skill.

To obtain better visibility of the capsule, different stains were tried such as fluorescein sodium (Hoffer and McFarland, 1993; Fritz, 1998; Nahra, 1998), haemocoloration of the capsule with autologous blood (Cimetta et al.,1995), indocyanin green (Horiguchi et al., 1998), trypan blue (Melles et al., 1999) and gentian violet (Gamal Aldin, 1999; Fekry and Zaghlool, 1999).

However the toxicity and hazardous effects of all of these dyes have not been completely excluded till now and post operative corneal oedema may happen due to endothelial toxicity of the dye. Inadvertent migration of the dyes like fluorescein sodium into vitreous cavity probably because of its smaller molecular weight can happen and so, it could not be removed by irrigation-aspiration (Horiguchi et al., 1998). Thus it needs more work to be more evaluated before routine use.

So, in order to minimize these effects, the minimal amount of these dyes with the least concentration must be used and this is the idea of this new simple capsular stainer presented here after it was manufactured by Geuder AG-Germany.

**Description of the stainer**

As shown in figure (1) it is formed simply of two parts: a metallic hand-piece (A) and a silicone compressible tube (B).

The hand-piece (A) which is similar to that of the flute needle used in vitreoretinal surgery is formed of three continuous parts: its proximal part (part 1 in the figure) can fit with any standard cannula from the front and with the open end of the silicone tube (B) from its back. The intermediate part 2 is no more than a bridge which helps in compressing the tube under the index finger of the user. The distal part 3 is a metallic cylinder in which the distal blind end of the tube is inserted for fixation and good handling.

The compressible silicone tube (B) which is fixed to the back of part 1 as shown in figure 2 with its open end and its blind end is inserted in the hollow cylinder 3 (fig. 3).
Fig. 1: The stainer is formed of two parts:

A: The hand-piece
which consists of:
Part 1: Fits with any standard canula from its front and the open side of the tube (B) from behind.
Part 2: The intermediate metallic bridge
Part 3: The hollow cylinder.

B: The silicone tube

Fig. 2: The proximal open part of the tube is fixed to the back of part 1 of the hand-piece.

Fig. 3: The distal blind end of the tube is inserted in the hollow cylinder of the hand-piece.
How to use the stainer

The tip of the stainer which adapts an aspirating needle if the dye is enclosed in a closed bottle or adapts an anterior chamber canula if it is diluted in a sterile container is used to aspirate the desired amount of the dye by relieving the pressure applied above the silicone tube with the index finger of the surgeon.

The 25 gauge canula is introduced inside the anterior chamber after complete relieve of the pressure on the tube to make the tip free from the dye. This is done through one of the side ports under an air bubble which is bigger or at least equal to the pupil size.

A micro drop of the stain like that shown in figure (4) is relieved above the anterior capsule by applying a gentle pressure on the tube. After ward, we disperse the stain moving the canula along the anterior capsule surface until there is a homogenous layer of stain.

The redundant stain is aspirated by relieving the pressure on the silicone tube creating a negative pressure which is completely under control.

Fig. 4: A micro drop of the stain is relieved by applying a gentle pressure on the tube by the index finger of the surgeon.
Advantages of the new instrument

Complete control of the dye(s) distribution as the excess stain is aspirated when needed and reintroduced to stain another parts of the capsule if there is poorly stained areas. The micro drop of the stain can be left above the desired area to be stained then aspirated at any time when indicated.

One hand is used with a good grip and full control of the staining procedure, so, the other hand can be utilized in maintaining the air inside the anterior chamber with another canula in the other side port.

So the least amount of the dye(s) with the best quality staining of the capsule is used minimizing their toxic effects on the ocular tissues and preventing the unavoidable excessive staining of the ocular tissues. This may open the way to more progress in minimizing the amount of dye(s) used in capsular staining.

References


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