Inadvertent vitreous staining by trypan blue during phacoemulsification

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ABSTRACT

We report a case in which the vitreous was inadvertently stained with trypan blue during cataract surgery.

INTRODUCTION

Trypan blue is commonly used during cataract surgery to enhance visualization of the anterior capsule, especially in white cataracts and patients with corneal opacities.1 It is also used in pediatric cataract surgery and staining of the internal limiting membrane during vitreoretinal surgery.2 Although the safety profile of Trypan blue is good, many authors report adverse events, including inadvertent staining of the intraocular lens,3 posterior capsule,4 cornea1 and vitreous5,7 during attempts to stain the anterior capsule. We report a case in which the vitreous was inadvertently stained with Trypan blue during cataract surgery.

CASE REPORT

A 68-year-old man with no history of previous ocular trauma presented with dim vision in the right eye. The best-corrected visual acuity was 20/40. A mature (LOCSIII) cataract was observed on slit lamp examination. Further anterior segment examination with a dilated pupil did not show phacodonesis or iridodonesis. Angle recession was not observed on gonioscopy.

Surgery was performed under topical anesthesia. The anterior chamber was entered with a 15-degree slit knife and Trypan blue (0.1 ml, 0.6 mg/ml) was injected to stain the anterior capsule. After 10 seconds, the anterior chamber was refilled with sodium hyaluronate 1.4% (Healon GV, Abbott Medical Optics). A 2.75 mm clear cornea incision was made, and a continuous curvilinear capsulorhexis was performed.

During cataract fragmentation, a dark blue glow was observed (Figure 1) instead of a red fundus reflex. This resulted in difficulty removing nucleus fragments and cortex and inserting the intraocular lens (IOL). The patient presented the next day for a postoperative examination and reported blue vision.

Figure 1 - Intraoperative view shows a blue fundus glow as a result of trypan staining of the vitreous.
Visual acuity was 20/40. Intraocular pressure was 20 mm Hg. Slit lamp examination showed particulate Trypan blue in the vitreous cavity. The IOL was well centered and the corneal incision was secure. The vitreous had a blue hue; there was no view of the fundus. B-scan ultrasonography showed no retinal neither choroidal detachment.

A clinical diagnosis of retained Trypan blue was made. A postoperative course of topical ciprofloxacin and prednisolone four times a day was started. The patient returned on postoperative day 5, and visual acuity had improved to 20/20.

**DISCUSSION**

In ophthalmology, Trypan blue has been used to stain the endothelium of donor corneas. Trypan blue 0.06% effectively stains tissue during anterior and posterior segment surgery without significant toxicity to corneal endothelial and retinal pigment epithelial cells with short exposure times.

Several methods of staining the anterior capsule have emerged, including Trypan blue under an air bubble, Trypan blue in a balanced salt solution injected subcapsularly, a prepared mixture of Trypan blue with sodium hyaluronate under an air bubble, and Trypan blue under sodium hyaluronate 1% (Healon GV).

Trypan blue has been reported to inadvertently stain the intraocular lens, posterior capsule, cornea and vitreous. These structures may also become stained if the dye gains access to the vitreous cavity in eyes with a history of trauma or vitrectomy in which there is some degree of zonular dehiscence and separation of the anterior hyaloid face from the posterior lens surface with liquid vitreous.

The patient had no history of blunt trauma, and we assumed the Trypan blue dye gained access to the vitreous cavity through a compromised zonular apparatus as in the case cited, although preoperatively there were no signs to suggest zonular weakness.

The surgery became very complicated, and to avoid complications, we positioned the chopper beneath nucleus fragments during phacoemulsification to separate the phaco tip from the posterior capsule and to avoid rupture (Figure 2). Before cortex aspiration, we inserted the IOL in the bag, and with the direct microscope light reflex on the IOL, visualization of the remaining cortex improved and facilitated aspiration (Figure 2).

Trypan blue dye requires careful use in cases with a history of trauma and possibly compromised zonular integrity. Limiting the duration in which the dye is placed over the capsule or premixing it with an ophthalmic viscosurgical device, as suggested by Chowdhury and coauthors, can limit the access of the dye to the vitreous cavity and avoid complications.

**References**