# To stress or not to stress: vitreous staining with Trypan-blue after imperfect curvilinear capsulorrhexis during cataract surgery

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## ABSTRACT

Trypan-blue is the most commonly used dye in ophthalmic operations, in order to enhance visualization of the targeted tissues. Generally, the application of trypan-blue is considered safe and of increased importance due to expanding indications for its use. Our aim is to report a case of vitreous staining caused by leakage of trypan-blue in the posterior chamber during cataract surgery, and to evaluate the safety and toxicity of trypan-blue application in cataract surgery.

*Key words:* trypan-blue, cataract, vitreous, toxicity.

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## Introduction

Trypan-blue is the most commonly used dye in ocular surgery, in order to enhance visualization of the targeted tissues.[1-4] Its application finds use in most ophthalmic operations varying from cataract to vitreoretinal surgery, corneal transplantation and others.[4] Generally, the application of trypan-blue is considered safe and of increased importance due to expanding indications for its use.[2-4] However, complications have been reported mainly due to cell death after prolonged exposure to high concentrations of the dye, constituting the use of trypan blue a growing area of research.[2-3] The main objective is researchers to determine the concentration of the solution which is not toxic and has the minimal clinical impact.[2-3] Our aim is to report a case of vitreous staining caused by leakage of trypan-blue in the posterior chamber during cataract surgery, and to evaluate the clinical outcome after cataract surgery.

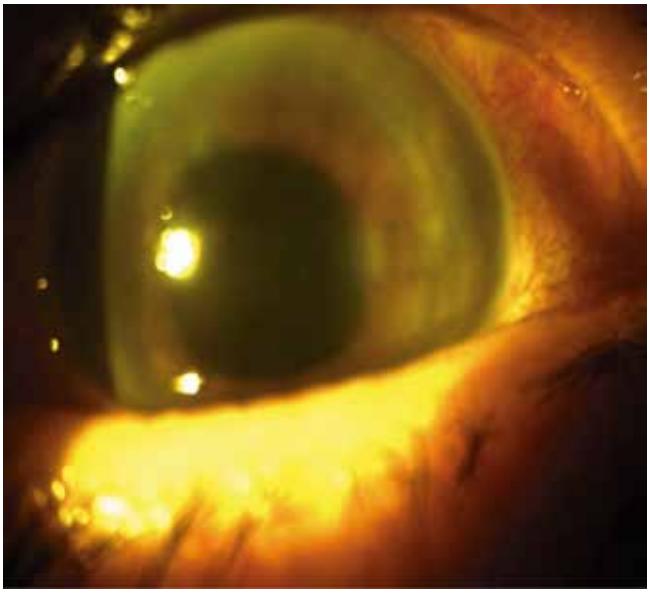

*Figure 1: Slit lamp examination on the first postoperative day shows a uniform bluish fundal glow*

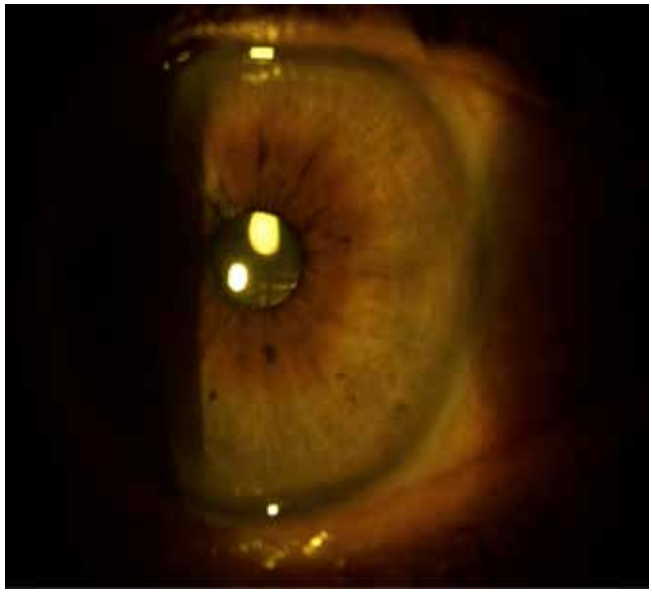

*Figure 2: Slit lamp examination 7 days after surgery, showing amelioration of the staining*

## Methods

Trypan-blue capsule staining was used during cataract surgery on an 80 year old male, in order to facilitate capsulorrhexis due to mature cataract. The continuous curvilinear capsulorrhexis was eventful, since a small posterior capsule rupture occurred, therefore leading to accidental vitreous staining. This made the operation much more difficult, due to the loss of red reflex. (Figure 1).

## Results

Fortunately, the operation was completed uneventfully. The small radial tear did not extend to the lens equator. Hydrodissection was risky, so we limited it, by injecting a very small amount of BSS just under the anterior lens capsule and within the nucleous, far away from the tear. Cracking and sculpting were avoided completely. Phacoemulsification was performed after cortex aspiration. We preferred to place a 3-piece IOL in the ciliary sulcus, in order to avoid further IOL decentration or dislocation due to asymmetric zonular support and capsular contraction after surgery.[5] Finally, the vitreous staining started to clear in a week's time (Figure 2) and IOP was always within the normal range and was restricted completely within two weeks. The patient's best corrected visual acuity was 0.8 and both slit-lamp examination and fundoscopy showed within normal limits one month after surgery.

## Discussion

Trypan-blue is a widely used vital dye in most ophthalmic operations and has been tested in numerous clinical studies for its safety.[1-4] The majority of these studies have revealed no significant toxicity or complications relevant to its use, such as rise of the IOP, increase of intraocular inflammation, associated post-operative macular edema, thickening of the cornea or decrease of endothelial cell count.[2-3]

Nevertheless, retinal toxicity has been reported in cases of prolonged dye exposure in higher concentrations than 0.06%.[1,3] More specifically, studies have revealed retinal toxicity, photoreceptor damaging and marked disorganization in rabbit eyes, after injecting trypan-blue in the vitreous cavity in concentrations of 0.2%,[1] whereas the short-term presence of trypan-blue at a concentration of 0,06% in the vitreous cavity proved to be harmless. In addition, several studies have been carried out in order to determine the lowest trypan blue concentration that satisfactory stains the anterior capsule for a safe continuous curvilinear capsulorrhexis during cataract surgery.[2] Most agree that a concentration as low as 0,1% of trypan blue can adequately stain the anterior capsule, even under dispersive viscoelastic material.[2]

In our case, there were no postoperative complications associated with trypan-blue staining of the vitreous after imperfect curvilinear capsulorrhexis during cataract surgery.

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