

M Soni, M Mughal and G Kirkby

Vitreo-retinal Surgery Unit, Birmingham & Midland  
Eye Centre, Birmingham City Hospital,  
Dudley Road, Birmingham,  
West Midlands B18 7QH, UK

Correspondence: G Kirkby,  
Tel: +44 121 507 6806;  
E-mail: graham.kirkby@swbh.nhs.uk

*Eye* (2006) **20**, 1308–1310. doi:10.1038/sj.eye.6702161;  
published online 13 January 2006

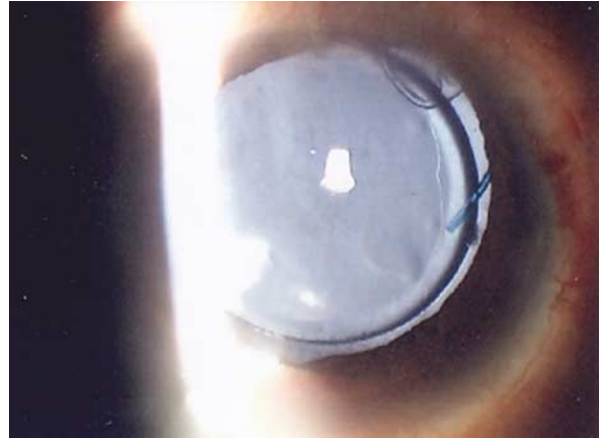
Sir,  
**Trypan blue-associated retinal toxicity post  
complicated cataract surgery**

#### Case report

A 30-year-old Chinese female consulted for progressive blurring of vision of the right eye after sustaining a blunt injury 1 year prior. On examination, best-corrected visual acuity (BCVA) was 20/70. Pupillary responses were normal. There was an iridodialysis and subluxation of the cataractous lens. The posterior segment was unremarkable.

Trypan blue (0.06%) (VisionBlue<sup>®</sup>, DORC International, Netherlands)—enhanced phacoemulsification was performed using a temporal clear corneal approach. The anterior chamber was filled with sodium hyaluronate 3%-chondroitin sulphate 4% (Viscoat<sup>®</sup>, Alcon Ophthalmic, Fortworth, TX, USA). Trypan blue was injected directly over the anterior capsule, avoiding the area of zonulysis. However, the dye was noted to enter the vitreous cavity from the area without clinically evident zonulysis posterior to the corneal incision. Irrigation was immediately carried out with balanced salt solution to remove excess dye. The loss of red reflex made phacoemulsification and the visualization of the capsular bag very difficult. After a Cionni 1L capsular tension ring (Morcher<sup>®</sup> Cionni capsular tension ring, FCI-Ophthalmics Inc., MA, USA) was inserted and scleral fixated at the 2 O'clock position with 10–0 prolene under a scleral flap, an acrylic lens was implanted in the capsular bag. The iridodialysis was simultaneously repaired with 10–0 prolene. As there was no vitreous presentation, vitrectomy was not performed.

On the first postoperative day (POD), the visual acuity was 20/50. A grade 1 relative afferent pupillary defect (RAPD) was noted. The vitreous cavity had a moderate bluish hue that persisted until the fourth POD. (Figures 1



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



**Figure 2** Fundal examination shows a moderate bluish hue in the vitreous cavity.

and 2) There was no macular oedema or other fundus lesions. Multifocal ERG (mfERG) showed reduced foveal P1 response without significant delay in implicit time (IT). Full field scotopic and photopic responses were subnormal without significant delays in IT.

At 1 month, BCVA was 20/20; the RAPD had resolved. Repeated testing showed normal photopic a-wave amplitudes and near normal photopic b-wave and 30 Hz flicker amplitudes.

#### Comment

Our patient presented with transient decrease in retinal responses post phacoemulsification, for which we suggest a multifactorial aetiology.

Inadvertent vitreous staining has been reported in cases with presumed zonular weakness post-trauma.<sup>1,2</sup>

In this case of post-traumatic cataract with subluxation, the dye was noted to enter the vitreous cavity through clinically evident and nonevident areas of zonular loss. Although Trypan blue at a concentration of 0.06% with exposure time of 2 min has not been found to cause retinal toxicity,<sup>3–5</sup> prolonged dye exposure has been reported to be toxic to the retina. In this case, the dye remained in the vitreous for 4 days thereby resulting in toxicity.

Photochemical damage from prolonged coaxial microscope light exposure could also explain the depressed mfERG foveal responses in our case. However, there were no fundus lesions typical of photochemical damage to support this diagnosis. Nevertheless, its role as a possible potentiating factor is considered.

Hence, the prolonged dye exposure, in addition to the extended surgical time, and hence, coaxial microscope light exposure, could have contributed to the transient retinal toxicity observed in our patient.

In complicated cases such as subluxated cataracts that may benefit from the use of Trypan blue, we recommend the following measures to minimize the risk of Trypan blue-associated toxicity to the retina: (1) Use lower concentrations of dye as previously described,<sup>6,7</sup> (2) Use dispersive ophthalmic viscoelastic devices (OVD) to seal the anterior chamber angles using the following techniques: (2a) Inject the dye onto the anterior lens surface under Viscoat<sup>®</sup> (2b) the 3-step technique described by Marques *et al.*,<sup>8</sup> or (2c) Akahoshi's soft shell stain technique.<sup>9</sup>

In conclusion, the use of capsular dyes is relatively safe for use in cataract surgery at low concentrations and brief exposure times. However, for complicated subluxated cataracts, it is necessary to exercise utmost caution to minimize outflow of dye into the vitreous cavity and prevent potential retinal toxicity.

## References

- 1 Chowdhury PK, Raj S, Vasavada A. Inadvertent staining of the vitreous with trypan blue. *J Cataract Refract Surg* 2004; **30**: 274–275.
- 2 Gaur A, Kayarkar V. Inadvertent vitreous staining. *J Cataract Refract Surg* 2005; **31**: 649.
- 3 Vote BJ, Russell MK, Joondeph BC. Trypan blue-assisted vitrectomy. *Retina* 2004; **5**(24): 736–738.
- 4 Haritoglou C, Eibl K, Schaumberger M, Mueller AJ, Priglinger S, Alge C *et al.* Functional outcome after trypan blue-assisted vitrectomy for macular pucker: a prospective, randomized, comparative trial. *Am J Ophthalmol* 2004; **138**: 1–5.
- 5 Li K, Wong D, Hiscott P, Stanga P, Groenewald C, McGalliard J. Trypan blue staining of internal limiting membrane and epiretinal membrane during vitrectomy: visual results and histopathological findings. *Br J Ophthalmol* 2003; **87**: 216–219.
- 6 Veckeneer M, van Overdam K, Monzer J, Kobuch K, van Marle W, Spekrijse H *et al.* Ocular toxicity study of trypan blue injected into the vitreous cavity of rabbit eyes. *Graefes Arch Clin Exp Ophthalmol* 2001; **239**: 698–704.
- 7 Yetik H, Devranoglu K, Ozkan S. Determining the lowest trypan blue concentration that satisfactorily stains the anterior capsule. *J Cataract Refract Surg* 2002; **28**: 988–991.
- 8 Marques D, Marques F, Osher R. Three-step technique for staining the anterior lens capsule with indocyanine green or trypan blue. *J Cataract Refract Surg* 2004; **30**: 13–16.
- 9 Akahoshi T. Soft shell stain technique for white cataract. Presented at the ASCRS symposium on Cataract, IOL and Refractive Surgery, Boston. May 2000.

KME Bacsal<sup>1</sup> and S-P Chee<sup>1,2</sup>

<sup>1</sup>Singapore National Eye Centre, Singapore

<sup>2</sup>National University of Singapore, Singapore

Correspondence: S-P Chee,

Tel: +65 6227 7255;

Fax: +65 6227 7290.

E-mail: sneccsp@pacific.net.sg

Proprietary Interests: The authors have no proprietary interests in the drugs and equipment mentioned in this paper

Financial Support: No financial support was received for this paper

Presentation at Meetings: This paper has not been presented at any meeting

*Eye* (2006) **20**, 1310–1311. doi:10.1038/sj.eye.6702164; published online 18 November 2005

## Sir, Effectiveness of emergency argon laser retinopexy performed by trainee doctors

Dr Ghosh *et al.*<sup>1</sup> reported that a significant proportion of patients (24%) undergoing laser retinopexy required further interventions and the unfamiliarity of the trainees towards laser indirect ophthalmoscope had been attributed as the most important factor for retreatment. However, based on the data cited, we found it difficult to concur with authors' conclusion.

Authors had observed that 24 patients (24%) requiring retreatment and a significant proportion of them (13 patients) had inadequate coverage of the retinal break.<sup>1</sup> We believed that the technique in delivering laser was not the sole factor in determining the adequacy of laser