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Sequential Dye Staining for Macular Hole Surgery

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Abstract

Trypan blue and Indocynanine green dye (ICG) has been used in epiretinal membrane and macular hole surgery. A 29 year old female diagnosed to have a full thickness macular hole with epiretinal membrane underwent surgery with sequential staining with trypan blue and ICG. Postoperatively, the macular hole was successfully closed and visual acuity improved from 20/400 to 20/80 at 2 months.

INTRODUCTION

Epiretinal membranes (ERM) develop as a result of proliferation of glial cells and deposition of collagen on the retinal surface. In advanced stages, ophthalmoscopically it appears as increased tortuosity of temporal arcade vessels as well as striae and folds in the underlying retina. Prolonged traction can give rise cystoid macular edema, macular cyst formation and even full thickness macular hole.

Various coloring agents like trypan blue, indocyanine green and infracyanine green are being used for staining ERM and internal limiting membrane (ILM).[1,2] Colorising the tissue aids in easier visualisation of the membrane and also judging the completeness of the peeled membrane.[3] We present a case of sequential staining of a thick epiretinal membrane with trypan blue and ILM with ICG in the management of secondary macular hole.

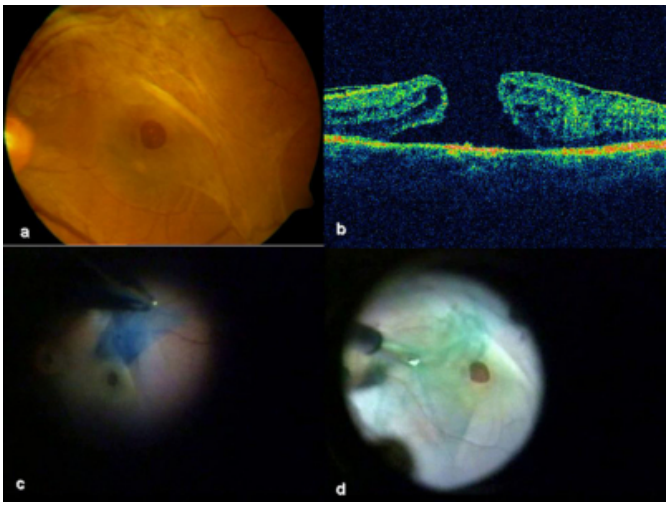
CASE REPORT

A 29 year old female patient presented to our retina department with decreased vision in the left eye for last 10 months. She gave history of undergoing cryotherapy in both the eyes for peripheral retinal angioma 11 years ago. On her last examination 10 years ago, she had visual acuity (VA) of 20/20 in the right eye and 20/50 in the left eye. An early epiretinal membrane (ERM) in the macula was observed in the left eye.

On examination, her best corrected visual acuity (BCVA) was 20/20; N6 and 20/400 in the right and left eyes respectively. Anterior segment examination was unremarkable in both eyes. Fundus examination revealed ERM (Grade 3) with full thickness macular hole in the left eye (Figure 1) and right eye was unremarkable. There was peripheral cryo scar in both the eyes. Optical coherence tomography (OCT) left eye showed high reflective membrane over the retinal surface in macular region suggestive of epiretinal membrane and full thickness macular hole with minimum width of 708 m (Figure1). A diagnosis of ERM with secondary macular hole in the left eye was made.

Figure 1

Figure 1: shows the preoperative color fundus photograph (a) of the left eye with full thickness macular hole with epiretinal membrane as also seen on OCT (b). Intra-operative initial staining with trypan blue (c) shows well demarcated epiretinal membrane and sequential staining with ICG after ERM peeling shows a prominently stained ILM (d).

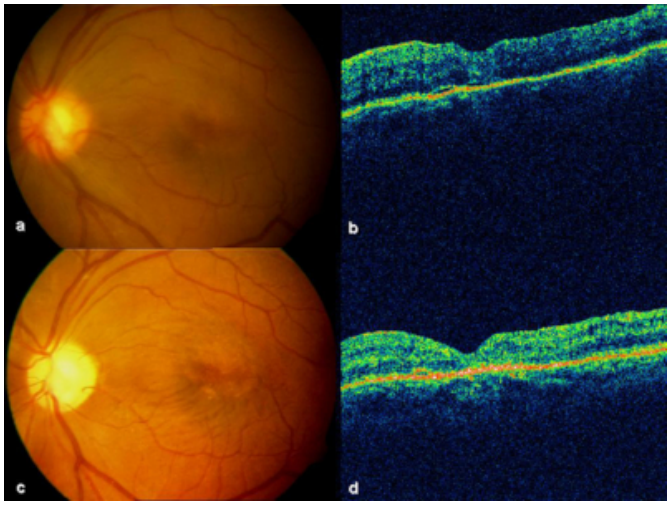


After proper informed consent, she underwent parsplana

vitrectomy with trypan blue assisted ERM peeling and indocyanine green dye assisted internal limiting membrane (ILM) peeling and C3F8 gas injection. Surgical steps included standard three ports pars plana vitrectomy with creation of posterior vitreous detachment, followed by fluid air exchange. 0.2 ml of trypan blue dye (0.5% Membrane Blue; Dorc International, Rotterdam, The Netherlands) was injected over the posterior pole. After a minute, excess dye was aspirated and vitreous cavity was refilled with fluid. ERM was peeled in toto (Figure 1). In order to proceed with ILM peeling and avoid ICG toxicity on the exposed retinal pigment epithelium at the bed of the macular hole, small bubble of perfluoro-octane (PFO) was injected over the macular hole, followed by ILM staining using of 0.1% indocyanine green dye. After 30 seconds excess dye and PFO was aspirated. ILM peeling was completed grasping with Eckardt's ILM forceps (Figure 1). Complete fluid air exchange was done and retina dried. Then air - 14% C3F8 gas exchange was done. Postoperatively, patient was advised prone position eight hours a day for one week, and prescribed topical steroid – antibiotics in tapering doses for one month and cycloplegic eye drops for two weeks. Macular hole was observed to be closed. (Figure 2)

Figure 2

Figure 2: Color fundus photograph (a,c) and OCT (b,d) shows a successful closure of macular hole at one month (a,b) and two month (c,d).



2 months following surgery, her BCVA was 20/80 in the left eye. Fundus examination showed closed macular hole (Figure 2). OCT showed a well maintained foveal contour with closed hole (Figure 2). The foveal thickness measured 124 microns.

DISCUSSION

It has been shown that trypan blue (TB) and infracyanine green can be used in the same procedure due to complementary staining properties for epiretinal membrane and internal limiting membrane. [4] One anecdotal report suggested immediate sequential use of Trypan blue and ICG dye for staining ERM and ILM and then perform the surgery. [5] Such differential staining can assists the surgeon to perform complete removal of ERM and ILM in successful macular hole surgery.

The present case has also shown that differential staining for ERM and ILM is possible. However, unlike other reports [4,5] ERM was stained and peeled first followed by ICG to stain and peel ILM. Gas exchange was done at the end of the procedure. Histopathology has also shown that double staining corresponded to the epiretinal membrane and ILM. [4] We have also shown indirectly that after successful removal of ERM, ILM could be removed entirely and completely (Figure 1).

Hence, trypan blue and ICG can be used sequentially in the management of macular hole associated with ERM. Such sequential staining in macular hole surgery was not shown earlier.

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