Macular Hole Surgery : Maiden Experience

Lt Col R Maggon*, Col JKS Parihar SM, VSM⁺, Brig DP Vats SM, VSM[#], Lt Col V Mathur**, Lt Col S Mishra⁺⁺

MJAFI 2009; 65 : 77-79

Key Words : Macular holes; Retinal detachment; Vitrectomy

Introduction

Macular holes (MHLs) first described over a century ago by Noyes [1], have seen a renewed interest in their pathophysiology and management in the last two decades. They occur following trauma, laser treatment, cystoid macular edema, retinal vascular disorders, retinal detachment (RD) or may not have any detectable cause. Most MHLs occur as age-related primary idiopathic entities. Full thickness MHLs were once considered untreatable and were treated only when there was an accompanying extensive RD. Initially MHLs were treated with achieving strong vitreo-retinal (VR) adhesions around the MHL but with refinement of VR techniques and emphasis on tangential traction being responsible for the MHL, retinal surgeons are attempting treatment with vitrectomy, membrane peeling and intra-ocular gas tamponade.

Case Report

This 25 year old serving soldier sustained injury to both eyes (BE) in Nov 2005 when a battery suddenly burst. He suffered chemical trauma to BE and a plastic fragment hit his left eye. He had ocular inflammation that subsided with topical steroids, antibiotics and cycloplegics. His right eye (RE) improved to a Snellen's visual acuity (VA) of 6/6 with no residual abnormality but the left eye (LE) had VA of only 6/60 with a quiet anterior segment. Fundus examination revealed a clear media, a normal optic disc (OD) and a large ½ disc diameter (DD) MHL. A stereoscopic examination showed that the MHL was lamellar with evidence of perilesional edema that had not resolved in spite of four weeks of oral steroids (Fig.1). Amsler grid showed a large central scotoma with significant distortion. The macular surface looked taut but since no visible membrane was seen, no surgical intervention was contemplated.

Follow-ups showed a deepening MHL assuming full thickness with a taut surrounding retina. The patient presented again in August 2007 with sudden fall in central

vision and a rapid deterioration of paracentral vision. His VA was 3/60 with a quiet eye. The MHL now had a distinct macular pucker that had caused a perilesional tractional retinal detachment (TRD) (Figs 2,3). There were marked striae from the OD to the macula and a threat of a secondary rhegmatogenous RD. At this stage a MHL surgery to relieve tangential traction due to this epiretinal membrane was planned.

A standard 3 port pars plana vitrectomy (PPV) was done with the 4 mm infusion cannula placed 4 mm from the limbus (phakic). Clear vitreous was stained with triamcinolone acetate (TCA) and a vitrectomy was done. Attempts to induce a posterior vitreous detachment (PVD) failed due to the thickness of membrane and its strong adhesions around the MHL. An air-fluid exchange was done and the epiretinal membrane was stained with trypan blue. Finally we made two nicks at 3 and 9 o'clock of this traction ring with the intravitreal scissors and gently pulled it away with an intravitreal forceps (Fig.4). The traction appeared relieved even per-operatively but a nearly 5 DD central RD around the MHL was a cause for concern and a prophylactic endolaser was done in all quadrants. A gas-air exchange using a 17% mixture of non-expansile gas using C3F8 was done and PPV ports were closed. The patient was put on oral and topical steroids-antibiotics and was instructed to maintain strict prone position with meal and toilet exemptions.

The patient reported improvement the very next day when he said the dark curtain that had appeared suddenly had disappeared but his central vision still remained 5/60. The size of MHL had reduced by 50%. After four weeks the vision had improved to 6/24, lens was clear, the MHL was reduced to a size of pinhead, perilesional traction and RD had resolved nearly completely (Figs.5,6). Amsler distortion had nearly regressed with a small paracentral scotoma.

At present, nearly 12 weeks after surgery the lens is clear, retina is attached, gas bubble has absorbed, best corrected VA is 6/18, the MHL has completely resolved with minimal Amsler distortion.

*Classified Specialist (Ophthalmology) & Vitreo-retinal Surgeon, Command Hospital (WC), Chandimandir. **Senior Advisor (Ophthalmology & Anterior Segment Surgeon), **Classified Specialist (Ophthalmology) & Anterior Segment Surgeon, **Graded Specialist (Ophthalmology), Army Hosp (R&R) Delhi Cantt. #Commandant, Command Hospital (SC), Pune.

Fig. 1 : Optical coherence tomography at presentation

Fig. 2 : Macular hole with marked traction

Fig. 3 : Optical coherence tomography before surgery

Discussion

MHLs were virtually untreatable and were treated only when there was a concurrent extensive RD [2, 3]. Recently, it has been hypothesised that idiopathic MHLs are a result of tangential vitreo-foveal traction caused by cortical vitreous adherent to the retinal surface and their evolution is a continuum. [4].

Initial treatment attempts were based on creating strong peri-lesional chorio-retinal adhesions but photocoagulation invariably caused foveal damage. With improved techniques and better understanding surgeons

Fig. 4 : Points of the nick & direction of peeling

Fig. 5 : Fundus picture at four weeks

Fig. 6 : Optical coherence tomography at four weeks, minimal sub-retinal fluid persists and foveal contour has not returned

have started treating MHLs with removal of posterior cortical vitreous, peeling of the internal limiting membrane (ILM) and intra-ocular gas tamponade. A PVD and complete removal of the cortical vitreous is important to remove all traction on the MHL. Thereafter ILM has to be enhanced using either indocyanine green (ICG) or trypan blue. We used trypan blue instead of ICG for reasons of cost, availability and suspected retinal toxicity of ICG.

Das et al [7] in their study of 54 cases of idiopathic or traumatic MHLs achieved a closure in 96% cases with the above technique involving ILM peeling and in only 72% cases without ILM peeling. In another study of 37 eyes with full thickness MHLs, Wolf et al [8] achieved anatomical closure in 36 (97%) and improvement in VA in 62%. They used ICG for enhancing and peeling the ILM. There are other reports in literature of successful MHL closure with this technique [9,10].

In our case there was a thick PVD ring that had failed to detach fully and caused traction to the point of creating a TRD. It stained well with trypan blue but attempts to free it with a diamond dusted Tano's brush failed to create a cleavage plane. We had to make two nicks with intravitreal scissors and then gently pull the loose cut ends with forceps to complete the PVD. The released traction reduced the hole diameter preoperatively itself but a large (nearly 5DD) neurosensory detachment was a cause for concern. We did endo-photocoagulation in all quadrants and injected intraocular gas (C3F8 -15%) with instructions to the patient to maintain a head low posture. The MHL showed signs of closure on the very first visit and has steadily improved thereafter. The lens was still clear at the last visit and a small remnant of gas bubble persists. Such VR procedures on phakic eyes do cause lenticular opacities in most of the eyes and he may have to be taken up for cataract surgery later.

MHLs are extremely common and are a significant cause of poor vision amongst the elderly. It is important to attempt to treat them, as their anatomical closure nearly always improves the vision and helps the patient

overcome distressing central scotoma. The surgery is a complex vitreo-retinal procedure that demands significant cooperation from the patient.

Conflicts of Interest

None identified

References

1. Noyes HD. Detachment of Retina with laceration at macular lutea. *Trans Am Ophthalmol Soc* 1871, 1:128-9.
2. Margherio RR, Schepens CL. Macular breaks. II. Management. *Am J Ophthalmol* 1972; 74: 233-40.
3. Harris ML, de Bustros S, Michels RG. Treatment of retinal detachment due to macular holes. *Retina* 1984 ; 94: 144-7.
4. Johnson R, Gass JDM. Idiopathic macular holes: observations, stages of formation and implications for surgical intervention. *Ophthalmology* 1988; 95:917-24.
5. Wendel RT, Patel AC, Kelly NC. Vitreous surgery for macular holes. *Ophthalmology* 1993;72:1671-6.
6. Sjaarda RN, Frank DA, Glaser BM et al. Assessment of vision in idiopathic macular holes with macular microperimetry using scanning laser ophthalmoscope. *Ophthalmology* 1993; 100:1513-8.
7. Das T, Parida S, Majji AB. Does Internal Limiting Membrane Peeling in Macular Hole Surgery Improve Reading Vision? *Indian J Ophthalmol* 2003; 51:251-4.
8. Wolf S, Reichel MB, Wiedemann P, Schnurbusch UEK. Clinical findings in macular hole surgery with indocyanine green-assisted peeling of the internal limiting membrane. *Graefe's Arch Clin and Experi Ophthalmol*. 2003; 7: 589-92.
9. Kwok AKH, Lai TYY, Li WWY, Yew DTW, Wong VWY. Trypan blue and indocyanine green assisted epiretinal membrane surgery: clinical and histopathological studies. *Eye* 2004;18:882-8.
10. Kwok AKH, Lai TYY, Yuen KSC. Epiretinal membrane surgery with or without internal limiting membrane peeling. *Clinical & Experimental Ophthalmology* 2005; 33:379-85.

Erratum

A randomized investigator-blind trial of different passes of microdermabrasion therapy and their effects on skin biophysical characteristics (*Journal Scan*), *MJAFI* 64; 300.

Authors: For Wg Cdr S Grover Amend: Lt Col M Chatterjee, Classified Specialist (Dermatology & STD), Command Hospital (SC), Pune.