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AUTOLOGOUS NEUROSENSORY RETINA TRANSPLANTATION FOR TREATING TRAUMATIC MACULAR HOLE

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Abstract. Macular hole (MH) is a defect of the neuroretina in the foveal central, which may result in the inadequacy of high acuity vision or in complete vision loss [1]. Traumatic macular hole (TMH) is the second most common cause of MH globally. TMH is defined as the hole in the macular region of the retina caused by the mechanical stress or hitting by an object [2]. Knapp and this team described the very first case of TMH in 1869 [3]. Commonly, the MH can be closed by using internal limiting membrane (ILM) peel with gas or air tamponade [4]; inverted ILM flap technique [5]; or autologous ILM flap6. However, these techniques are not suitable for closing the large MH. The success of Autologous Neurosensory Retina Transplantation (ANRT) by Grewal and Mahmoud (2016) has opened the new ventures for treating complicated MH [7]. In the present case report, we used the technique proposed by Grewal and Mahmoud with some intraoperative variables to treat a traumatic MH [7,8].

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Case Report.

A 12-year-old Asian male patient visited Soni Eye Care Centre, Doraha, Punjab (India). The chief complaints were a sudden diminution of vision, floaters, and heavy pain in his left eye following trauma caused by a brick accident. The slit-lamp examination revealed that his left eye vision was hand movement close to the face (HMCF). There was a presence of central epithelial defect in the cornea and temporal tear in the conjunctiva. In addition, the pupil was mid-dilated and non-reacting. The anterior chamber had a dispersed hyphema, the lens was clear, but vitreous haemorrhage was present (Figure 1A).

As a primary procedure, a bandage contact lens was applied and the patient was recommended for topical drops such as atropine (twice daily), moxifloxacin (six times a day), dexamethasone (six times a day), timolol (twice daily), and carboxymethylcellulose (four times a day) for treating the hyphema. Along with these topical drops, the patient was also asked to take an oral steroid in tapering form.

At 12 days follow-up, the hyphema was cleared. During that time, the patient had spikes of increasing intraocular pressure (IOP; 35 mmHg) for which more topical drops in the form of brimonidine and dorzolamide (both twice daily) were recommended. As hyphema was cleared, a sphincter tear was found responsible for the mid dilated pupil during the first visit. The fundus was visible on the 12th day upon examination, which showed a traumatic macular tear in the left eye with rhegmatogenous retinal detachment and vitreous haemorrhage. Remarkably, the IOP was reduced to 18 mmHg and the patient was advised for the surgery.

On 27th day from the first visit, the patient underwent the surgical procedure. The technique involves a pars plana vitrectomy with post vitreous detachment induction7. The autologous neuro sensory retina was harvested and positioned over the MH. It was done by using perfluorocarbon liquid for tissue stability followed by fluid air exchange and endo laser to the part from where the retinal graft was taken with silicon oil insertion (Figure 1B).

Post-operative, the patient was advised to re-start the topical drops as mentioned above and suggested to rest in the prone position. On subsequent follow-up, the grafted neuro sensory retina maintained its position. The vision was improved with a best corrected visual acuity (BCVA) of 4/60.

Silicon oil was removed on 45th day post-surgery by using conventional technique (23g pars Plana route using active oil suction). The patient maintains a vision of 6/60 with an attached neuro sensory retina which was grafted in situ (Figure 1C and 1D).

Discussion. MH are full thickness defects of neuroretina that disrupt foveal contour [3]. The prevalence of TMH in closed and open globe trauma is 1.4% and 0.15%, respectively [9]. TMH incidence is more common among young population and severe trauma may even leads to vitreous haemorrhage, choroidal rupture, damage in retinal pigment epithelium and photoreceptors [10].

For the treatment and prognosis of TMH, limited clinical guidelines are available. In the present case-report the patient came with a traumatic eye and the retina was not visible because of vitreous haemorrhage. The macular hole was very large which couldn't be treated by standard techniques; therefore,

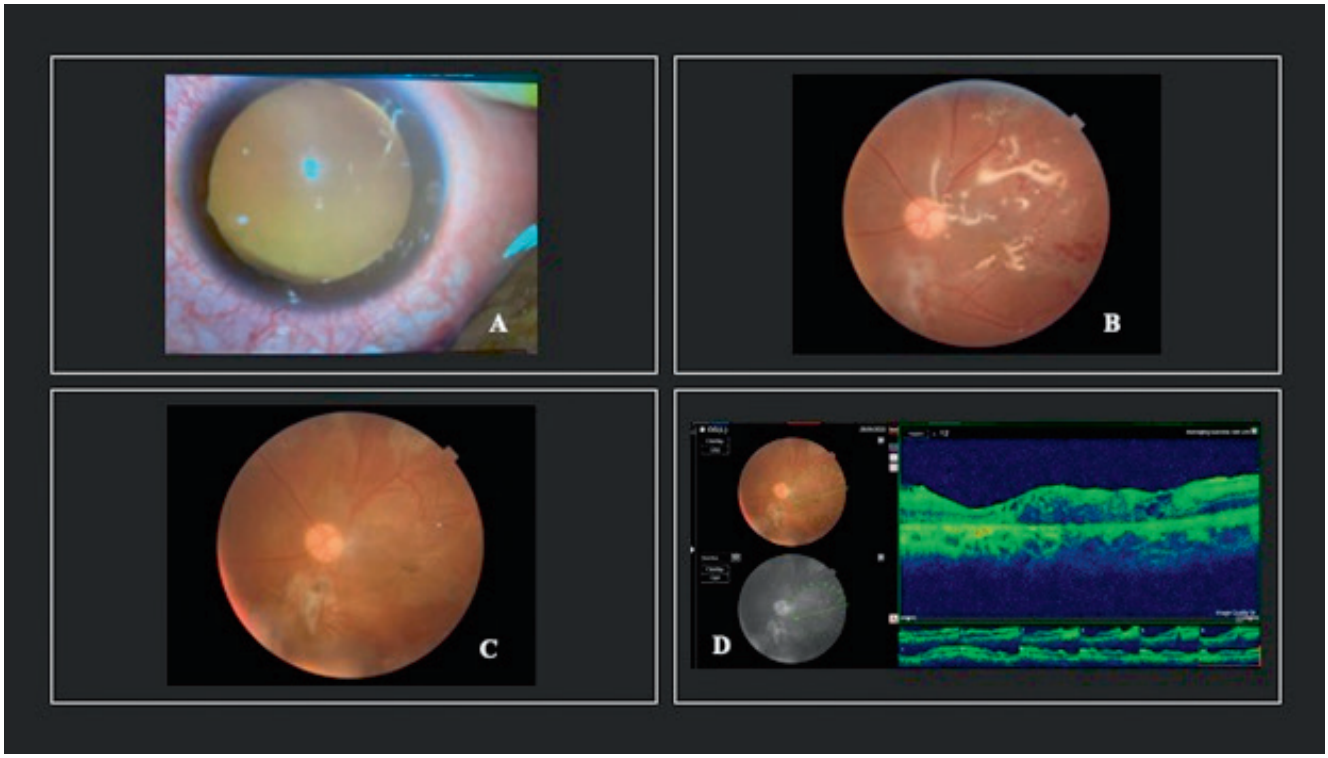

Figure 1: (A) Pre-operative image showing dull fundal glow due to residual vitreous haemorrhage (B) Fundus photograph of the graft under silicon oil (C) Fundus photograph after silicon oil removal (D) Post-operative OCT showing maintained foveal contour

we used the ANRT technique with some intraoperative differences. The patient didn't develop any side effect of the surgery during the follow-up. The grafted neuro sensory retina remained in the position and vision was maintained. The procedure proposed by Grewal and Mahmoud in 2016 has been used in treating large MH globally with a positive outcome [8,12]. In conclusion, the ANRT enhances the anatomical outcome in traumatic cases of macular hole. The development of psuedofovea, tissue amalgamation and recovery of external retinal layers are some of the positive surgical outcomes of ANRT.

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