Microperimetry and optical coherence tomography in a case of traumatic macular hole and associated macular detachment with spontaneous resolution

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The association of macular detachment with posttraumatic macular hole is a known but rare occurrence. Spontaneously occurring resolution of the detachment and closure of the macular hole has been reported only once in the literature. We describe a similar rare event in a young male, the documentation of which was done serially by microperimetry (MP) and optical coherence tomography (OCT). A 17-year-old male presented with a decrease in vision following a closed globe injury to the left eye. A coexisting macular hole and macular detachment were detected in the affected eye. Serial follow-up with OCT and MP documented complete resolution of the macular hole and the macular detachment within 1 week of presentation. The case highlights that spontaneous resolution of traumatic macular hole and related macular detachment may occur and a waiting period is advisable before undertaking any corrective surgical procedure. The pathophysiologic mechanisms of causation and the resolution of posttraumatic macular hole-related retinal detachment are discussed.

Key words: Microperimetry, optical coherence tomography, retinal detachment, spontaneous resolution, traumatic macular hole

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Traumatic macular holes (MHs) were first described by Knapp in 1869. While retinal detachments (RDs) associated with nontraumatic MHs usually occur in highly myopic eyes, and can be effectively treated surgically, those arising from traumatic MHs occur rarely, and clear management guidelines are therefore lacking. Our case demonstrates that spontaneous resolution of the RD along with MH closure is possible in traumatic eyes.

Case Report

A 17-year-old boy sustained blunt trauma from a tennis ball to his left eye, 5 h before examination. Only hand movements were perceivable and projection of light rays was accurate. The vision in the right eye was 20/20. Clinically, a full-thickness MH, sized 415 µm, with coexistent macular detachment of height 458 µm on optical coherence tomography (OCT) examination (Stratus OCT, Carl Zeiss Meditec Inc., USA), was detected along with commotio retinæ and widespread subretinal hemorrhages of the posterior pole and inferior retina [Fig. 1a and b]. A curvilinear choroidal rupture was present inferior to the fovea. Peripheral retinal breaks were absent. Examination by microperimetry (MP-1, Nidek Technologies SRL, Italy) demonstrated reduced sensitivity of the macula to high-intensity light stimuli [Fig. 1c]. Surgical intervention was contemplated. However, follow-up examination 3 days later surprisingly revealed that the MH had reduced in size to 218 µm. The height of the macular detachment had decreased to 420 µm [Fig. 1d and e]. Visual acuity showed no change however. Careful serial follow-up found complete closure of the MH and near complete resolution of the macular detachment 7 days after presentation [Fig. 2a and b]. Three weeks posttrauma, the chorioribetinal scarring and pigmentary changes at the macula were very prominent [Fig. 2d]. Significant atrophy and thinning of all the retinal layers was evident on OCT examination; the foveal thickness was 82 µm [Fig. 2e]. Large atrophic holes were noticed at this time in the inferior retina and were delimited by laser photocoagulation [Fig. 2f]. Subsequent microperimetry examinations were similar to earlier ones. The visual evoked potential was similar in both eyes. Best corrected visual acuity in the affected eye after 6 months was 20/1200.

Discussion

Two considerations relevant to the management of the present subject are, first, the mechanisms involved in the formation and closure of the traumatic MH and detachment, and second, whether a waiting period is advisable before undertaking any surgical repair.

With respect to the first issue, the most important fact to understand is that the vitreous is very tightly adherent to the macula in young normal eyes, putting considerable stress upon this region when compression–expansion of the globe occurs in a concussion injury. Most eyes with a traumatic MH have an attached vitreous. OCT imaging corroborates this finding lending credence to the belief that the pathogenesis of MH is independent of the occurrence of a posterior vitreous detachment (PVD) and occurs likely as an immediate mechanical disruption in a coup contrecoup injury. Delayed MH may however develop if PVD is incomplete, causing continued foveal traction, or due to contusion necrosis, or consequent to the formation and rupture of a foveal cyst. A PVD was absent in our case and we believe that the hole occurred due to mechanical disruption as an immediate effect of concussion. A RD may occur due to the mechanical distortion that occurs between the retina and the vitreous; loss of the retinal pigment...
epithelial (RPE) function and the hyperpermeability of retinal vessels consequent to the retinochoroidal concussion injury may be the important contributing factors.

The mechanisms responsible for the spontaneous closure of a traumatic MH include proliferating glial cells and RPE cells from the edges that fill the hole; formation of an epiretinal...
Fast macular thickness scan showed who had traumatic MH-related RDs. Procedure and gas tamponade in seven patients out of eight management guidelines are lacking. Traumatic MHs are known to arise simultaneously after trauma and therefore specific results may not correlate depending on the severity of the trauma; the final VA depends upon the degree of photoreceptor and RPE cell disruption. Immediate visual loss after injury due to retinal dehiscence is followed by a delayed visual loss due to secondary changes in the retinochoroidal layer. Besides this, our case illustrates that the spontaneous reattachment of a traumatic MH-related macular detachment is possible and a clear evidence of progressive clinical improvement entails a waiting period in the expectation of a spontaneous recovery.

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