
SHORT COMMUNICATION

Case report

Acute commotio retinae determined by cross-sectional optical coherence tomography

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PURPOSE. *To demonstrate the cross-sectional anatomy in acute commotio retinae.*

METHODS. *A 27-year-old male with unilateral decreased vision after acute blunt ocular trauma, was examined by optical coherence tomography (OCT).*

RESULTS. *Visual acuity was 20/20 OD and 20/50 OS. Fundus examination OS demonstrated a mild edema in the papillomacular and foveal area. OCT confirmed a separation of the neurosensory retina and the retinal pigment epithelium (RPE). The thickness of the retina was normal and the contour of the foveola intact. The uncommon hyperreflective band at the outer retina may present the traumatic disruption of photoreceptors.*

CONCLUSIONS. *In vivo investigations by OCT confirmed previous histological studies, a commotio retinae consists a disruption and fragmentation at the level of the foveal photoreceptor segments and RPE. (Eur J Ophthalmol 2003; 13: 816-8)*

KEY WORDS. *Commotio retinae, Berlin edema, Optical coherence tomography, Ocular trauma, Retina*

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INTRODUCTION

Commotio retinae after blunt ocular trauma was first described by Berlin as a retinal opacification (1). The transient whitening and elevation of the peripapillary retina immediately appears with scattered white opaque zone in the central retina, opposite to the site of the impact as a contre-coup injury. Although Berlin attributed the loss of transparency to extracellular edema, the origin and underlying pathogenesis remain controversial. Several postmortem studies on human and animal eyes identified disruption of photoreceptor segments and retinal pigment epithelium (RPE) damage on histologic sections (2, 3). In vivo measurements

determined a full recovery of these macular lesions 3 months after blunt trauma (4).

We present a young patient with commotio retinae immediately after blunt ocular trauma. In vivo measurements by optical coherence tomography (OCT) determined the acute cross-sectional anatomy in the papillomacular and foveal area.

Case report

A 27-year-old man presented with a 3-hour history of blurred vision after blunt ocular trauma. His best-corrected visual acuity was 20/20 in the right eye and 20/50 in the left. The anterior segment was normal on

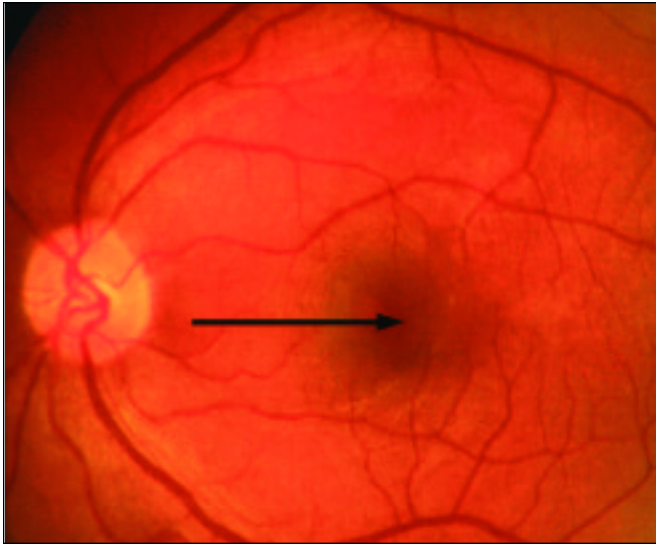


Fig. 1 - Fundus image of the left posterior pole. The optic disc is vital with sharp margins and visible nerve fibers in the superior and inferior quadrant. The foveal reflex is vanished. There is a mild retinal elevation in the fovea and papillomacular area. The macular edema appears with white concentric lines. The black arrow indicates the location and direction of the corresponding linear optical coherence tomography scan.

slit lamp examination bilaterally. Fundus biomicroscopy of the left eye revealed a mild retinal elevation at the level of the deep sensory retina or the RPE in the fovea with white concentric lines (Fig. 1). Linear OCT disclosed a detached neuroretina with fluid in the subretinal space. The reflectivity of the neuroretinal tissue was reduced and the architecture less compact. Although the neuroretinal thickness was increased, the foveolar indentation was still visible (Fig. 2). The patient returned 5 months later with 20/20 vision bilaterally. The foveal contour appeared normal and there was no subretinal fluid on OCT (Fig. 3).

DISCUSSION

There have been conflicting reports on histopathologic features of Berlin edema or commotio retinae. Some authors reported direct damage to the neurosensory retina as evidenced by swelling of Müller food processes and mitochondria in the nerve fiber layer; others noted acute photoreceptor outer segment disruption and RPE damage as the most striking change (2, 3). Commotio retinae consists of define impairments

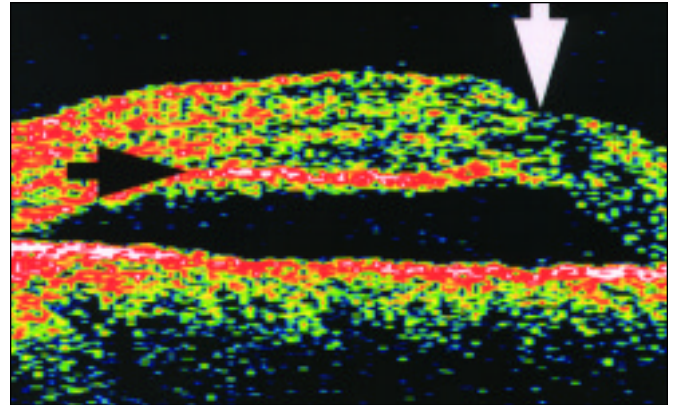


Fig. 2 - Horizontal optical coherence tomography scan of the papillo-macular region of the left eye. The neuroretina is detached from the retinal pigment epithelium and the subretinal space is filled with fluid. The reflectivity of the neuroretinal structure appears hyporeflective and less compact. The swollen retina has a mean retinal thickness of 285 μm (190–345 μm). The foveolar indentation is present with a thickness of 70 μm (white arrow). The outer retina appears as a hyperreflective band in reddish to orange colors, corresponding to the layer of the photoreceptors (black arrow).

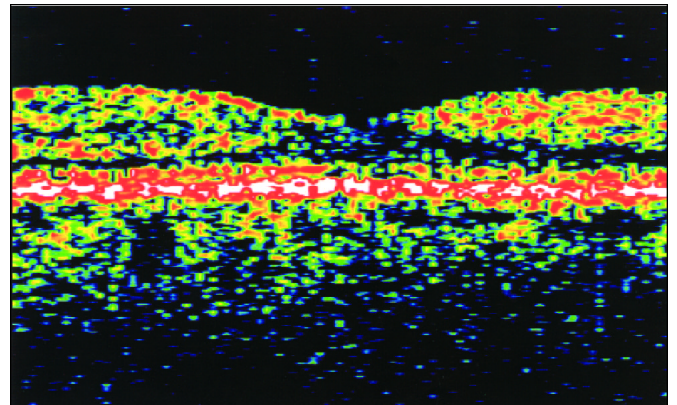


Fig. 3 - Horizontal optical coherence tomography scan 5 months after the blunt ocular trauma. The fluid in the subretinal space has disappeared and the physiologic indentation of the foveola is present. The retinal thickness of 189 μm is within normal limits.

of intracellular compartments without any sign of extracellular edema. The gross anatomy revealed swollen inner segments with mitochondrial deposits resembling calcium, indicating an increased permeability of the plasma membranes. Blunt ocular trauma may generate mechanical contre-coup distortion of the retina via vitreoretinal attachments. Mansour et al. hypothesized that hydraulic forces stretch the neuroretina at the level of the outer segments while intact Müller cells hold the rest of the retina together (2).

Our OCT results revealed traumatic lesions at the level of the photoreceptor-RPE complex. The fundoscopic opacity in our patient seems to present swollen nerve fibers, Müller cells, and disrupted photoreceptor cells. The neuroretina, held together by the Müller food processes, appears to be intact up to the level of the photoreceptors. The uncommon hyperreflective inner retinal band possibly represents the photoreceptor inner segments, with less reflective outer segments underneath and in the subretinal space. The RPE phagocytoses the damaged outer segments and restores central vision within weeks (3). However, chronic cystoid edema and macular holes may develop, if vitreoretinal traction persists and Müller cells degenerate (5).

OCT is a useful technique to investigate the cross-sectional structure of the vitreoretinal, intraretinal, and subretinal architecture in acute and chronic commotio retinae, providing additional evidence for recent in vivo and histopathologic data.

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