PHOTO ESSAY

Clinical and Imaging Findings One Year Following Traumatic Chiasm Transection

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ABSTRACT

Traumatic chiasm transection is a rare condition characterized by bitemporal hemianopsia following head trauma. In a study of visual complications following head trauma, only 4.4% of patients suffered from chiasmal injuries. Complete transection of the chiasm is even more rare and best visualized using magnetic resonance imaging (MRI). We report the one-year follow-up of clinical, visual field, and MRI findings of a patient with complete transection of the optic chiasm following head trauma.

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Photo essay

A 35-year-old male presented to our clinic for follow-up of a visual field defect. He had a history of a road traffic accident one year and three months ago that was associated with fronto-facial, skull base, and orbital fractures and required surgical repair. Examination revealed a corrected distance visual acuity of 20/20 in the right eye and 20/40 in the left eye. A macular splitting demonstrated by eccentric fixation of the left eye was suspected to be the cause of the diminution of vision in the left eye. Colour vision was 12/12 in the right eye and 8/12 in the left. Pupillary examination revealed a left relative afferent pupillary defect. Confrontation visual field testing revealed a temporal visual field defect in both eyes. Ocular motility testing was full in both eyes but showed progressive left hypotropia in the primary position of gaze (Figure 1) which may have been due to the hemifield slide phenomenon. Anterior segment examination was normal in both eyes. Posterior segment examination revealed bilateral optic disc pallor. Visual field testing using central 30–2 pattern of automated static perimetry showed bitemporal hemianopsia (Figure 2). Magnetic resonance imaging (MRI) of the brain and orbit showed complete transection of

the optic chiasm with optic chiasm and frontal lobe encephalomalacia (Figure 3).

Traumatic chiasm transection (TCT) is a rare condition characterized by bitemporal hemianopsia following head trauma. In a study of visual complications following head trauma, only 4.4% of patients suffered from chiasmal injuries.¹ Injury to the chiasm can range from small tears to complete transection of the chiasm which is even more rare.² Most injuries occur following frontal head trauma and are often associated with skull fractures.^{2,3} Injuries to the chiasm following head trauma can result from the mechanical stretch, compression by a hematoma or cerebral oedema, and by contusion necrosis.² MRI

Figure 1. Examination of ocular motility and balance revealed progressive left hypotropia in the primary position of gaze due to loss of binocularity and fusion.

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Figure 2. Automated static perimetry showing bitemporal hemianopsia with macular splitting using the central 30-2 pattern.

Figure 3. Magnetic resonance imaging of the brain and orbit. (A) Axial image showing disruption of the chiasm (white hollow circle) with encephalomalacia of the frontal lobes and optic chiasm. (B) Coronal image showing complete transection of the optic chiasm (large white arrow). (C) Sagittal image showing disruption of the optic chiasm with encephalomalacia (white arrowhead) in front of the pituitary stalk (small white arrow).

is the best imaging modality to diagnose TCT and can reveal complete transection.^{2,4} Reported visual acuity following TCT is variable and can be different between both eyes.² Macular splitting is a condition which occurs in hemianopic patients in which the scotoma reaches the fixation point leading to eccentric or unstable fixation. It is commonly reported with chiasmal injury.⁵ Macular sparing denotes sparing of the vision in the central area of the visual field and can be missed with standard automated perimetry using the 30-2 pattern.^{5,6} Hemifield slide phenomenon is a condition in which there is vertical or horizontal displacement of the visual fields in the absence of muscle paresis in patients with heteronymous hemianopsia.^{7,8} This occurs due to loss of binocularity in these patients with loss of the ability to fuse the visual fields of both eyes. This may lead to instability of ocular alignment and ocular deviations as in the presented case.^{7,8}

Declaration of interest

None.

Ethical approval

This report was approved by Cairo University research ethics committee and followed the tenets of the Declaration of Helsinki.

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