

Bitemporal Blindness in Traumatic Head Injury

Wahab Z^a, Tai E^{a,b}, Wan Hitam WH^{a,b}, Khairy Shamel ST^{a,b}

^aDepartment of Ophthalmology and Visual Sciences, School of Medical Sciences, Health Campus, Universiti Sains Malaysia, Kelantan, Malaysia

^bHospital Universiti Sains Malaysia, Kubang Kerian, Kelantan, Malaysia

ABSTRACT

We report a case of isolated bitemporal hemianopia in traumatic chiasmal syndrome. A 20-year-old male motorcyclist was brought unconscious into the emergency department after an alleged accident involving a horse-drawn vehicle. He was intubated for three days. Computed topography of the brain revealed bifrontal and facial bone fractures, associated with subarachnoid haemorrhage. He underwent frontal bone and facial bone reconstruction. Three weeks later, patient complained of left eye blurred vision. On examination, the visual acuity was 6/7.5 in the right eye and 6/12 in the left eye, with a left relative afferent pupillary defect. Visual field charting showed complete bitemporal hemianopia. Over the next six months, the visual acuity of the left eye worsened to 6/45, while the field defect remained static. Bitemporal hemianopia in traumatic chiasmal syndrome is a rare complication of severe head injury. A history of trauma should always be elucidated in patients with visual field defects.

Keywords

Traumatic chiasmal syndrome, bitemporal hemianopia, visual field defect

Corresponding Author

Dr. Evelyn Tai
Department of Ophthalmology,
School of Medical Sciences,
Health Campus, Universiti Sains Malaysia,
16150 Kubang Kerian, Kelantan, Malaysia.
Tel No: +609-767 6362
Email : daileid@yahoo.com (E.T.)

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INTRODUCTION

Bitemporal hemianopia is a classic sign of optic chiasmal pathology. The most common aetiology of chiasmal pathology are compressive lesions, which may be secondary to various causes including tumours, inflammation, demyelination, ischemia and infiltration.¹ Traumatic chiasmal syndrome secondary to head injury is a rare clinical condition, accounting for only 0.3% of cases of bitemporal hemianopia.² We report a case of bitemporal hemianopia developing three weeks after traumatic head injury.

CASE REPORT

A 20-year-old male motorcyclist was brought into the emergency department with loss of consciousness after an alleged motor vehicle accident involving a horse-drawn vehicle. He was intubated for airway protection, and emergency computed tomography (CT) of the brain revealed depressed bifrontal bone fractures extending to clivus and left sphenoid bone, with subarachnoid

haemorrhage and multiple facial bone fractures (Fig. 1). He underwent immediate frontal bone reconstruction, followed by open reduction and internal fixation of the mandible fracture. He was intubated for three days in the intensive care unit. During admission, patient was noted to have a transient period of diabetes insipidus, which improved after a week. He was discharged home after nine days of admission.

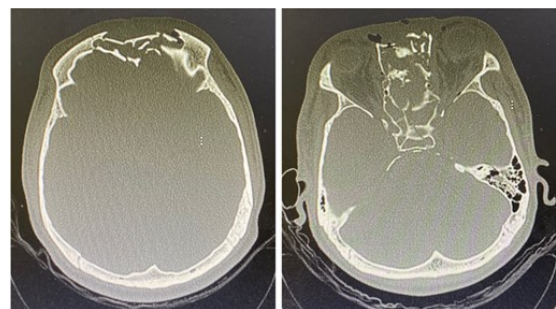


Fig. 1: Axial image of CT scan showing comminuted fracture of the frontal bones with fracture line extending to bilateral lamina papyracea, nasal bone, clivus, petromastoid part of temporal bone, and left sphenoid bone.

Three weeks after trauma, patient complained of blurring of vision over the left visual field. There was no diplopia. The Snellen visual acuity was 6/7.5 in the right eye and 6/12 in the left eye. Relative afferent pupillary defect was positive in the left eye. Ocular motility and slit lamp examination revealed no abnormalities. Automated Humphrey visual field testing showed bitemporal hemianopia (Fig. 2).

Over the next three months of follow up, the left eye visual acuity progressively deteriorated to 6/45, with no improvement on refraction. Repeated visual fields at six months post trauma showed a static bitemporal field defect (Fig. 3).

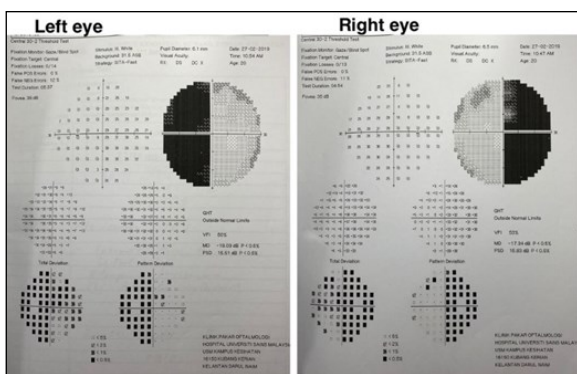


Fig. 2: Automated 30-2 analysis of both eyes at the first visit showing bitemporal hemianopia.

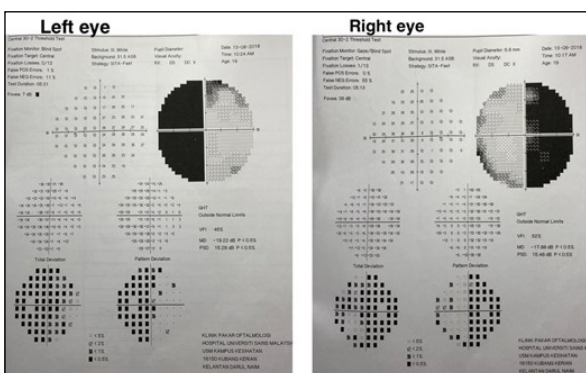


Fig. 3: Automated 30-2 analysis of both eyes at 7-months post trauma showing the static visual field defect (bitemporal hemianopia).

DISCUSSION

Head trauma results in a variety of complications, most commonly seizures, infection and post-concussion syndrome. Field defects in patients with head injury are variable, ranging from non-specific subtle scotomas and

nasal island defects to complete monocular blindness.⁴ Bitemporal hemianopia post head injury, termed traumatic chiasmal syndrome, is unusual.⁵

The optic chiasm is the part of the visual pathway where the optic nerves of each eye meet before they separate again into the optic tracts (Fig. 4). At this point, the nasal fibres of each side decussate to the contralateral optic tract, while the temporal fibers continue into the ipsilateral tract. An understanding of this nerve fiber arrangement is essential to predict the common presentation of field defects in lesions of the visual pathway.⁶

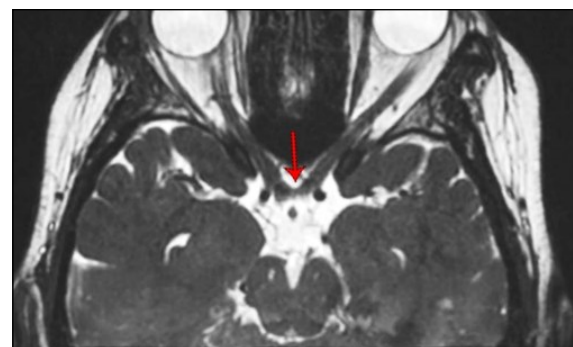


Fig. 4: Magnetic resonance imaging scan of the brain showing optic nerves meeting at optic chiasm. Red arrow indicates optic chiasm

Most cases of traumatic chiasmal injury occur in motor vehicle accidents involving young males. The majority of these have frontal fractures, followed by basal skull fractures and closed head injury.⁵ These findings are consistent with our case. Other manifestations of traumatic chiasmal syndromes include cranial nerve palsies, cerebrospinal fluid rhinorrhoea, carotid cavernous fistulas, meningitis, intrasellar hematoma and endocrine abnormalities.⁷ These occur due to collateral damage to neighbouring structures. Transient diabetes insipidus is a common finding, as observed in our patient.⁷

The mechanism of chiasmal injury in head trauma varies between individuals; postulations include mechanical stretch or tear, contusion haemorrhage, contusion necrosis and compression necrosis.^{5,7,8} In some cases, no anatomical chiasmal defect can be identified, suggesting that the damage may be due to vascular compromise. Magnetic resonance imaging (MRI) has advantages over CT in evaluating the soft tissue response to chiasmal

trauma. Unfortunately, MRI is not readily available in our center, and its added cost is not justified in a condition which is most often managed conservatively.

Traumatic chiasmal syndrome has a guarded prognosis, with only a minority experiencing improvement in visual symptoms, with or without treatment.⁴ Partial recovery may occur in cases of contusion after resolution of the acute oedema, while in those with vascular compromise, development of new vascular anastomoses may explain the improved functionality.⁴

CONCLUSION

Traumatic chiasmal syndrome is a complication of major head injury, particularly in the frontal region. A history of trauma should always be elucidated in patients with bitemporal hemianopia. The visual prognosis is guarded.

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REFERENCES

1. Levin LA. Topical diagnosis of chiasmal and retrochiasmal disorders. Walsh and Hoyt clinical neuro-ophthalmology, 6th ed. Baltimore: Williams & Wilkins. 2005:503-73.
2. Tang RA, Kramer LA, Schiffman J, Woon C, Hayman LA, Pardo G. Chiasmal trauma: clinical and imaging considerations. Survey of ophthalmology. 1994 Jan 1;38(4):381-3.
3. Mejico LJ, Miller NR, Dong LM. Clinical features associated with lesions other than pituitary adenoma in patients with an optic chiasmal syndrome. American journal of ophthalmology. 2004 May 1;137(5):908-13.
4. Mookan LV, Thomas PA, Harwani AA. Traumatic chiasmal syndrome: A meta-analysis. American Journal of Ophthalmology Case Reports. 2018 Mar 1;9:119-23.
5. Hassan A, Crompton JL, Sandhu A. Traumatic

- chiasmal syndrome: a series of 19 patients. Clinical & experimental ophthalmology. 2002 Aug;30(4):273-80.
6. Mohindra S, Sharma M, Mohindra S. Traumatic chiasmal syndrome. British journal of neurosurgery. 2012 Dec 1;26(6):872-4.
7. Savino PJ, Glaser JS, Schatz NJ. Traumatic chiasmal syndrome. Neurology. 1980 Sep 1;30(9):963-.
8. Traquair HM, Dott NM, Russell WR. Traumatic lesions of the optic chiasma. Brain. 1935 Sep 1;58(3):398-411.