The eyes have it: duret haemorrhage after traumatic subdural haematoma

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DESCRIPTION

A 51-year-old woman with no significant medical history was found collapsed at work having sustained a head strike. She was evaluated at her local hospital. Glasgow Coma Scale was 12 (E3 V3 M6). Pupils were equal and reactive. Eye movements were normal. CT of the brain revealed a large left-sided acute subdural haematoma with 12 mm midline shift ([figure 1](#)). She was intubated and transferred to Wellington Hospital where she had emergency haematoma evacuation.

CT of the brain performed the next day showed resolution of the subdural haematoma and midline shift ([figure 1](#)). After extubation, she was noted to have new extraocular movement abnormalities.

Examination revealed a left third-nerve palsy. At rest the eye was 'down and out' with left ptosis, severe restriction of left eye adduction and also vertical eye movements. Additionally, there was a right internuclear ophthalmoplegia with restricted right eye adduction and corresponding abduction nystagmus of the left eye. Photographs demonstrating her eye movements are shown in [figure 2](#) and a video of eye movements is included in [video 1](#).

MRI of the brain ([figure 1](#)) showed two diffusion restricted lesions corresponding to the left oculomotor nucleus in the midbrain and the right medial longitudinal fasciculus in the pons. Susceptibility-weighted imaging revealed signal drop out consistent with acute haemorrhage in these areas. Retrospective review of the initial CT of the brain did not show any evidence of haemorrhage in the brainstem and a cerebral angiogram was performed which was normal.

The consensus was that these represented Duret haemorrhages secondary to transtentorial

Figure 2 Eye movements clockwise from top left: (A) looking straight ahead; (B) looking right; (C) looking left; (D) looking up and to the right.

brain herniation as a result of the acute subdural haematoma.

The patient was able to be discharged home after a short period of rehabilitation with persisting restricted eye movements but no significant functional impairment.

Duret haemorrhage, also known as secondary brainstem haemorrhage, occurs as a result of transtentorial herniation of the brain in the context of acute trauma (eg, subdural haematoma).^{1,2} It is hypothesised to occur as a result of the downward pressure shearing small mobile blood vessels within the brainstem from the relatively immobile basilar artery.² Surgical decompression can also result in haemorrhage from reperfusion injury.² Due to their location, there is an association with poor prognosis of death or severe neurological disability, which often results in earlier withdrawal of life-sustaining therapies.²

Our case highlights the caution required when assessing prognosis in patients with Duret haemorrhage. Not only did she survive, but also her neurological disability was not debilitating—unusual in Duret haemorrhage. Given the normal eye movements on presentation and lack of haemorrhage on

Figure 1 Imaging—(A) Axial CT of the brain images—pre (left) and post (right) drainage of left-sided subdural haematoma with midline shift. (B) Postoperative MRI of the brain—diffusion-weighted imaging (left) and susceptibility-weighted imaging (right) of midbrain (top) and pons (bottom) showing lesions at the level of the left oculomotor nucleus and the right medial longitudinal fasciculus, respectively.

Video 1 Recording of eye movements demonstrating a left third-nerve palsy along with a right internuclear ophthalmoplegia

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Learning points

- ▶ Confusing eye signs usually localise to the brainstem—always consider more than a single lesion.
- ▶ Duret haemorrhage is not universally fatal.
- ▶ Post decompression Duret haemorrhage is thought to have a better prognosis and this should be considered when making clinical decision about ongoing management of these patients.

the initial CT of the brain, we suspect that in her case the haemorrhage was a small reperfusion injury following her decompressive surgery. This may have contributed to her better prognosis and hence similar findings in other patients may influence and help guide clinical decision-making.

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