

Tension hydropneumocephalus

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A 21-year-old male was brought to the emergency department with a head injury following a road traffic accident. Examination revealed a Glasgow Coma Scale (GCS) of 9/15. There were no abnormal physical signs noted except a right-sided supraorbital bruit. An initial noncontrast head CT revealed a large left-sided frontal intracerebral haemorrhage with perilesional oedema causing mass effect; subdural haemorrhage in the left frontoparietal temporal region; multiple fractures involving facial bones; and sinuses containing sinus haemorrhage involving bilateral frontal, maxillary and ethmoids. Cervical spine was spared. Haemorrhage was evacuated by neurosurgical intervention and the patient was on ventilator support for 10 days. A head CT 1 day postoperatively showed resolution of previous changes. He was discharged home after recovery. Two weeks later he presented with severe holocranial headache and

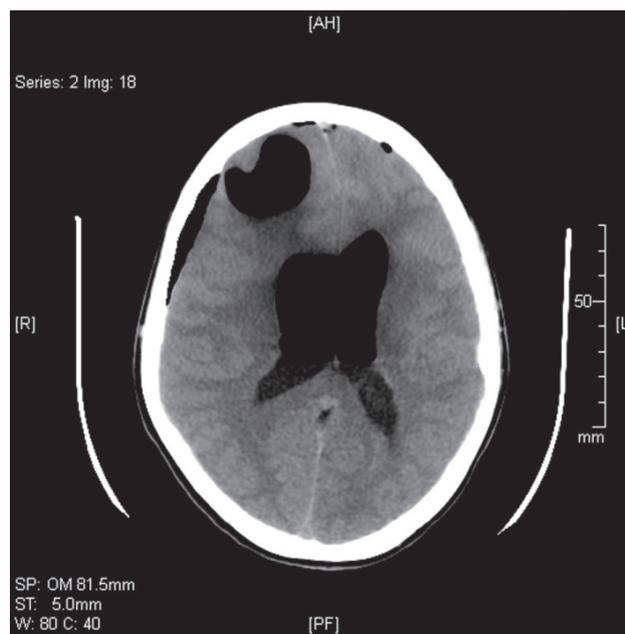
clouding of consciousness. A plain skull radiograph (Figure 1) showed pneumocranium and a head CT (Figure 2) revealed tension hydropneumocephalus with marked midline shift. High-flow oxygen therapy and bed rest lead to complete clinical and radiological resolution of hydropneumocephalus.

The tension hydropneumocephalus was most probably due to the leakage of air through the fractured sinuses rather than the neurosurgical intervention, as a head CT immediately after surgery and a week thereafter did not show signs of hydropneumocephalus. As the patient started to mobilise

Figure 1 Skull X-ray, lateral view, showing pneumocranium



Figure 2 Head CT showing hydropneumocephalus with midline shift



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after a week a ball valve effect, which allowed influx of air from the extracranial space through cerebrospinal fluid leakage but not efflux in the fractured sinus, could have been the responsible mechanism. Bed rest with maintained supine position and oxygen therapy would have helped to seal the tissue valves. Avoidance of Valsalva manoeuvre and administration of antibiotics in the case of depressed skull fractures are the other recommended conservative treatment modalities, while emergency neurosurgical intervention is warranted if indicated.¹

The causes of tension hydropneumocephalus are many. Blunt and penetrating trauma, previous surgery, tumours involving the paranasal sinuses, barotrauma and infections are some

of the recognised causes.¹⁻³ The risk of iatrogenic tension hydropneumocephalus developing after the evacuation of a subdural haematoma is a rare observation.⁴ Tension hydropneumocephalus may manifest with a wide array of clinical presentations, including severe restlessness, deteriorating consciousness, focal neurological deficits and even adverse cardiac events.⁵

CT is the gold-standard imaging modality widely available for diagnosis of this medical emergency. Early clinical recognition and prompt treatment results in improvement in the majority of cases. Our patient did not have any worsening neurological symptoms or signs, and was able to be discharged home after conservative management. ①

References

- 1 Pillai P, Sharma R, MacKenzie L et al. Traumatic tension pneumocephalus – two cases and comprehensive review of literature. *Int J Crit Illn Inj Sci* 2017; 7: 58–64.
- 2 Lin MB, Cheah FK, Ng SE et al. Tension pneumocephalus and pneumorachis secondary to subarachnoid pleural fistula. *Br J Radiol* 2000; 73: 325–7.
- 3 Leong KM, Vijayanathan A, Sia SF et al. Pneumocephalus: an uncommon finding in trauma. *Med J Malaysia* 2008; 63: 256–8.
- 4 Ishiwata Y, Fujitsu K, Sekino T et al. Subdural tension pneumocephalus following surgery for chronic subdural hematoma. *J Neurosurg* 1988; 68: 58–61.
- 5 Satapathy GC, Dash HH. Tension pneumocephalus after neurosurgery in the supine position. *Br J Anaesth* 2000; 84: 115–7.