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# When Air Kills: Rapid Recognition of Tension Pneumocephalus

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## INTRODUCTION

Tension pneumocephalus (TP) is a life-threatening neurosurgical emergency caused by trapped intracranial air under pressure, typically secondary to skull base fractures or penetrating trauma. Delayed recognition may lead to brain herniation and death. We report a rare case of delayed TP – a teenager who survived trauma and developed TP three months after the initial traumatic brain injury.

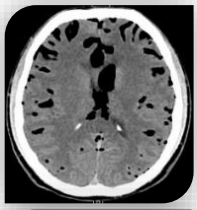

**Figure 1:** Axial CT brain of the patient showing extensive pneumocephalus with early hydrocephalus, cerebral oedema, and bifrontal gliosis.

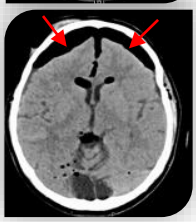

**Figure 2**: Axial CT brain showing the "Mount Fuji sign".

## CASE PRESENTATION

A 17-year-old male presented to our Emergency Department with a one-week history of persistent headache, with a pain score rated 10/10, associated with vomiting and intermittent rhinorrhea. He had a history of a motor vehicle accident three months earlier, during which he sustained multiple acute intracranial haemorrhages with cerebral oedema, bilateral comminuted frontal bone fractures with a depressed segment on the right, as well as multiple facial and base of skull fractures. He was treated conservatively and discharged after five days of hospitalisation.

A repeat computed tomography (CT) scan of the brain was performed, revealing extensive pneumocephalus with early hydrocephalus, cerebral oedema, and bifrontal gliosis secondary to previous haemorrhage. He subsequently underwent decompressive frontal craniectomy, recranialisation, and dural repair. Postoperatively, he remained clinically asymptomatic and was discharged eight days after admission.

## DISCUSSION

- TP typically develops when air enters the intracranial cavity through a skull fracture during actions like coughing but becomes trapped due to a ball-valve mechanism in which air enters but is unable to escape, leading to increased intracranial pressure.
- Clinically, TP may present with a thunderclap headache, abrupt mental decline, vomiting, and seizures.
- A non-contrast CT scan of the brain is the gold standard for diagnosis, showing the classic “Mount Fuji sign” resulting from bilateral subdural air compressing and separating the frontal lobes.
- Urgent surgical decompression is essential for effective treatment. Timely decompression is critical for survival, as mortality rates can decrease from 40% to 15% when surgery is performed within six hours.

## CONCLUSION

TP is a neurosurgical time bomb. High clinical suspicion is crucial in patients with head injury presenting with persistent headache and cerebrospinal fluid (CSF) leakage. CT imaging should be evaluated for signs of TP. Though rare, TP is potentially fatal if missed, and thus early recognition and timely intervention are critical to improving patient outcomes.

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