

Clinical-Medical Image

Tension Pneumocephalus and the Mount Fuji Sign: A Case Study and Review

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Figure 1: An axial Ct scan image revealed double bone fracture in the frontal sinus (yellow arrow), along with bilateral frontal subdural hypoattenuating collections causing the frontal lobes to collapse and the interhemispheric space to widen, resulting in the Mount Fuji sign (white arrow).

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Abstract

Tension pneumocephalus, marked by subdural air causing a mass effect on the brain, results from increased air pressure within the subdural space due to a ball-valve mechanism. The Mount Fuji sign on CT scans is key to distinguishing this neurosurgical emergency from nontension pneumocephalus. Common after subdural hematoma evacuation, it can also result from surgeries or head trauma (like in this case). Diagnosis relies on correlating CT findings with clinical signs of deterioration. Treatment involves emergent decompression, 100% oxygen, and dural defect closure.

Introduction

An 87-year-old woman with no significant medical history was brought to the emergency room after falling on her face. She was conscious with epistaxis and tachycardia (120 beats per minute). A cerebral computed tomography revealed multiple head and facial bone fractures, along with bilateral frontal subdural hypoattenuating collections causing the frontal lobes to collapse and the interhemispheric space to widen, resulting in the Mount Fuji sign (Figure 1). The follow-up revealed a deterioration of the patient's consciousness and she passed away after few days.

Discussion

Tension pneumocephalus, characterized by subdural air causing mass effect on the brain, requires increased air pressure within the subdural space. This is thought to result from a ball-valve mechanism, where air enters through a dehiscence in the skull base or calvaria and is trapped by an obstruction. Increased air pressure can lead to extraaxial mass effect and compression of the frontal lobes. The presence of air between the frontal tips indicates that the air pressure exceeds the surface tension of cerebrospinal fluid between the frontal lobes [1].

The Mount Fuji sign on CT scans is crucial for distinguishing tension pneumocephalus, a potential neurosurgical emergency, from nontension pneumocephalus. Tension pneumocephalus often occurs after the neurosurgical evacuation of subdural hematomas, with a prevalence of 2.5%

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to 16% [1,2], and can also result from skull base surgery, paranasal sinus surgery, posterior fossa surgery in the sitting position, or head trauma. Diagnosis relies on correlating CT findings with clinical signs of deterioration [1].

Treatment involves emergent decompression using techniques such as drilling burr holes, craniotomy, needle aspiration, ventriculostomy, 100% oxygen administration, and dural defect closure, along with careful monitoring and serial CT scans [3].

Keywords: Tension pneumocephalus; Mount fuji sign; CT scan

Conflict of Interest

None.

References

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