№ 013

A Head Full of Air: The Perils of Tension Pneumocephalus

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Introduction

Traumatic tension pneumocephalus (TP) occurs in the presence of a “one-way valve” at the site of the leptomeningeal tear. This intracranial air can cause a significant mass effect on the brain, frequently compressing the bilateral frontal lobes, which leads to an increase in intracranial pressure.

Case Description

A 15-year-old boy presented with severe headache, vomiting, rhinorrhea, and a subsequent drop in consciousness (GCS 15 to 8) following a fall from the second floor of his hostel. Skull X-ray done in a district hospital revealed extensive pneumocranium. Cranial CT confirmed a basal skull fracture and extensive bi-frontal pneumocephalus with the characteristic "Mount Fuji" sign, supported by air bubble sign, exerting a significant mass effect intracranially. Following emergent decompression and dural repair in a tertiary center, the patient made a favorable postoperative recovery, returning two months later with independent ambulation and no significant neurological deficits.

Discussion

Traumatic TP is an uncommon finding reported in less than 1% of traumatic brain injury[1]. As little as 65mls of air is sufficient to create TP[2]. Skull radiography that demonstrates pneumocranium can trigger prompt advanced neuroimaging and expedite definitive care. The "Mount Fuji sign" and peaking of the frontal lobes on CT imaging are critical diagnostic clues. Treatment options include emergency craniotomy with dural repair, insertion of external lumbar drainage (ELD).

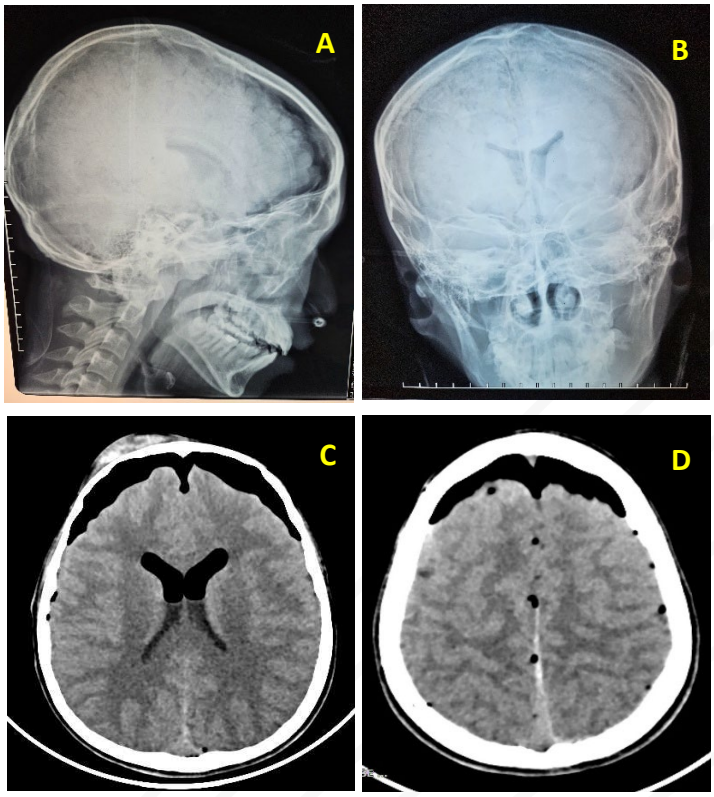

Figure A & B: Skull X-Ray shows radiolucency at the frontal (lateral view) outlining the brain. Radiolucency is also seen at the lateral horn of the lateral ventricle.
Figure C & D: Extensive bifrontal pneumocephalus with “Mount Fuji sign”, peaking of the frontal lobes and pneumoventricles. Multiple air bubbles can be seen in *Figure D*.

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Conclusion

Early recognition of traumatic TP is possible with a high index of clinical suspicion and visible intracranial air on skull radiography. Although CT is the gold standard for this diagnosis, plain skull x-ray remains a valuable tool in resource-limited settings. Prompt diagnosis and treatment result in improvement in the vast majority of cases.

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(1):58-64.
2. Monajati A, Cotanch WW. Subdural tension pneumocephalus following surgery. J Comput Assist Tomogr. 1982;6: 902-906.