Air in the Parapharyngeal Space: A CT Sign of Temporal Bone Fracture

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Purpose
More than 50% of patients with moderate to severe head injury suffer from complications related to temporal bone fracture (TBF). Direct visualization of TBF in acute trauma cases may be difficult. Early detection of fractures and appropriate management may prevent such complications. We report the presence of air in the parapharyngeal space (PPS) as a CT sign of TBF in patients with closed head injury.

Materials & Methods
We prospectively studied admission CT scans of 677 patients with moderate to severe head trauma (Glasgow Coma Scale) over 3 years (1998 through 2000) in a level one trauma center. The scans were analyzed for TBF and the presence of air in the PPS and temporomandibular joints (TMJ). Examinations included head CT, CT of cervical spine, CT of craniovertebral junction, CT of facial bones and temporal bones. Patients with penetrating injuries, open mandibular fractures, and facial bone fractures involving paranasal sinuses were excluded.

Results
Thirty-three patients had TBF; CT scans of 17 patients (21 fractures) exhibited air in the PPS or TMJ. In 19 fractures air was noted in the anterior (prestyloid) PPS (57%), and in 16 fractures there was air in the TMJ (42%); three patients had air in the PPS and not in TMJ fossa. Sixteen patients with TBF did not exhibit air leaks. We believe fracture of air-containing structures in the temporal bone results in air collection in the TMJ fossa. Air then leaks out through the damaged joint capsule and is conducted by facial planes into the anterior PPS.

Conclusion
The presence of air in the PPS on CT can be a sign of TBF in the absence of penetrating injury, open mandibular fracture or facial bone fracture involving paranasal sinuses. Air often can be seen in CT of the cervical spine, craniovertebral junction or facial bones, which are frequently part of the initial radiographic evaluation of trauma patients. If PPS air is seen but no fracture line is visible, temporal bone CT is warranted when the patient becomes stable. Early detection of TBF can be useful in management and prevention of
related complications.

References