Air in acute epidural hematomas

Report of two cases

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Two pediatric patients with acute epidural hematomas containing air bubble(s) are reported. A skull fracture was observed extending to the mastoid cells of the temporal bone in both patients. In one patient the hematoma and air bubbles subsequently increased in volume, requiring a craniotomy. The clinical significance of air in an acute epidural hematoma is discussed.

KEY WORDS epidural hematoma - head trauma - skull fracture - pneumocephaly

The presence of air in acute epidural hematomas has been described as not infrequent; however, it is difficult to find its significance evaluated in the literature. Two pediatric patients with acute epidural hematomas containing air bubble(s) are reported here, and the clinical significance of this finding is discussed.

Case Reports

Case 1

This 9-year-old boy was struck by a car while riding a bicycle on June 29, 1985. He was hit on the right temporoparietal region. It is not certain whether he lost consciousness, but shortly thereafter he was taken by ambulance to the emergency room at Tokyo Metropolitan Fuchu Hospital.

On arrival, he was noted to have a scalp contusion in the right temporoparietal region. No bleeding was observed from the nose or ear. Neurologically, he was alert and the cranial nerves were intact. Motor and sensory function was normal. His medical history was unremarkable. A skull x-ray film revealed linear fractures of the right temporal bone, one of which extended into the mastoid. A plain computerized tomography (CT) scan showed a thin acute epidural hematoma in the right posterior temporal region, containing an air bubble at the top (Fig. 1). Results of laboratory studies, including blood analysis, coagulation tests, and blood chemistry, were all within normal range. The patient was admitted for clinical observation, during which consciousness remained clear. Sequential CT scanning failed to reveal an increase in volume of the hematoma or in the amount of air. Seven days later he was discharged without neurological deficit, cerebrospinal fluid (CSF) otorrhea, or infection.

Case 2

This 7-year-old girl was struck by an automobile while out walking on July 2, 1985. She was hit on the left temporal region and was reported to be drowsy immediately after. She was brought to the emergency room by ambulance. On arrival, she was noted to have a scalp hematoma in the left temporal region and CSF otorrhea from the left ear. On neurological examination she was drowsy, but no other abnormalities were found.
FIG. 2. Computerized tomography scans in Case 2. Left: Scans taken 30 minutes after the trauma showing a thin acute epidural hematoma containing air bubbles. Right: Scans 3 hours later demonstrating a definite increase in the volume of the hematoma and in the amount of air.

on cranial nerve, motor, or sensory examinations. A skull x-ray film demonstrated two fractures of the left temporal bone, one of which extended into the mastoid. Plain CT scans (Fig. 2 left) taken 30 minutes after the accident disclosed a thin acute epidural hematoma over the left temporal region. Air bubbles were evident within the hematoma. Laboratory studies, including blood analysis and blood chemistry tests, showed normal results. The patient was managed under close observation. Three hours later, her level of consciousness decreased, requiring emergency CT scanning. An increase in the volume of hematoma and air bubbles was demonstrated (Fig. 2 right), and craniotomy was carried out under general anesthesia. Approximately 50 gm of epidural clot was evacuated. The source of the hemorrhage could not be identified, and no laceration of the dura mater was observed. Her postoperative course was uneventful, and the following day she regained consciousness. The CSF otorrhea ceased 2 days later, and 10 days postoperatively she was discharged without neurological deficit or infection.

Discussion

Prior to the advent of CT scanning, air could not be detected in acute epidural hematomas due to closed head trauma. Although air bubbles in acute epidural hematomas have been recognized on CT scanning, little attention has been given to them. Without giving an incidence of air in acute epidural hematomas, Tsai reported that the finding was not infrequent; however, the reports have been isolated and the clinical significance of the entity has only been touched on. It was not possible to obtain the CT density numbers of the black dot in the acute epidural hematoma in the two cases reported here. Considering its shape and appearance, however, each black dot was believed to be gas, specifically an air bubble.

Since both of our patients had fractures involving the mastoid portion of the temporal bone, it is reasonable to consider that the air in the epidural hematoma originated from the mastoid air cells. For this reason, although both patients sustained closed head trauma, the presence of air in the epidural hematomas offered a risk of infection. In Case 2, a second CT scan performed 3 hours after the admission scan clearly demonstrated an increase in volume not only of the hematoma but also of air. Entrance of air into the epidural space may have contributed to the increase in mass effect of the acute epidural hematoma, because of associated CSF otorrhea, which facilitated entrance of air by the inverted-bottle mechanism.

The presence of air in acute epidural hematomas does have clinical significance. Fracture of structures containing air involves the possibility of contamination of the epidural hematoma and an increase in the possibility of delayed mass effect.

Addendum

Since this manuscript was accepted, the author has noted a report published in May, 1986, of two cases with air in acute epidural hematomas in the posterior fossa (St John JN, French BN: Traumatic hematomas of the posterior fossa. A clinicopathological spectrum. Surg Neurol 25:457-466, 1986).

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References


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