Unexpected outcome (positive or negative) including adverse drug reactions

Radiolucent wooden foreign body masquerading as a depressed skull fracture

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The following case describes a head injury in an older male patient in which a large wooden foreign body, forming a subcutaneous tract in the scalp, was mistaken for a depressed skull fracture on initial clinical assessment. This foreign body was not visualised on CT brain imaging until specialised views were used retrospectively, after surgical exploration of the scalp laceration. Appropriate radiological techniques for the detection of radiolucent foreign bodies are discussed.

BACKGROUND

This case highlights the use of simple techniques such as CT 'lung window' views and ultrasonography to aid visualisation of penetrating radiolucent foreign bodies, which pose a risk of infection if surgical extraction is incomplete.

CASE PRESENTATION

A 78-year-old male patient was brought by ambulance to the emergency department (ED) after he sustained a head injury while sweeping a wooden staircase at home, whereby he slipped and fell backwards down 4 steps. There was no loss of consciousness or amnesia associated with this unwitnessed head injury and the patient denied palpitations, chest pain or dizziness preceding the mechanical fall. He had persistent occipital headache without nausea, vomiting or visual disturbance after the fall. Medications on admission included aspirin 75 mg once daily and metoprolol tartrate 100 mg once daily. He was

a known hypertensive and he had a history of ischaemic heart disease with cardiac stenting performed 10 years previous to this admission.

The patient was alert and orientated on arrival to hospital 30 min after the injury occurred with a Glasgow coma scale of 15/15 and equal reactive pupils. His vital signs including heart rate and blood pressure were stable and cervical spine precautions had been implemented prior to arrival at the ED department. An actively bleeding 5 cm long scalp laceration was noted extending transversely across the patient's occipital area. There was a palpable hard longitudinal prominence underlying the laceration extending from the occipital area to the vertex, taken to represent a depressed skull fracture. There were no signs of basal skull fracture. Cardiovascular, respiratory, musculoskeletal and neurological examinations were unremarkable and he had no other obvious injury on admission.

Figure 1 (a) Axial non-contrast CT image towards the vertex shows a right occipital subgaleal haematoma and a sizeable pocket of associated subcutaneous air. There is no intracranial abnormality or fracture. (b) Axial CT image on lung window at the vertex shows a portion of the obliquely orientated (at that point in the scalp) wooden foreign body with surrounding subcutaneous air on the right side of the vertex.

Figure 2 Photograph of scalp laceration prior to surgical exploration.

Figure 3 Photograph of scalp laceration after extraction of wooden foreign body.

Figure 4 Photograph of wooden foreign body removed from scalp laceration.

A CT brain was performed due to the clinical suspicion of a depressed skull fracture. CT imaging failed to demonstrate any fracture of the skull or intracranial abnormality (figure 1a) but instead revealed a severe scalp degloving injury with a subgaleal haematoma in the right occipital region and much of the scalp towards the vertex separated from the outer table of the skull vault. Lung window viewing of these CT images demonstrates the radiolucent wooden foreign

body responsible for the degloving injury (figure 1b). On surgical exploration of the scalp, laceration under local anaesthetic following the CT study, a 2.5×27 cm piece of timber (figures 2–4) was removed which had dissected along a longitudinal subcutaneous tract from the occiput to the vertex.

INVESTIGATIONS

CT brain.

TREATMENT

The scalp wound was irrigated with saline and antiseptic solution, closed with skin staples and a pressure dressing was applied. Prophylactic antibiotics and tetanus antitoxin were administered.

OUTCOME AND FOLLOW-UP

The patient did not undergo any further cranial imaging after surgical exploration of the scalp laceration. The patient remained stable with no neurological deficit and was otherwise well during admission. He was discharged home on oral antibiotics after 4 days of observation and follow-up was uneventful with satisfactory healing of the scalp laceration.

DISCUSSION

CT imaging of the brain was performed in this case in keeping with The Canadian CT head rule due to the clinical suspicion of an open/depressed skull fracture and also due to the patient's advanced age. The CT imaging in this case was vital in outruing both a skull fracture and intracranial abnormality but did not initially visualise the clinically occult radiolucent foreign body which had caused the scalp degloving injury (figure 1a). Of note, that there was no initial suspicion of foreign body and the scalp injury was thought to represent a simple laceration.

Subsequent surgical exploration revealed a large piece of timber which was thought to represent a component of the wooden staircase down which the patient had fallen. It was only when 'lung window' settings were used to view these CT images retrospectively (figure 1b) that this large wooden foreign body could be seen. The angle/orientation of entry and subcutaneous dissection of the large linear wooden foreign body further increased the difficulty in visualisation on CT.

A similar scenario has been reported in children with radiolucent hair accessories associated with traumatic depressed skull fractures.¹ In this series of cases, CT images poorly demonstrated spherical radiolucencies in the scalp, initially thought to represent posttraumatic air secondary to concomitant skull fractures. Surgical exploration revealed impacted beaded hair accessories which were the true source of these radiolucent areas.

Retained foreign bodies pose a risk of infection in the scalp and brain parenchyma^{2 3} (in cases of head injuries)

in addition to other body parts such as the foot.⁴ Delayed presentation of brain abscess has been reported in cases of penetrating brain injury with radiolucent materials. Surgical extraction may not always be complete, particularly in the case of radiolucent material such as wood or splinters. Ultrasonography has been suggested as one means by which retained radiolucent foreign bodies may be accurately and effectively detected following surgical exploration and extraction.^{4 5}

Learning points

- ▶ We recommend that when there is clinical suspicion of a penetrating foreign body composed of material that is ordinarily radiolucent, such as wood or plastic, any CT study obtained of the region should be viewed on window settings such as 'lung windows', whose inherent properties will enhance visualisation of foreign bodies of this radiographic density.
- ▶ Ultrasonography has a role in the detection of otherwise radiolucent foreign bodies and can be used intraoperatively or postoperatively to ensure complete surgical extraction.
- ▶ Retained foreign bodies in penetrating brain injury can lead to brain abscess formation with associated seizures and neurological disability.

Competing interests None.

Patient consent Obtained.

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