Unusual presentation of more common disease/injury

A potentially missed cervical (C2) spine fracture

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Summary

The authors present a case report of a potentially missed C2 fracture whose signs and symptoms did not warrant radiograph imaging according to both the National Emergency X-Radiography Utilization Study and Canadian C-spine Rules. The patient had a significant injury while rear-ending a stationary vehicle at 20 mph, and the correct diagnosis was only made based on approaching him with a high index of suspicion. He was successfully treated in a halo collar and made an excellent recovery.

BACKGROUND

Despite advances in trauma care and imaging techniques, the recognition of cervical spine injuries can be difficult. The National Emergency X-Radiography Utilization Study (NEXUS)¹ and Canadian C-spine Rule (CCR)² are decision rules used to guide clinicians on requesting radiographs in patients suspected of having a cervical spine injury following blunt trauma. We report a patient with a cervical spine (C2) fracture who did not fulfil the NEXUS or CCR criteria for requesting plain radiography of the cervical spine.

CASE PRESENTATION

A 64-year-old man who was involved in a road traffic accident self-presented with a subjective sensation of neck

stiffness. He was the driver of a car, who sustained a frontal collision at low speed (20 mph) with a stationary vehicle. He was wearing a seatbelt and airbags were not deployed. He did not lose consciousness and walked after the injury.

His Glasgow Coma Score was 15 and he had no distracting injuries. There was no cervical midline tenderness. He was able to rotate his neck 45° to the left and right, but complained of a subjective sensation of stiffness. There was no neurological deficit. Clinically, the presentation suggested a neck sprain.

A plain radiograph of his cervical spine was obtained because of his reported symptom of stiffness. This revealed a fracture of the posterior arch of C2 (figure 1). A CT scan (figure 2) revealed fracture of the left lateral mass of C2 along with fractures of both C2 laminae. He was then admitted under the care of the orthopaedic surgeons and was treated with a halo neck brace.

Figure 1 Lateral C-spine radiograph.

Figure 2 CT of C2 showing fracture of the lateral mass and posterior arch.

INVESTIGATIONS

- Lateral radiograph and CT of neck.

DIFFERENTIAL DIAGNOSIS

- Neck sprain.

TREATMENT

- Treated in a halo collar.

OUTCOME AND FOLLOW-UP

- Treated and managed by the orthopaedic team and made an uneventful recovery.

DISCUSSION

The NEXUS and CCR decision systems were based on prospective cohort studies involving a large number of patients and have provided guidelines to assist the clinician on when to order cervical spine radiographs. When validating the NEXUS criteria, Hoffman *et al*⁶ examined the decision instrument in 34 069 patients who underwent radiography of the C-spine. Of them, 818 had fractures and 8 were missed (sensitivity 98%, $p < 0.02$). Of the eight, only two had clinically important fractures.

Clearly, the fracture our patient sustained was clinically important. Hoffmann estimated that using the NEXUS criteria, would result in a clinician missing a cervical spine fracture every 125 years.

In 2003, Stiell *et al*,⁴ performed a prospective cohort study ($n=8283$) and found that the CCR was superior to the NEXUS criteria with respect to sensitivity (99.4% vs 90.7%, $p < 0.001$) and specificity (45.1 vs 36.8 $p < 0.001$) for cervical spine injuries. They too used the same criteria for non-significant cervical spine injuries.

Most head rotation is brought about at the atlanto-axial joint (C1–C2). This is an area of diagnostic difficulty, due to complex anatomy and overlapping structures.^{5 6}

We have presented a potentially missed cervical spine (C2) fracture that was only picked up due to approaching the patient with a high index of suspicion. The two clinical scoring systems, although considered, did not deem radiography a necessity.

Learning points

- Always ensure you have an adequate film.
- Approach C-spine injuries with a high index of suspicion.
- Use scoring criteria like the NEXUS and Canadian CCR with caution.

Competing interests None.

Patient consent Obtained.

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