Occult Cervical Spine Fracture in an Ambulatory Patient

Significant injury to the cervical spine may not be obvious in patients whose mental status is decreased. We present the case of a fully conscious, ambulatory patient with no complaint of neck pain and only mild tenderness on examination who nevertheless had sustained an unstable fracture-dislocation of the cervical spine. Following surgery, the patient recovered without permanent neurologic sequelae. Criteria are suggested for ordering radiographic studies of the cervical spine for victims of trauma. [Bresler MJ, Rich GH: Occult cervical spine fracture in an ambulatory patient. Ann Emerg Med 11:440-442, August 1982.]

INTRODUCTION

The importance of cervical spine evaluation is well recognized for victims of trauma, as well as for patients with altered mental status in whom signs and symptoms of traumatic injury may not be obvious.1 Such patients may present with alcoholic or drug intoxication, seizures, or cardiac dysrhythmias. Even if it is known that the patient has fallen, trauma to the cervical spine may not be apparent if altered mental status has precluded subjective awareness of neck pain.1,2

There have been few reports, however, of patients with intact mental status who present with few (if any) symptoms or signs of neck trauma, but who nevertheless have sustained significant injury to the cervical spine.3,4 We present the case of such a patient who was ambulatory on admission.

CASE REPORT

A 32-year-old woman walked into the emergency department of Mills Memorial Hospital at 6:41 AM complaining of pain in her left wrist and multiple abrasions. She did not complain of neck pain. She had fallen out of a rapidly moving car approximately six hours earlier and had been unconscious for at least several minutes. She initially went home, but came to the hospital a number of hours later for evaluation of her wrist pain. She admitted to drinking alcohol prior to the accident.

The patient was in no acute distress, with intact mental status and normal vital signs. She had significant tenderness and swelling of the left wrist, a laceration of the forehead, and abrasions of the scalp, left knee, right elbow, and right hip. Her neck was mildly tender to palpation. She was able to move all four extremities and had grossly intact sensation to light touch. Radiographs of the left wrist, skull, and cervical spine were ordered.

Films revealed a comminuted, impacted fracture of the distal radius and an associated fracture of the ulnar styloid. They also showed subluxation of C4 on C5 with fractures of the pedicle and neural arch of C4 (Figures 1 to 3). The patient's neck was immobilized with sandbags, neurosurgical consultation was obtained, and Gardner-Wells tongs were applied. More detailed neurologic examination at this time revealed normal sensation and motor function. There was, however, a Babinski reflex on the left and an equivocal plantar reflex on the right. Deep tendon reflexes were slightly decreased on the left.

The patient was admitted to the intensive care unit and maintained in skeletal traction. Her wrist fracture was reduced and casted. On the sixth hospital day anterior cervical disectomy, decompression, and fusion were performed, with insertion of an iliac crest bone dowel (Figure 4). Findings at
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Fig. 1. Lateral view of cervical spine showing subluxation of C4 on C5 with fracture of C4.

Fig. 2. Transaxillary "swimmer’s" view revealing T1 and subluxation of C4 on C5.

The surgery included posterior rupture of the C4-5 disc, tearing of the anterior longitudinal ligament, and subluxation of C4 on C5.

The patient continued to do well and was discharged on the 11th hospital day with intact neurologic findings. She was asymptomatic on follow-up evaluation one year later.

DISCUSSION
Clinical Presentation

The association of occult cervical spine injury with decreased mental status is well recognized. However, our case emphasizes that patients with an alert sensorium may be unaware of significant neck injury, perhaps considering their mild neck discomfort as merely one of multiple minor aches and pains following trauma. Our patient was ambulatory and presented to the hospital several hours after the accident. In fact, she walked into the emergency department and had no complaint of neck pain. Although she had been drinking prior to the accident, she was not overtly intoxicated when she arrived. The examining physician was not particularly impressed with the degree of tenderness on palpation of her neck, but ordered cervical spine films in accordance with the standards of the emergency physicians at that hospital.

Criteria for Radiographic Study

When the patient presents with a decreased level of consciousness following obvious trauma, there is little question that cervical spine films are appropriate, as are skull studies, whether regular films or CT scan. When there is a decreased level of consciousness on presentation but trauma is not obvious — as in neurologic or cardiac patients — the decision concerning cervical spine studies will involve consideration of whether the head or neck was struck with any force during a fall.

The problem arises, however, when the patient presents with a normal sensorium. If there was no contact trauma to the head or neck, but the patient complains of neck pain following a “whiplash” type of injury, then the decision concerning radiographic studies of the cervical spine will depend in part on clinical findings, medical-legal considerations, and the standard of care in the community. Such patients are beyond the scope of this paper.

The patient who presents with a normal sensorium, but who has had obvious contact trauma to the head or neck as our patient did, is somewhat different. While each case should be evaluated individually, we believe there are three situations in which radiographic studies of the cervical spine should usually be obtained.

If the patient complains of neck pain following a significant blow to the head or neck, it may be assumed that neck trauma has occurred. Such patients may have sustained injury to the skeletal or ligamentous support system.

If tenderness of the posterior neck is elicited on palpation in those who have experienced contact trauma to the head or neck, we think cervical spine films are indicated.

The third situation is that of the patient who has suffered traumatically induced loss of consciousness following a blow to the head or neck. This injury implies a significant application of force to the skeletal structure of the
Evaluation of Radiographs

Various methods for reading films of the cervical spine have been described. Regardless of the method, it is essential to evaluate the soft tissue spaces, bone alignment, and bone structure. Radiographs in our case revealed abnormalities of all three parameters: narrowing of the C4-5 disc space, misalignment of the vertebral bodies and spinal canal, and fractures of the associated pedicle and neural arch (Figures 1 to 3).

The top of T1 should always be visualized. Arm traction or a transaxillary "swimmer's" view (Figure 2) may be required. Tragedy has occurred when inadequate studies were read as negative.

If there is a significant suspicion of neck injury, spinal immobilization should be maintained and a cross-table lateral cervical spine film evaluated before moving the patient from the hospital gurney to the x-ray table. Under no circumstances should the physician actively manipulate the head and neck until radiographic studies are evaluated.

CONCLUSION

Our case illustrates the importance of obtaining films of the cervical spine when there is any question of neck injury following contact trauma in which the head or neck may have received a direct blow. Even when significant injury to the neck is not apparent, a question of neck injury should be considered to exist — and cervical spine films should be ordered — in patients with contact trauma when any of the following conditions applies: 1) the patient complains of neck discomfort; 2) the physician elicits neck pain on physical examination; or 3) traumatally induced loss of consciousness has occurred.

Scrupulous attention to these standards proved crucial in this case in avoiding possible permanent paralysis in a patient with an unstable cervical spine fracture-dislocation which was at first unsuspected by both patient and physician.

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REFERENCES