Missed C1 posterior arch fracture: a case report

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A case of a C1 posterior arch fracture following a fall is presented. The need to perform a thorough history and examination, regardless of previous examination findings, is emphasized. This is especially true when there is a history of recent trauma. A brief discussion of the characteristics and management of C1 fractures follows.
(JCCA 1990; 34(1): 27–29)

KEY WORDS: Fracture, cervical spine, diagnosis, chiropractic, manipulation.

On présente un cas de fracture C1 de l'arche postérieure à la suite d'une chute. On y souligne le besoin de dresser les antécédents médicaux et de faire un examen en profondeur, peu importe ce qu'a révélé un examen antérieur. Cela est surtout vrai lorsqu'il y a des antécédents de traumatisme récent. Vient ensuite un bref exposé des caractéristiques et de la gestion des fractures C1.
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MOTS CLÈ: Fracture, colonne cervicale, diagnostic, chiropraxie, manipulation.

Introduction

Fractures of the C1 vertebra most commonly involve a portion of the posterior arch.[1] They typically present following an acute hyperextension injury to the cervical spine.[1] The diagnosis is often delayed or missed since the presenting complaints may be minimal. For this reason, it is important to maintain a high index of suspicion with every patient involved in a trauma, no matter how trivial. The following case illustrates this point.

Case report

A 33-year-old female presented with neck pain and stiffness of one day duration. She stated she had fainted in the shower the previous day and although she could not recall having hit her head, when she regained consciousness she was aware of a dull headache, as well as neck stiffness. She was not aware of how long she had been unconscious. She was seen in the local hospital Emergency Department several hours later, where she was diagnosed as having a viral infection. The patient was discharged with Tylenol 2 and advised to rest for the next several days.

When seen in our office the following morning, the patient did not appear in any acute distress. When asked about any recent illness or prior history of similar episodes, she reported noticing ringing in her ears and slight nausea the evening prior to the fall. Past history revealed that five years previously she had undergone a series of tests for fainting spells. The cause of these had never been established.

On examination, it was noted she was holding her head in a very erect position and was reluctant to move it in any direction. Cervical compression produced pain in the left upper neck. Neurological assessment of the upper and lower limbs was within normal limits. Cranial nerves were intact. While seated in a swivel chair, the patient was instructed to turn her body from side to side with the head held in a stationary position. There was no dizziness reported. Her blood pressure was 110/68.

Anteroposterior and lateral radiographs of the cervical spine were taken. Ultrasound was applied to the neck and the patient was told to use ice at home. Subsequent review of the x-rays revealed a non-displaced fracture of the posterior arch of C1 (figure 1). The patient was called and told to return to the hospital for further assessment. It was suggested she use a cervical collar in the meantime.

The patient was seen again the following morning. Her neck was immobilized in a soft collar. She stated she had felt some relief following the previous treatment, however, the ultrasound had produced some discomfort at the time of application. She had returned to the hospital the previous day as instructed, where another series of x-rays had been taken. These had been reported as normal (figure 2). Subsequent to the receipt of this latter report, a consultation was arranged with the hospital staff radiologist. After viewing our radiographs, it was agreed that

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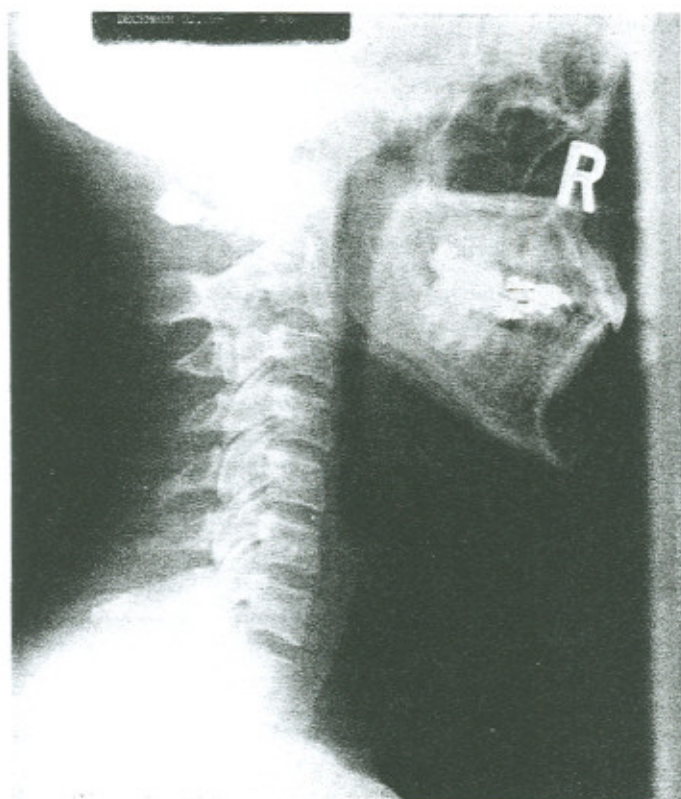© JCCA 1990

Figure 1 Lateral view of the cervical spine demonstrating a linear radiolucency extending obliquely through the posterior arch of C1.

Figure 2 Lateral view of the cervical spine taken one day later. The fracture line is not visualized.
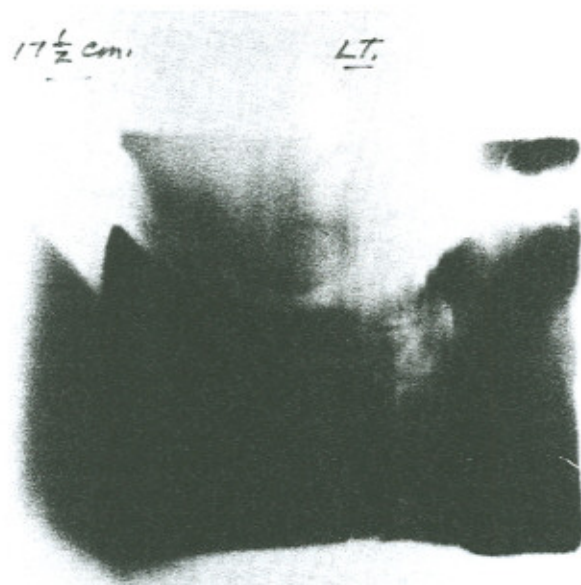

Figure 3 Linear tomogram confirms the presence of a fracture through the posterior arch of C1.

there was a high probability of a fracture. A series of lateral tomograms were ordered which confirmed the presence of a linear fracture through the posterior arch of C1 (figure 3).

The patient remained in the cervical collar for a further six weeks. She continued to report neck stiffness for several months following the original injury. When last examined, she had minimal suboccipital tenderness and full range of motion of her neck. There was no evidence of neurological deficit. There had been no further episodes of fainting or dizziness.

Discussion

Fractures of the C1 vertebra are relatively uncommon. Landells et al. report that 35 of 750 acute cervical spine fractures are of C1, yielding an overall incidence of 4.7%. Posterior arch fractures account for 16 of these 35. The remaining fractures involved either the anterior arch or lateral masses of the atlas.[2]

The most common mechanism of injury resulting in a fracture of the posterior arch involves hyperextension combined with axial compression of the cervical spine. This leads to an entrapment of the posterior arch of atlas between the occiput and the spinous process of C2.[1] As a consequence of its ring-like structure, the atlas is weakest at the point where the arch joins its lateral masses.[3] Therefore, this is usually the site of failure in

this type of fracture.[2] Fortunately, posterior arch fractures are considered to be stable injuries, usually dismissed as relatively innocuous.[2]

Clinically, patients with a posterior arch fracture typically present with a history of a sudden hyperextension injury resulting in neck pain and stiffness. It is important to note that symptomatology may be minimal, as in the case described above. Also neurologic deficit is uncommon. However, several cases have been described where patients reported scalp dysesthesia.[1] The relative paucity of neurological complications is the result of the anatomical configuration of the arches of the atlas. The spinal canal is usually "decompressed" when there is a fracture of one or both arches. Notwithstanding, severing of a vertebral artery is a potential serious complication, considering the close proximity of these arteries to the lateral masses of the atlas.[2]

The diagnosis of fractures of the atlas is confirmed by radiography. However, this diagnosis is complicated by the inability to appropriately visualize all portions of the atlas on plain film radiographs. The radiograph most helpful in assessing the posterior arch of C1 is the lateral view of the cervical spine. In addition, lateral tomograms are a useful adjunct when there is overlap of adjacent structures making visualization of C1 difficult. Computed tomography can also be a valuable aid, as it allows more precise visualization of the upper cervical vertebra and can be used to rule out the presence of more complicated injuries.[4]

The most complicated issue surrounding C1 fractures is determining whether it is an isolated injury or part of a more complex injury. Levine et al. report that patients with posterior arch fractures have approximately a 50% incidence of a concomitant injury in another portion of the C1–C2 complex, the most common of these being a C2 posterior arch fracture.[1] A burst or Jefferson fracture of C1 must also be ruled out.

In the absence of a concomitant injury, posterior arch fractures are stable and can be treated symptomatically. Immobilization of the cervical spine in a rigid or soft orthosis for six to eight weeks is usually sufficient for healing.[2] Patients usually do well following this regime of therapy, either recovering fully or being left with minimal neck pain and/or stiffness.

Conclusion

In addition to the clinical relevance, this case draws attention to some valuable points. First, it is essential to listen to the patient during the history taking and to delve into any previous health concerns. The patient reported having had a trauma to the neck and head secondary to an episode of syncope. The emergency room doctor focused on the fainting and appeared to dismiss the neck complaint. Secondly, the examining doctor needs to be aware of the subtle clues, such as erect posture and muscle spasm of the neck, since these may point to a more sinister problem. Thirdly, radiography plays a major role in diagnosis, although it should only be used in conjunction with the clinical picture to establish a diagnosis. Repeat radiographs of an area of complaint may be required, especially in the case of persistent signs and symptoms with a history of recent trauma.

Finally, this case also illustrates the need to perform a complete and thorough history and physical examination, regardless of any previous consultants' opinions, since no practitioner is infallible.

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