Pitfalls in Spinal Radiology:

Association between the Hangman's fracture and an extension teardrop fracture of the body of C2

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Figures 1 and 2 are lateral cervical spine radiographs of a patient who presented following a hypertension injury to the neck and who sustained a Hangman's fracture (traumatic spondylolisthesis of the axim). The fracture was not visible on the initial films that showed only an extension teardrop fracture of the body of C2.

Figure 1: Cervical spine radiograph taken at presentation. The shows an extension teardrop of the antero-inferior angle of the body of C2. No further bony injury can be identified on the film. Note the widening of the upper precervical soft tissue shadow, indicating the presence of haematoma in association with the vertebral injury.

Figure 2: Follow-up lateral shoot through cervical spine radiograph. Follow-up films taken seven weeks later again show the extension teardrop fracture of C2 but now in addition demonstrates a fracture through both pars interarticulartis regions of C2; the so-called Hangman's fracture. The extension teardrop fracture is beginning to unite. Note the widening of the precervical soft tissue shadow has resolved.

Comment

The association between an extension teardrop fracture of the body of C2 and a Hangman's fracture is well described.[1] Both injuries commonly result from a hyperextension force such as may occur when the forehead of an unrestrained occupant of a motor vehicle is thrown forward against the windscreen as a result of a sudden deceleration impact. (In the case of a judicial hanging, a severe distracting force is probably the more important mechanism).

The fact that the Hangman's fracture is not visible on the initial films is unusual. However because of the known association between an extension teardrop fracture of the body of C2 and the Hangman's fracture, the presence of one should generate a high index of suspicion for the possible presence of the other. The extension teardrop fracture is unstable in extension, but stable in flexion. The Hangman's fracture is completely unstable because of the bilateral pedicle fractures. (The extension teardrop fracture of C2 can be thought of as the "little brother" of the Hangman's fracture).

Reference

1. Grainger RG, Allison DJ. *Diagnostic Radiology* 1st ed. Churchill Livingstone 1986: 1231.