Traumatic Spondylolisthesis of the Axis in a Patient Presenting with Torticollis
A Case Report

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In a 34-year-old man with an acute traumatic spondylolisthesis (ATS) of the axis, the presenting physical sign was severe torticollis associated with reactive spasm of the right sternomastoid muscle. Computed axial tomography (CAT) was useful both in assessing the nature of ATS (which involved more displacement of the axis fracture and adjacent soft-tissues on the right side of the neck) and in ascertaining reduction, realignment, and healing. The reduction was sustained by halo-vest immobilization.

Acute traumatic spondylolisthesis of the axis in a patient presenting with unequivocal torticollis is an apparently uncommon finding, as a search of the literature has failed to find a similar case report.

CASE REPORT

A 34-year-old alcoholic man with a chronic seizure disorder was found on the sidewalk in a postictal state and brought to the hospital for acute medical care. At the time of his examination, the patient was alert and oriented and had no major complaints except for some tongue pain. Positive physical findings consisted of a tongue laceration and small contused lacerations of his scalp. The patient’s treatment consisted of replenishing his antiseizure medication, observation, and suturing of his scalp lacerations. No roentgenograms were ordered. The patient was given an appointment for a follow-up assessment.

Upon returning to the medical clinic five days later, the patient had developed a semirigid torticollis, with the head somewhat flexed, tilted to the right, and rotated slightly to the left. The patient complained of severe spasms in his right neck of one day’s duration; and the neck was tender in the area of the superior portion of the right sternomastoid muscle. The patient would not voluntarily hold his head fully erect, and rotation to the right was limited. He was not noticeably hoarse and denied any difficulty with swallowing. The patient’s temperature was normal, and he had no cervical lymphadenopathy.

A soft cervical collar was applied and the patient was taken to the radiology suite where plain films, tomograms of the lateral cervical spine (Fig. 1), and computed axial tomography (Figs. 2 and 3) confirmed a traumatic spondylolisthesis of the axis with significant anterior displacement; the patient was admitted.
Shortly after admission, a neurosurgeon examined the patient and noted no focal neurologic findings. The patient was initially placed on strict bed rest in 5 lb of head halter traction. With the patient in the supine position, a small rolled towel was placed behind his lower neck and the fracture was reduced manually with minimal axial traction applied from beneath the mandible. Two days after admission, the patient was placed in a halo-vest. Because the patient and his home situation were deemed to be less than optimally reliable, he was kept in the hospital for the next three and one-half months, during which time his halo-vest was adjusted as needed, his seizure problem was brought under control, and his overall nutritional status was improved.

Following removal of the halo-vest at three and one-half months after injury, lateral roentgenograms and a computed axial tomogram assessment (Fig. 4) confirmed the maintenance of a satisfactory reduction and the early healing of his fracture. Wearing a Philadelphia collar, which was to be worn for

Fig. 1. Tomogram of injury of the lateral cervical spine revealing a fracture through the posterior body of C2 with 12 mm of anterior displacement of the body of C2 on C3. Significant retropharyngeal soft-tissue swelling is also seen.
two more months, the patient was subsequently discharged from the hospital. At his clinic visit six weeks after discharge, the patient had no neck pain, no torticollis, and approximately 40° of rotatory head motion to each side. A lateral cervical spine roentgenogram was taken (Fig. 5) and revealed no change in axis position when compared to a prior roentgenogram taken just after halo-vest removal. The patient was subsequently lost to orthopedic follow-up evaluation.

DISCUSSION

While other studies have described pain and restricted neck motion as the physical findings most often associated with patients who have sustained a traumatic spondylolisthesis of the axis injury, none has described a frank torticollis as the initial predominant clinical presentation of this injury. The clinical picture of this patient at five days after injury was quite reminiscent of the “cock robin” head-and-neck pose seen both in some forms of inflammatory atlantoaxial joint displacement in children1,6,7 and in atlantoaxial rotatory fixation.4 In this patient, a computed axial tomogram (Fig. 2) revealed a normal relation between the axis and odontoid, however, and
Fig. 3. Computed axial tomogram of injured neck through the axis. A fracture disrupting the posterior body of the axis and extending through its superior facet joints is clearly seen. Greater bony and soft-tissue displacement are seen in the right neck. (Also present at this level are the lateral portions of the inferior facets of the atlas.)

Thus was useful in ruling out the latter diagnosis. The transient torticollis in this case appears to have been caused by a protective spasm of the right sternomastoid muscle; and this inference is certainly compatible with the initial computed tomograms through the axis that revealed greater bony and soft-tissue displacement on the right side of the injured neck (Fig. 3).

Because of the significant anterior displacement of the axis with respect to the body of C3, this patient’s fracture, according to the classification of Francis et al., is a Grade V injury, with disruption of the integrity of the C2–C3 disc. It should be noted, however, that despite 12 mm of anterior axis displacement, there was no anterior angulation of the body of the axis, which has been implicated by others as a possible risk factor for nonunion.2,5,8 Also, while Levine and Edwards8 have noted difficulty in either reducing or maintaining the reduction of some of these fractures when the bony disruption occurs through the facets of the axis, that problem was, fortunately, not
Fig. 4. Computed axial tomogram through the axis after removal of the halo-vest at three and one-half months after injury. A satisfactory reduction and some bony bridging of the fracture can be seen.

encountered in the management of this patient’s injury.

As has been pointed out by several authors, the eponym “hangman's fracture” as proposed by Schneider et al.\textsuperscript{10} has been adopted to describe a spectrum of bilateral and axial loading-related fractures of the ring of the axis that may involve the facet joints, the pars interarticularis, the laminae, or even part of the posterior wall of the body of the axis.\textsuperscript{2,9,12} These fractures may be symmetrical or asymmetrical, but all have in common the presence of an intact odontoid and, generally, some degree of anterolisthesis of the axis relative to C3. Sherk and Howard\textsuperscript{11} noted that when the fracture occurs through or near the spongy cancellous bone of the superior facet joint, the potential for bony union of the reduced fracture is higher than when the fracture involves an area of thinner cortical bone such as the pars interarticularis, and that axial tomography could be potentially useful in identifying patients at risk for delayed union or nonunion despite immobilization. For this case, axial tomography, in addition to enabling a more precise evaluation of the injury sustained, proved useful in our subsequent assessment of the alignment and healing of the fracture.
REFERENCES


FIG. 5. Lateral roentgenogram of healed axis fracture at five months after injury and six weeks after halo-vest removal.