Delayed diagnosis of a thoracolumbar flexion-distraction injury

Dear Editor,

In 1948, G.Q. Chance observed a pattern of spinal injuries associated with flexion in which the fracture line traveled from the transverse process to the anterior vertebral body.\[^{1}\] Chance injuries are typically associated with seatbelt trauma as the belt creates a fulcrum around which the thoracolumbar spine rotates.\[^{2,3}\] Seatbelts are implicated in 71–95% of these fractures.\[^{4}\]

There is a strong correlation between thoracolumbar Chance injuries and abdominal injuries. One recent study found that one-third of patients with a Chance fracture had associated intra-abdominal injuries, most commonly hollow viscus injury.\[^{4}\] A high index of suspicion is essential to establish the diagnosis and prevent subsequent neurologic injury.

A 35-year-old female involved in a high-speed motor vehicle collision was transferred to our Level-1 trauma center. Systolic pressures were 60–70 mmHg on arrival to the trauma bay. Her secondary survey was significant for a seatbelt sign, evisceration of the small bowel, diffuse abdominal tenderness, and posterior thoracic spinal tenderness.

Following the primary and secondary survey, she was emergently taken to the operating room. She underwent exploratory laparotomy with partial small and large bowel resection. On hospital day 2, thoracolumbar spine computed tomography (CT) was performed [Figure 1]. No spinal injury or instability was suspected based on the initial review of the CT.

After transfer to a rehabilitation facility, the patient complained of persistent back pain prompting a repeat spinal CT. The CT scan demonstrated spinal pathology not previously recognized [Figure 2]. Radiologic findings consisted of focal kyphosis and anterior translation at the T12-L1 level consistent with a flexion-distraction spinal injury. Plain radiographs of the thoracolumbar spine were obtained in the upright position [Figure 3]. The alignment at T12-L1 did not change on flexion-extension views, indicative of a fixed deformity.

Although the patient remained neurologically intact, she continued to complain of severe axial back pain and elected to undergo surgery for the condition. The operative procedure consisted of posterior spinal osteotomy and posterior instrumented fusion from T10 to L3 [Figure 4].

This case of a missed thoracolumbar flexion-distraction injury represents an important example of the need for a high index of suspicion in the appropriate setting as well as the need for thorough reevaluation of the polytrauma patient during the hospital course.

In many cases, the initial angular displacement will spontaneously reduce, making the radiologic diagnosis difficult at the time of initial evaluation. In retrospect, there was subtle evidence of a...
Letters to Editor

Jonathan D. Hodax, J. Mason DePasse, Alan H. Daniels, Mark A. Palumbo

Department of Orthopaedics, Warren Alpert Medical School of Brown University, Division of Spine Surgery, Providence, RI 02903, USA
E-mail: jmdepasse@gmail.com

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Financial support and sponsorship
Nil.

Conflicts of interest
There are no conflicts of interest.

Figure 1: Mid-sagittal computed tomography image on the 2nd day of hospitalization

Figure 2: Representative sagittal computed tomography image after displacement of the flexion-distraction injury. Note the focal kyphosis, widened interspinous distance, and anterior translation of the T12 vertebra relative to L1

Figure 3: (a-d) Preoperative radiograph series. (a) Standing anteroposterior, (b) standing lateral, (c) standing flexion, and (d) standing extension. Note the lack of mobility at T12-L1 indicative of a fixed deformity. On the lateral projections the kyphotic deformity measured approximately 55° (b-d)

Figure 4: (a and b) Postoperative radiographs after osteotomy, open reduction, and posterior instrumented fusion
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