Let's review Chance fracture

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DESCRIPTION

A 40-year-old man was brought to the emergency department after a fall while working at a construction site. He fell off a scaffold, 25 m high, but was saved by his safety harness. As the patient was hanging in the harness at a height of 8 m, the lanyard suddenly tore and he fell on a concrete floor.

He reported a severe lower back pain but was able to walk at the scene. On examination he was fully conscious and vitally stable. The patient had normal motor power in all four limbs with no sensory deficit. The palpation of the back revealed prominence of the 1st and 2nd lumbar spinous processes area as well as an increased gap between the 12th thoracic and 1st lumbar spinous processes (figure 1).

Anteroposterior radiograph showed an increased gap between the 12th thoracic and 1st lumbar spinous processes (figure 2). CT of the spine revealed a compression fracture of the superior end plate of the first and second lumbar vertebra with disruption of the spine columns (anterior, middle and posterior) (figures 3 and 4). There was no evidence of cord compression or retropulsed fracture fragments into the spinal canal.

Diagnosis of 1st and 2nd lumbar vertebrae Chance fracture was concluded and the patient underwent emergent surgical fixation by posterior approach instrumentation of 12th thoracic, 1st and 2nd lumbar vertebrae (figures 5 and 6). The postoperative period was uneventful and the patient was instructed to follow a rehabilitation programme consisting of back muscle extension exercises (figures 7 and 8).

Figure 1 Prominent swelling over the upper lumbar spinous processes area as well as an increased gap noted between the 12th thoracic and 1st lumbar spinous processes area while palpating the back.

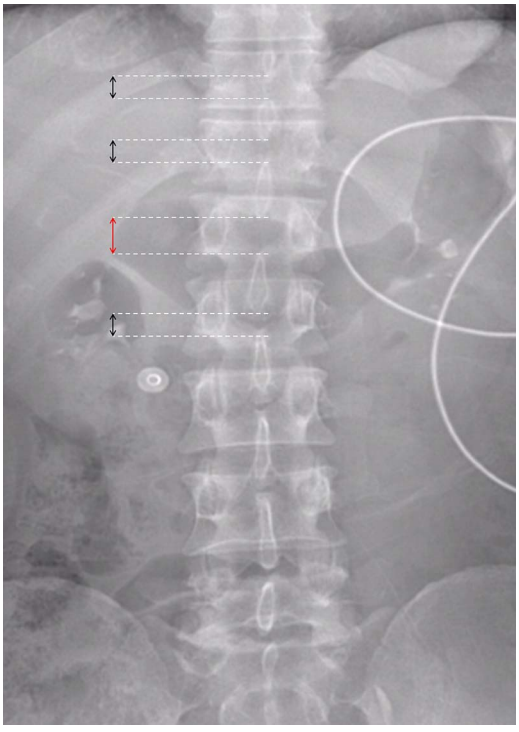

Figure 2 Anteroposterior radiograph: red arrow showing the increased gap between the 12th thoracic and 1st lumbar spinous processes, indicating middle and posterior spinous elements disruption.

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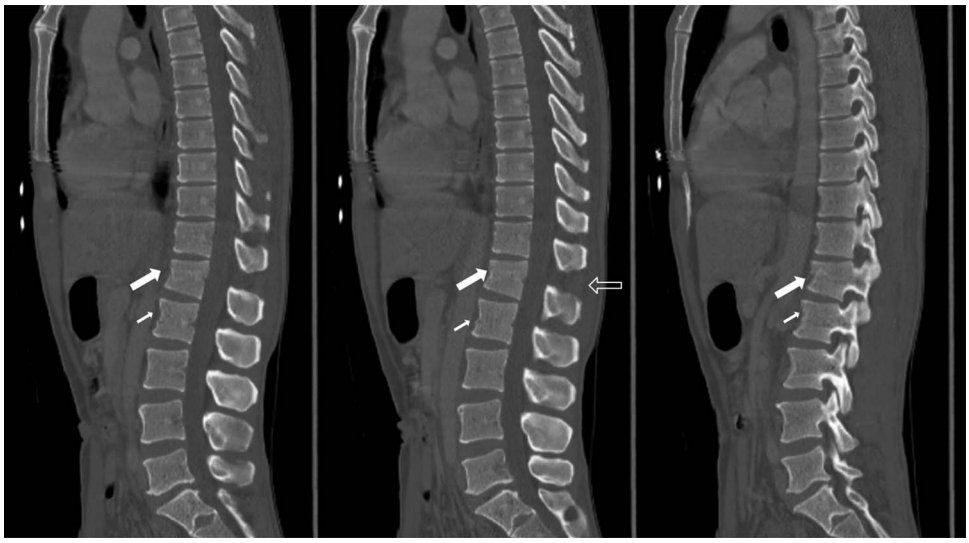

Figure 3 CT scan—sagittal plane: filled arrows point towards the compression fracture of the superior end plate of the 1st and 2nd lumbar vertebra indicating anterior elements disruption. Empty arrow points towards the increased gap between the 12th thoracic and 1st lumbar spinous processes indicating middle and posterior spinous elements disruption.

Figure 4 CT scan—coronal plane: the arrow points towards the compression fracture of the superior end plate of the 1st lumbar vertebra.

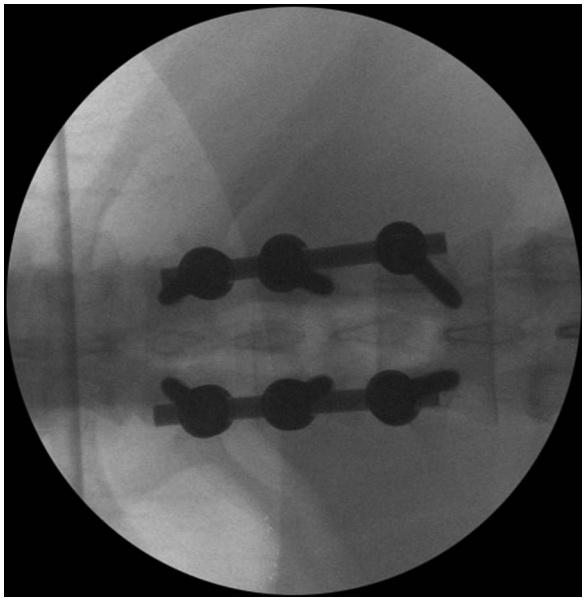

Figure 5 Intraoperative fluoroscopy—posteroanterior and lateral planes showing internal posterior stabilisation between T12, L1 and L2 vertebrae with metallic rods and screws in situ. Minimal anterior wedging of L1 vertebral body noted.

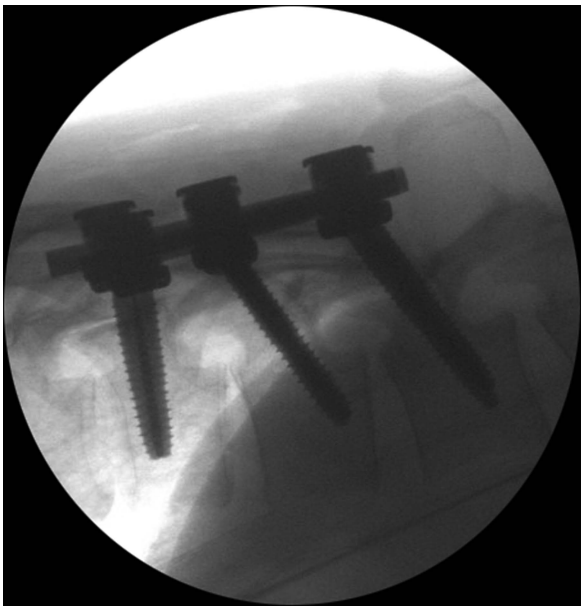

Figure 6 Intraoperative fluoroscopy—posteroanterior and lateral planes showing internal posterior stabilisation between T12, L1 and L2 vertebrae with metallic rods and screws in situ. Minimal anterior wedging of L1 vertebral body noted.

Figure 7 Follow-up radiography: showing postoperative internal fixation status with plate and screws in situ.

Figure 8 Follow-up radiography: showing postoperative internal fixation status with plate and screws in situ.

Learning points

- Chance fracture is a transverse vertebral splitting that spreads from the posterior spinal column to the anterior vertebral body, with no lateral displacement or rotation of the fracture fragments.[1] It can be bony, ligamentous or both.
- The proposed mechanism of injury is applied flexion and distraction forces on the spine, usually over a fulcrum site. The fulcrum could be a seat belt worn by drivers involved in automobile accidents or a safety harness belt used by workers who accidently fall from height. These mechanisms cause the anterior column to fail under tension along with middle and posterior columns.[2]
- Commonly, Chance fractures are located at the thoracolumbar junction (T10-L2) in adults and at the lumbar spines in children. Up to 50% of cases have associated intra-abdominal injuries.[1–3]
- Antroposterior and lateral radiographic films performed in flexion and extension aid in the diagnosis. A CT will evaluate the degree of bone injury and retropulsion of the posterior vertebral wall into the spinal canal. Furthermore, MRI will evaluate for injury to the posterior elements of the spine.
- Bony Chance fractures, stable posterior elements with no neurological deficits and less than 15° kyphosis, can be treated conservatively with immobilisation in a thoracolumbosacral orthosis in an extension position with 2-week follow-up for non-union and degree of kyphosis deformity. Ligamentous Chance fractures and unstable posterior elements with neurological deficits should be treated by emergent open reduction surgery followed by a rehabilitation programme consisting of extension exercises to strengthen back muscles and reduce backache.[4]

Contributors MA and HA diagnosed and managed the patient in emergency department. They also wrote the imaging in the manuscript, reviewed the literature on the topic and wrote the learning points. LH reviewed the manuscript, made the necessary corrections to language and edited the images.

Competing interests None.

Patient consent Obtained.

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