

Case Report

Hangman's Fracture Caused by a Truck Cabin Tilting Backward: A Case Report

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Abstract

Hangman's fracture is a term used to describe traumatic spondylolisthesis of C2. Conservative treatment is usually effective in stable and neurologically normal patients, and involves appropriate immobilization in an extended position. We report a case of Hangman's fracture in a 64-year-old man that resulted from trauma to the neck when it was caught between a truck cabin tilting backward and the base frame, which was treated conservatively using a halo vest. Three months after the removal of the halo vest, there was no pain or neurological deficits.

Keywords: Hangman' fracture; Spondylolisthesis; Spine; Truck; Halo Vest; Conservative.

Abbreviations: CT: Computed Tomography; MRI: Magnetic Resonance Imaging.

Introduction

A fracture of the pars interarticularis of C2 causes traumatic spondylolisthesis at C2-3 and is referred to as the Hangman's fracture. The Hangman's fracture classically results from hyperextension and distraction of the upper cervical spine, causing the axis to break symmetrically across its pedicles or lateral masses, and may involve the body of the vertebrae. The most common causes of this fracture are falls and car accidents [1-3]. Cervical spine injury associated with backward tilting of the trunk cabin is rare and has not yet been reported in the literature. This trauma can be fatal due to severe major organ damage. We present a case of type II Hangman's fracture in a 64-year-old man that resulted from trauma to the neck when it was caught between a truck cabin tilting backward and the base frame.

Case presentation

A 64-year-old male truck driver tilted the truck cabin forward to check the engine (Figure 1). After checking the engine, he tilted the cabin backward. However, he forgot that he had put his head in the engine room, and his neck was caught between the truck cabin tilting backward and the base frame. Fortunately, he was freed from the cabin by applying traction to his body. He was admitted to the emergency department of our hospital with neck pain and limited range of movement due to pain. In the field, emergency services had ensured complete spinal immobilization by using cervical collars.

On physical examination, the patient was neurologically intact and showed moderate to sharp midline tenderness in the cervical spine and paraspinal muscles. No signs of intracranial involvement were observed. Plain radiography, three-dimensional Computed Tomography (CT), and Magnetic Resonance

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Imaging (MRI) of the cervical spine were performed. No bony abnormalities were found in the open-mouth view; however, a fracture of the C2 pars interarticularis with angulation and translation of C2-C3 was found in the lateral view (Figure 2). A three-dimensional CT scan revealed fractures of the axis body and both pars interarticularis of the axis, with angulation and translation of C2-C3 (Figure 3). MRI did not show signal change in the spinal cord but showed intervertebral disc protrusion between C2-C3 in the T2 weighted image (Figure 3).

We diagnosed the patient with traumatic spondylolisthesis of the second cervical Levine-Edwards type 2 (Hangman's fracture). We initially considered conservative treatment, and halter traction was applied with 6 pounds of weight. We subsequently reduced the halter traction by 6 pounds to 2 pounds and confirmed that the reduction was well-maintained. We then applied traction and a halo vest using fluoroscopy (Figure 5). After checking the reduced angulation and translation of C2-3, the patient was discharged after 5 days. Three months later, radiographs and cervical CT scans showed union of the C2 fracture (body and pars interarticularis), and the halo vest was removed (Figure 6). No complications were observed. The patient reported no neck pain or discomfort at the last follow-up visit.

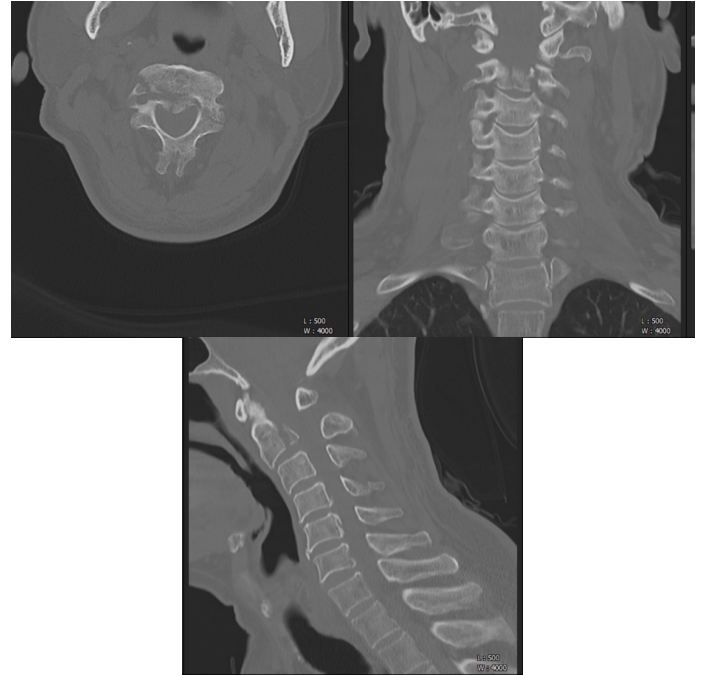


Figure 3: CT shows Hangman's fracture of C2 extends through the C2 body and both pedicles with spondylolisthesis of C2 on C3.



Figure 1: Hyundai mega truck with the cabin in a raised tilted position.

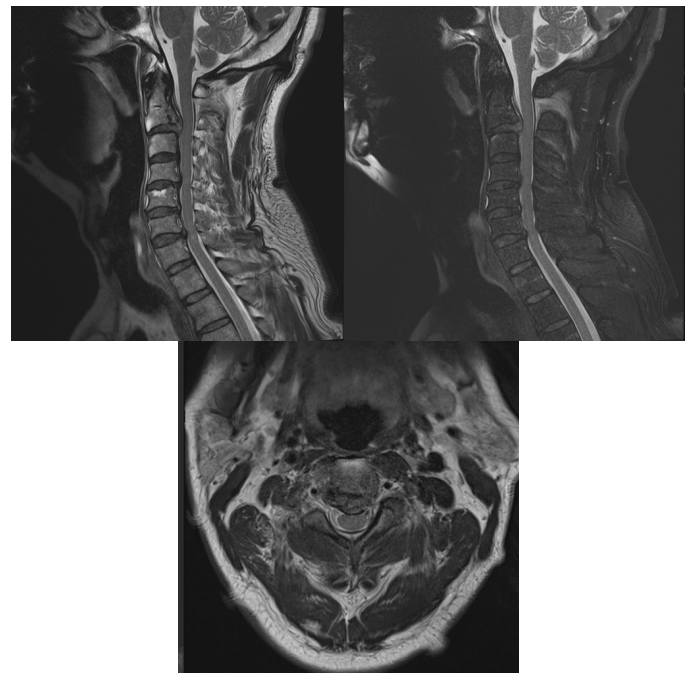


Figure 4: MRI demonstrates translation of the second and third cervical vertebrae accompanied by intervertebral disc protrusion.

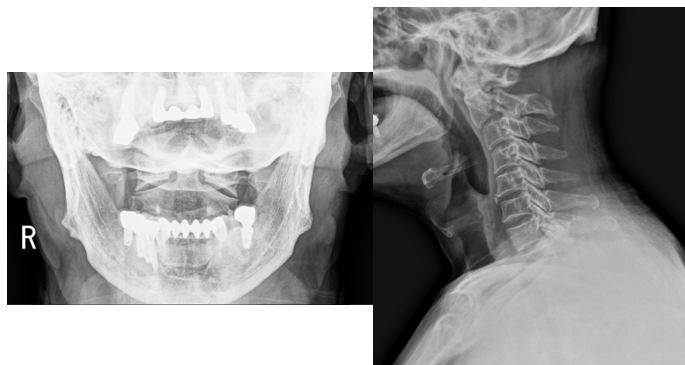


Figure 2: Plain film radiograph (open-mouth view) demonstrating no bony abnormalities. However, plain film radiography (lateral view) shows a fracture of the C2 pars interarticularis with angulation and translation of C2-C3.

Discussion

The cabin of a truck is the inside of the truck, where the driver is seated. Cabover trucks refer to trucks with a body style or design in which the cabin is positioned directly above the engine and front axle. The entire cabin is tilted forward to access the engine. Accidents related to backward tilting of the cabin are rare but can be fatal due to severe major organ damage.

Traumatic spondylolisthesis of the axis, also known as the Hangman's fracture, is the second most common fracture pat-



Figure 5: Post halo vest radiograph showing appropriate reduction and good alignment.



Figure 6: Flexion and extension radiographs obtained after removal of the halo vest show no instability in the C2-3 disc space.

tern of the C2 vertebrae after odontoid fracture [1]. Schneider first noted this fracture in 1965 [2]. The injury involves bilateral fractures of the ring of the axis through the pars interarticularis of C2. Thus, during the injury, the forces across the C2 and C3 vertebral bodies widen the spinal canal, although a low rate of neurological deficits has been reported [3]. High-speed motor vehicles or fall accidents typically account for this type of injury, and the most common mechanism involves hyperextension with axial loading or distraction and rebound hyperflexion [4]. A violent hyperextension force stretches the anterior structures and compresses the posterior structures, causing them to tear apart, resulting in a pars interarticularis fracture. Continuation of this force causes the anterior longitudinal ligament and anterior disc to be torn. If the force continues for an extended time, the disc is separated from C3, and there is a C2–C3 dislocation. Type II fractures are thought to be caused by a combination of extension and axial loading, followed by flexion and compression loads [5]. Many type II fractures are stable; thus, if stability is proven, they can be treated with nonsurgical management via a rigid cervical collar or halo vest [6,7].

At the time of the accident, the patient’s neck was between the truck cabin, which was tilted backward, and the base frame without hyperextension or distraction. We thought that the only mechanism of trauma was a direct blow to the cervical spine and not the common mechanism of Hangman’s fracture. However, this patient had Hangman’s fracture type II and C2 body fractures without any neurological deficits.

Conclusion

In conclusion, an injury related to a truck cabin tilting backward can cause damage similar to that observed in judicial hanging, with traumatic spondylolisthesis of the axis. Primary care physicians should be aware of the possibility of axis fractures in patients with a history of truck cabin tilting backward-related injuries. This case suggests that in patients with Hangman’s fracture type II and C2 body fractures, non-operative management with a halo vest is a safe and efficacious option.

Declarations

Conflicts of interest: None

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References

1. Hadley MN, Dickman CA, Browner CM, Sonntag VK. Acute axis fractures: A review of 229 cases. *J Neurosurg*, 1989; 71: 642-647.
2. Schneider RC, Livingston KE, Cave AJ, Hamilton G. “Hangman’s Fracture” of the cervical spine. *J Neurosurg*, 1965; 22: 141-154.
3. Effendi B, Roy D, Cornish B, Dussault RG, Laurin CA. Fractures of the ring of the axis. A classification based on the analysis of 131 cases. *J Bone Joint Surg Br*. 1981; 63-B: 319-327.
4. Francis WR, Fielding JW, Hawkins RJ, Pepin J, Hensinger R. Traumatic spondylolisthesis of the axis. *J Bone Joint Surg Br*. 1981; 63-B: 313-318.
5. Joel T, Adam K, Nicholas TS, John CF, Brandon DL. Hangman’s Fracture. *Clin Spine Surg*. 2020; 33: 345-354.
6. Rouzbeh ML, Homa S. C2 Body Fracture: Report of Cases Managed Conservatively by Philadelphia Collar. *Asian Spine J*. 2016; 10: 920-924.
7. Schleicher P, Scholz M, Pingel A, Kandziora F. Traumatic Spondylolisthesis of the Axis Vertebra in Adults. *Glob Spine J*. 2015; 5: 346-357.