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CHANCE-TYPE FLEXION-DISTRACTION FRACTURE OF LUMBAR SPINE

Arshad A. Siddiqui and Ahmad Ali Shah

ABSTRACT

A case of a twenty years old male who had been hit by a van at the lower back, presented two weeks later with complete paraplegia and double incontinence is presented. Radiological imaging revealed shearing of spine with fracture line slicing through the second lumbar (L2) vertebra going across all the three vertebral columns with complete retrolisthesis of upper fragment. He was managed conservatively with immobilization and rehabilitation.

KEY WORDS: *Chance-type fracture. Fracture-dislocation. Lumbar spine fractures.*

INTRODUCTION

Chance-type fractures were first described by Chance in 1948 as a result of flexion distraction injuries of spine.¹ Holdsworth described these fractures in his classification (two column hypothesis of stability) as a "slice" fracture in which fracture line goes right through the vertebral body without dislocation.² Finally, Denis classification (three column theory of spine stability) included these as type A (flexion rotation) fracture dislocation with incidence close to 13.5% in his landmark study.³ Chance-type fracture involve posterior disruption and marked increase of interspinous distance with horizontal split through the transverse processes, pedicles, pars interarticularis along with vertebral body or disc space. There is no anterior displacement (anterior longitudinal ligament remain intact).^{1,3} This should also be differentiated from shear-type of fracture-dislocation in which fracture line goes through the disc space with complete anterior displacement (disruption of anterior longitudinal ligament).³ This report illustrate a unique case in which there is a horizontal split of the posterior ligament complex, slicing through vertebral body with complete dislocation along the fracture line, characterizing features both of Chance-type and of flexion-rotation type fracture-dislocation.

CASE REPORT

A 20-years old male, motor mechanic was working in kneeling position. His buttocks were resting on his heels with the back facing the bumper of a close-by van. His fellow colleague in the driving seat accidentally ran the van forward and the bumper of the van hit the lumbar region of the patient with a tremendous force. He was brought to the emergency room two weeks later and was found to have bruises in the lumbar region with complete flaccid paraplegia and incontinence of both urine and faeces since the time of injury.

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Plain X-ray film (Figure 1) and computed tomographic scanning with 3-D imaging (Figure 2 and 3) revealed a shearing of spine with fracture line completely slicing through the second lumbar (L2) vertebra going across all the three vertebral columns. There was significant backward listhesis of upper fragment (along with the whole vertebral column above) of sliced L2 vertebra on the lower segment resulting in complete anatomical transection at this level.

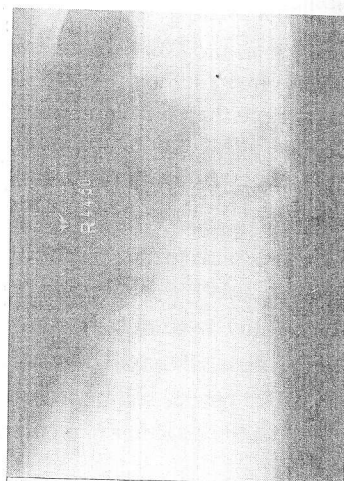


Figure 1: Plain X-ray of lumbar spine shows the fracture of L-2 vertebral body with significant listhesis.

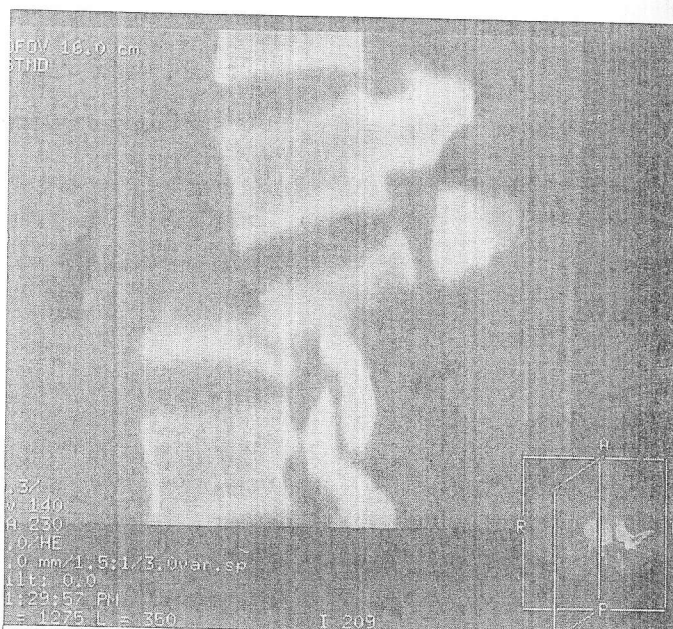


Figure 2: CT scan of lumbar spine with sagittal reconstruction showing fracture slicing through L-2 vertebra and complete anatomical transection of spinal canal.

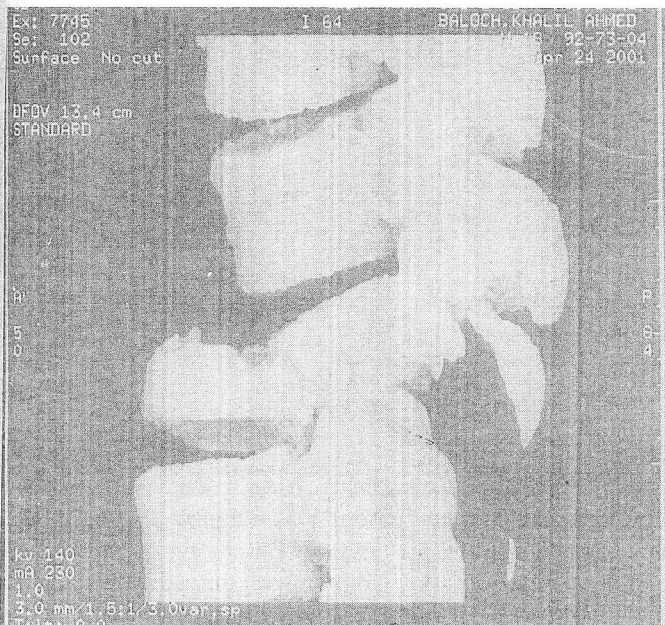


Figure 3: CT scan of lumbar spine with 3D reformation showing lateral view of "Chance-type" flexion-rotation fracture-dislocation of L-2 vertebra.

He was treated with strict immobilization and bed rest, taking all the measures of protecting the unstable spine. He was provided with intensive supportive care, nursing and physiotherapeutic rehabilitation. At three months, he was propped up in a lumbar corset and further rehabilitated in a wheel chair. This patient showed no neurological recovery till the last clinical follow up at 12 months and remained wheel chair-bound with complete paraplegia and double incontinence.

DISCUSSION

Both fracture-dislocation and Chance-type fractures involve a force acting on flexed spine violently bending it forward, causing fracture of the anterior column and tension splitting of posterior column. If the mid-column in between, the fulcrum, is also injured and shifted forward, this will result in shearing with dislocation.³⁻⁵ Pedicles are the strongest part of a vertebral body, and horizontal splitting at this level requires a tremendous force.^{3,6} Our case demonstrate the mechanism in which tremendous thrust is acting on a partially flexed spine. It not only slices the vertebral body through the pedicular line but also produces complete dislocation along the same frac-

ture line which is not described in the classifications of fractures of thoracolumbar spine.^{1,3,6,7}

Management of spine injuries at cuada equina level involving complete anatomical (radiologically) and functional (clinically) transection at late presentation is controversial.⁸⁻¹⁰ Our patient showed no neurological improvement after two weeks since the time of injury. So we thought that reduction with internal fixation after 2 weeks will not benefit the patient both in terms of neurological recovery and spinal stabilization. Strict spinal immobilization till the spontaneous healing of fracture; along with good nursing care and physiotherapeutic rehabilitation considered a better management option in this case.

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