Acta Orthop Scand 55, 466–468, 1984

Fracture dislocation of the lumbar spine without paraplegia

A case report

A 17-year-old boy sustained a complete fracture-dislocation of the lumbar spine. Immediately after the injury there was motor paralysis of the lower limbs; 17 hours post-injury, operative reduction and fixation were carried out. Nearly full neurological recovery was obtained.

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Complete fracture-dislocation of the lumbar or thoracic spine without permanent neurological loss is extremely rare. Only three previous cases have been reported.

Case history

A 17-year-old boy was a passenger in a car struck by a train on 28th November, 1981. First aid was given in a local hospital, 145 km from the University Central Hospital of Kuopio. Transport and examinations in the two hospitals took 17 h before the operation could be started.

The injuries included pneumothorax on the right side, fractured 5th–12th right ribs, complete displacement of vertebra L4, with the whole distal vertebral column shifted to the right (Figures 1 & 2), and distended and tender abdomen. Neurological examination revealed motor paralysis of the lower limbs, but skin sensibility was nearly intact with minor hyperaesthesia. Ankle and knee jerks were absent on the right side. On the left side, the knee jerk was normal, but the ankle jerk was diminished. Because the patient was unable to pass urine, urethral catheterization was necessary. The pneumothorax was drained.

Since there was no sign of severe abdominal bleeding, we operated first on the back. The midline incision revealed complete displacement of vertebra L4, and the distal vertebral column was displaced to the right and upward. Vertebral bodies L3 and L4 were located side by side. The fractures ran through the right pedicle and left pars interarticularis of the third lumbar vertebra. The neural arch was loose. **The dislocation was reduced by pulling at the feet** and shoulders while the operator manipulated the vertebral bodies into line. The loose neural arch was removed, and a 3-cm-long tear in the dura was sutured. The reduction was fixated with Williams plates. Haemorrhaging was slight; a drain was applied to the wound.

The patient was then turned onto his back, and a laparotomy was performed. There was a large retroperitoneal haematoma, serosal laceration on the caecum and a 4-cm lateral rupture on the right lobe of the liver. The tear was sutured, and the abdominal cavity was drained. Lumbar radiographs demonstrated that the spine was in good alignment (Figure 3).

Partial postoperative recovery of the neurological deficit was immediate. The patient was nursed on

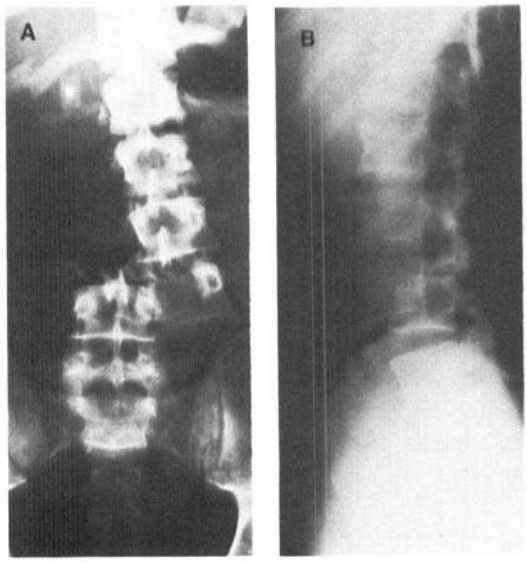

Figure 1 (A and B). Complete dislocation of vertebra L3/L4

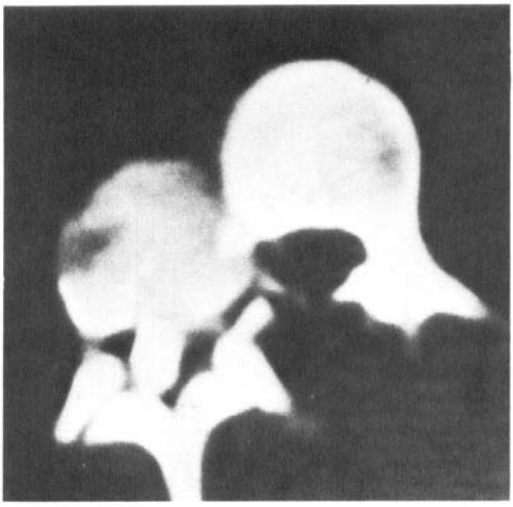

Figure 2. CT shows dislocation and fractured right pedicle and left pars interarticularis of L3.

a Stryker frame. Six weeks after the injury, posterolateral spondylodesis was carried out with autogenous iliac bone grafts. Eleven weeks after injury, the patient, wearing a brace, was able to walk with crutches.

One month after injury, all muscle groups of the lower extremities were functional. The left hip flexion, extension and adduction forces were nearly normal. Three months after the accident, the knee and ankle jerks had returned but were still weak on the right leg. Both knees and all toes could be extended and flexed voluntarily. The power of the muscles in the right leg was less all the time than in the left leg. Skin sensibility was normal, except on the lateral side of the right leg, which was hyperaesthetic. The urinary bladder and anal sphincter functioned normally.

Six months after injury, the muscle forces in the left leg were normal. Knee and toe extension and flexion were more than half normal in the right leg (complete range of motion against gravity with some resistance). Two years after injury, the patient was able to walk and run without limping and was working on a farm.

The EMG showed that the velocities of sensory and motor conduction were within normal limits. The spinal reflexes were significantly lengthened in both lower extremities and the H-reflex was absent. There were signs of denervation, mainly in the anterior tibial muscle.

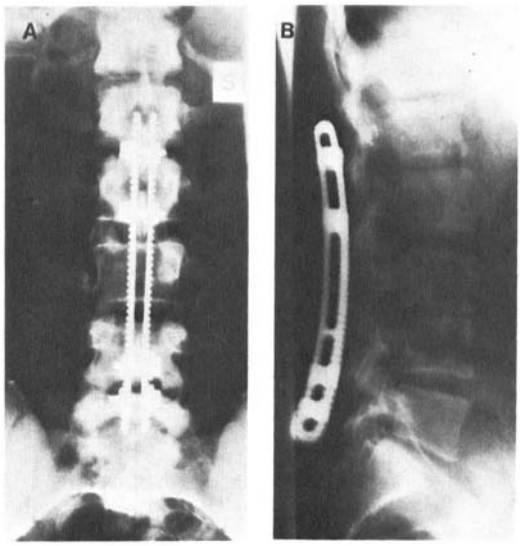

Figure 3 (A and B). Reduction and fixation of fracture-dislocation of L3/L4.

Discussion

Hellner et al. (1970) reported a case of total lateral fracture-dislocation of vertebra L2 without motor paralysis or loss of skin sensibility. The patient, a 56-year-old woman, was treated conservatively. A gross deformity of the lumbar spine remained. Her walking ability afterwards was not reported.

In a series of 3000 consecutive spinal injuries, Guttman (1976) reported one case of total lateral displacement of vertebra L1, together with the whole distal lumbar vertebral column. At first, the patient sustained complete paraplegia. She was treated conservatively. Six weeks after the injury spondylodesis was performed with a long bone graft, but the spine remained dislocated. The final disability of the patient was weakness in the distal muscles of the feet, which did not prevent her from walking with the aid of a cane.

El Masri & Silver (1983) reported a case with complete lateral displacement of the 6th, 7th and 8th thoracic vertebral bodies associated with an incomplete lesion of the spinal cord. The dorsal elements of the spine, however, remained in good alignment. Therefore their patient sustained only a traumatic decompression, which accounted for the fact that he had an incomplete lesion of the spinal cord. However, he remained paraplegic. His motor power was normal down to T9. Power was di-

minished but present in the lower abdominal musculature and there was a flicker movement in the left hip flexors, but otherwise there was spastic paraplegia in the lower limbs. Analgesia below the level of T10 remained. He became independent with a wheelchair for all daily activities. He had an automatic bladder and sterile urine. This patient was also treated conservatively.

Our patient sustained fractures through the pedicle on the right side and pars interarticularis on the left side of vertebra L3, with complete lateral displacement of vertebra L4. The right-sided pedicle fracture of vertebra L3 offers at least a partial explanation for the incomplete lesion of the cauda equina. Although the patient was also young and obviously had a relatively wide spinal canal, the root distraction must still have been considerable. Root recovery coincided with recovery from neurapraxia of the peripheral nerves. The cauda equina is known to be very sensitive to distraction or compression. In this case, the cauda equina had been stretched for 17 h before the operation, because first aid was given in another hospital. Thus, even for gross and profound fracture-dislocations in the lumbar region, the prognosis need not be poor. We advise early and exact operative postural reduction of this unstable and potentially crippling deformity.

References

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