Compression of the cervical spine cord after reduction of fracture dislocations

Report of 2 cases

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Two cases of severe neurologic damage after open reduction of locked facet joint dislocations of the cervical spine are described. Both patients had progressive neurologic deterioration after the accident. In both cases, the cause of the neurologic injury was sequestrated disk material compressing the spinal cord. One patient, who was reoperated on as an emergency, recovered after removal of the sequestra, whereas the other patient, who was reoperated on later, remained tetraplegic.

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A neurologic complication directly related to reduction and stabilization of cervical spinal fractures is rare (Guttmann 1969, O'Brien et al. 1982, Capen et al. 1985). However, in recent years, both clinical and pathoanatomic studies have reported retropulsed disk material causing spinal cord compression following cervical spinal reduction (Jacobs 1975, Ruflin et al. 1989, Rauschning et al. 1989).

We have seen 2 patients in whom a severe neurologic complication occurred after reduction of a fracture dislocation of the cervical spine. In both cases, retropulsed disk material was compressing the spinal cord.

Case 1

A 54-year-old man fell 2 meters from a tractor wagon while loading timber and sustained a hyperflexion injury to his neck. After the accident, a slow, progressive neurologic deterioration was observed. On admission, he presented with an incomplete tetraplegia, Frankel grade C (Frankel et al. 1969), and patchy sensory loss below the C-7 level. The reflexes in the legs were increased. Plain radiography (Figure 1) and CT scans revealed a dislocation, with C-6 displaced 1 cm anteriorly in relation to C-7. The right facet joint was completely dislocated and the left one was subluxed. Attempts to reduce the dislocation by closed means failed.

The patient was operated on within 12 hours after the accident with posterior reduction and fusion using plates and screws. Upon regaining consciousness, he was found to have a complete tetraplegia, Frankel A, with sensory loss below C-7. Radiographically, the dislocation was corrected, and the position of the internal fixation was satisfactory. MRI revealed an anterior soft-tissue compression of the cord at the level of injury. At anterior decompression and fusion 10 days after the initial procedure, large masses of ruptured disk material were extracted from the spinal canal. This patient has not experienced any neurologic recovery 4 years later.

Case 2

A 72-year-old man fell 4 meters from a roof while cleaning drain pipes and landed on his shoulders. He reported an initial electric sensation in his left arm. At arrival at the hospital, he complained of numbness and weakness of the left arm, but no neurologic deficit could be detected. Radiographically, he had a C4–C5 flexion rotation injury, with the right facet joint completely dislocated and the left one subluxed (Figure 2). CT scans revealed a small compression of the anterior superior part of the body of C-5. The initial CT scans did not allow conclusions regarding the condition of the disk.

Closed reduction by means of scull traction failed, and he was operated on with a one-stage posterior reduction and fusion followed by anterior disk removal and fusion. After the operation, a severe neurologic deterioration occurred, and he was trans-

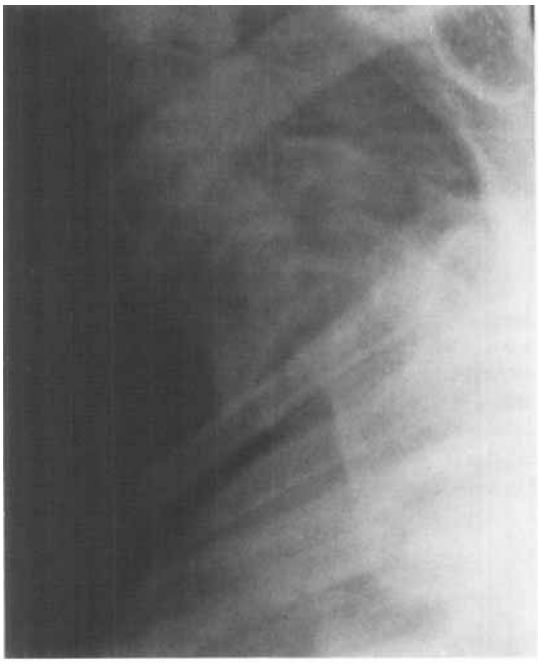

Figure 1. Case 1. Fracture-dislocation at the C6–C7 level. MRI scan of the cervical spine in the sagittal plane in the midline showing a soft-tissue mass protruding from the C6–C7 disk space compressing the spinal cord from the front.

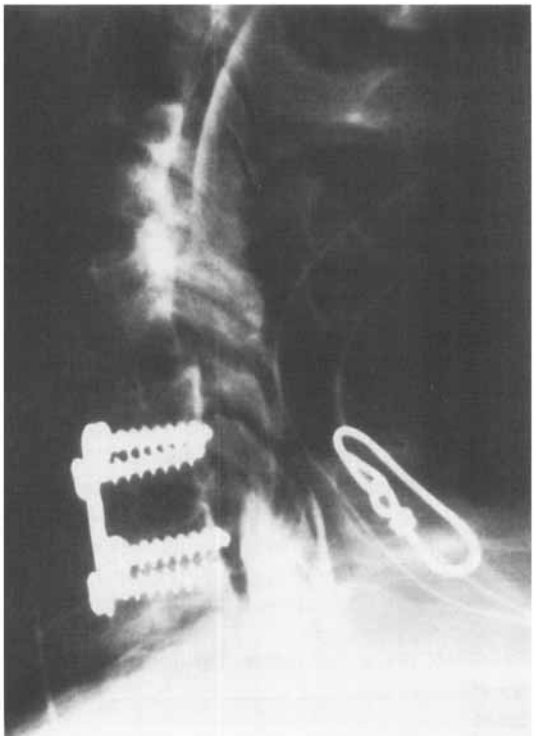

Figure 2. Case 2. Facet joint dislocation between C-5 and C-6. The myelogram shows a complete spinal block at the injury level.

ferred to our unit. At arrival, he had an incomplete tetraplegia, Frankel grade C, with sensory loss below C-5. The neurologic symptoms were progressive.

Cervical myelography showed a total block at the level of the initial injury, and the CT scan suggested a sequestrated disk as the cause to the anterior block, pushing the spinal cord posteriorly. At the reoperation, within 24 hours after the accident, when the anterior fusion was removed, bony contact between the posterior parts of the vertebral bodies of C-4 and C-5, due to posterior endplate osteophytes, was found. After excision of these osteophytes, the sequestrated disk could be removed and a new anterior fusion was performed. Postoperatively, the patient recovered neurologically, Frankel E, with only a slight loss of power in the left arm 6 months after the injury.

Discussion

Disk injury is common in cervical spinal fractures. In a series of 55 patients with cervical spinal fractures, Piazza et al. (1990), using MRI scanning, found disk lesions in 23. As is suggested by our 2 cases, the reduction of a fracture-dislocation may cause fragments from a ruptured disk to be retropulsed into the spinal canal. This has some clinical consequences. First, perhaps, fracture-dislocations of the cervical spine should be reduced after the ruptured disk has been excised? Drawbacks of such a policy would be that reduction of facet joint dislocations from an anterior approach may be difficult, and small fragments avulsed from the articular processes may not be reached from a secondary posterior approach once the dislocation is reduced. These small fragments may impinge on a nerve root. Secondly, if a posterior approach is chosen initially to effect reduction, an anterior disk excision and fusion should be carried out without delay, taking care to expose the dural sac in front to insure that no disk sequestra are present. This procedure may require excision of posterior endplate osteophytes from both the upper and the lower vertebral body, which otherwise, as in our Case 2, may conceal the intraspinal sequestra. This latter policy is the one we presently adhere to. Finally, the initial open reduction and posterior fushion can also, of course, be performed under local anesthesia, with excellent monitoring of the neurologic function during the operation.

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