

Posterior reduction of a pathologic spinal fracture

A case of indirect anterior dural decompression

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In a patient with paraparesis resulting from a pathologic fracture of Th9, which was due to a breast cancer metastasis, indirect anterior decompression via posterior reduction was performed. The rationale for the operation technique was the similarity

between a pathologic fracture of the thoracolumbar spine and a traumatic burst fracture. The method, which uses a transpedicular reduction and fixation device, is substantially less invasive than a formal anterior decompression.

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By appreciating the similarities to a traumatic burst fracture of the thoracolumbar spine, it is evident that the dural compression in a pathologic fracture secondary to a malignant metastasis is caused by a combination of a kyphotic deformity and fracture fragments bulging into the spinal canal. In a traumatic burst fracture, it is often possible to release the dural compression by reduction. The dural compression in a pathologic fracture can be managed in the same way.

We report a new technique: indirect anterior decompression of dural compression by posterior reduction in pathologic spinal fractures. The technique, which uses a transpedicular reduction and fixation device, is especially useful when the patient is generally affected by the malignancy, as it is a substantially less invasive procedure than a formal anterior decompression.

The case

The patient was a 41-year-old woman with metastatic collapse of Th9 secondary to breast cancer. Over a 2-month period, she had experienced mounting back pain that was followed by the sudden onset of neurologic deficit. On admission, she had severe pain and paraparesis Grade C (Brice and McKissock 1965) that had arisen 3 hours previously. A myelographic investigation showed a complete block (Figure 1), and CT revealed tumor and bone fragments in the spinal canal.

The operation was performed with the patient in the prone position using a posterior spinal reduction and fixation device, the PSF (Karlström et al. 1988). Pedicle screws were inserted in the two vertebrae adjacent

to the affected one. The fixator was mounted, and reduction of the collapsed vertebra was carried out by gently decreasing the kyphosis by apposition of the reduction arms along with simultaneous shortening of the fixator. This maneuver resulted in a decompression of the spinal canal by ligamentotaxis. Intraoperative myelography was done, which confirmed the anterior decompression (Figure 1). Postoperatively the pain diminished and the patient recovered from the neurologic deficit. She remained an independent walker without back pain until she died of her disease 9 months later.

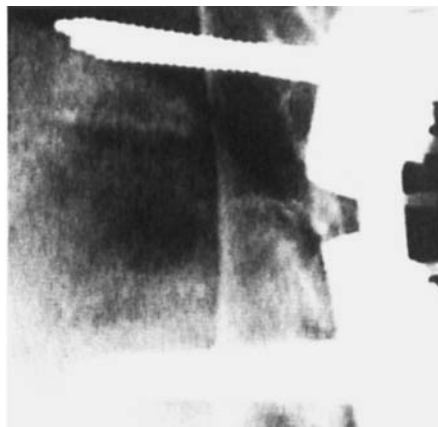
Discussion

Spinal metastasis can affect different parts of the vertebra. With a metastasis in the neural arch or the pedicle, the pathoanatomic problem is that of posterior or lateral compression of the dural sac or nerve root by the tumor mass. The logical method of treatment is posterior decompression by a laminectomy followed by stabilization.

With a metastasis affecting the vertebral body, on the other hand, the vertebra loses its mechanical integrity and subsequently collapses (Asdourian et al. 1990). The instability is painful, and when collapse has occurred, the dural sac may be compressed by the bulging tumor and bone fragments. This type of spinal metastasis, which in our experience is the most common one, does not respond positively to a posterior laminectomy and stabilization (Brice and McKissock 1965, Kostuik et al. 1988). Instead, the recommended treatment is anterior decompression and stabilization



Spinal metastasis of Th9, preoperative myelogram. Note the collapse of the vertebral body. The dural compression is caused by a combination of a kyphotic deformity and fragments bulging into the spinal canal.



Intraoperative myelogram after indirect anterior decompression via posterior reduction. The alignment of the spine is corrected, the vertebral body height is normal, and the bulging fragments have been reduced by ligamentotaxis. There is no longer any compression of the dural sac.

Figure 1. A 41-year-old woman who was operated on for breast cancer several years earlier. She had had increasing back pain for about 2 months and acute paraparesis for 3 hours before admission.

(Kostuik 1983, Siegal et al. 1985, Harrington 1986, Onimus et al. 1986, Harrington 1988, Kostuik et al. 1988). The anterior approach is, however, a major undertaking that is associated with a higher morbidity and mortality than the posterior approach (DeWald et al. 1985, Moore and Uttley 1989).

By applying the same principles as in a traumatic burst fracture, indirect anterior decompression via ligamentotaxis by reducing the collapsed vertebral body and realigning the spine, the symptoms can be brought under control with a substantially smaller, less invasive operation, with less morbidity and a lower mortality risk for the patient than an anterior procedure. This less invasive procedure is also more apposite, because these patients tend to present themselves as emergencies, often to be operated in the middle of the night.

However, because of the lack of anterior support by the vertebral body, the stabilization is solely dependent on the fixation device, which will eventually fail due to fatigue. If the patient has a short expected survival time, say less than 6 months, the instrumentation is likely to outlive the patient, and the less invasive posterior procedure is all that is necessary. If, however, the expected survival time is longer, the anterior support can be reconstructed during a second procedure, which can be performed at a convenient time when the patient is in optimal condition.

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