CASE REPORT

Spinal reconstruction for symptomatic thoracic haemangioma using a titanium cage

T Ogura, M Mori, T Hayashida, T Osawa, H Hase

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Most vertebral haemangiomas are asymptomatic. A case of spinal reconstruction for symptomatic extraosseous thoracic haemangioma using a titanium cage is reported. Radiographs of the T11 vertebra demonstrated characteristic vertical striations. Magnetic resonance imaging and computed tomography showed spinal cord compression by extraosseous tumour extension. Several tumour feeding vessels were shown by angiography. Through a transpedicular biopsy, a histological diagnosis of cavernous haemangioma was made. Embolisation of feeding vessels was performed using coils before surgery. Laminectomy and subtotal vertebrectomy were performed by a single posterior approach. Rigid stabilisation of the spine was achieved with pedicle screw systems and a cage filled with an autogenous bone graft. Five months postoperatively, stabilisation of the spine was established without loosening of the cage or pedicle screws. Clinical symptoms were improved.

Vertebral haemangiomas are usually asymptomatic and routine operative techniques have not yet been established. We report the spinal reconstruction in a patient suffering from T11 haemangioma with spinal canal stenosis using a single posterior approach. By preoperative embolisation of feeding vessels, haemorrhage during surgery was minimised.

CASE REPORT

A 68 year old woman had become aware of numbness in her right lower extremity in October 1998. Despite a temporary remission of the symptoms, she again felt back pain and numbness in her right lower extremity from July 1999. The patient was admitted to hospital for examination and then referred to our hospital as a thoracic vertebral tumour was suspected. The patient exhibited an increased deep tendon reflex in both of her lower extremities but no muscle weakness in either. The clinical score for cervical myelopathy (excluding the upper limbs) was 9.5 out of 11.¹ Radiographs of the thoracic spine showed sparse bone trabecular structures and an indistinct shadow on the pedicle of the T11 vertebra (figs 1A, 1B). T1-weighted sagittal magnetic resonance imaging (MRI) showed low signal areas (fig 2A), and T2-weighted sagittal MRI showed medium to high signal areas all over the T11 vertebra.

Spinal cord compression by an extraosseous extension was seen in T1-weighted axial MRI with gadolinium contrast enhancement (fig 2B). Computed tomograms showed sparse thick bone trabecular structures and dotted shadows in the vertebral body. Spinal cord compression by the extraosseous tumour extension was also delineated (fig 3).

Accumulation was noticed in the T11 vertebra on bone scintigraphy. A transpedicular biopsy was taken from the

Figure 1 (A) An anteroposterior radiograph showing an indistinct shadow on the pedicle of the 11th thoracic vertebra. (B) A lateral view showing sparse bone trabecular structures (vertical striations) at the 11th thoracic vertebra.

tumour under local anaesthesia. Histopathologically, the tumour was diagnosed as a cavernous haemangioma (fig 4). The feeding arteries of the tumour were identified as the bilateral 10th and 11th intercostal arteries on angiography. Preoperative embolisation of the right 10th and the bilateral 11th intercostal arteries—that is, the feeding arteries, was performed using coils while avoiding the left 10th intercostal artery from which the Adamkiewicz artery was visualised. Laminectomy of the T11 vertebra and subtotal vertebrectomy were performed via a single posterior approach.

Reconstruction of the spine was performed using a titanium cage filled with an autogenous bone and rib graft; the upper and lower vertebral bodies were fixed using pedicle screw systems (figs 5A, 5B). The operative time was eight hours, and the blood loss was 658 ml. Radiographs five months postoperatively revealed no loosening of the cage or the pedicle screws. The patient had made satisfactory progress with improvement of her back pain. Computed tomography showed no absorption of the grafted bone.

DISCUSSION

Several authors have reported that the incidence of vertebral haemangioma in patients who underwent biopsy ranged from

Figure 2 (A) T1-weighted image (sagittal) section showing low signal areas in the T11th thoracic vertebra. (B) A transverse image enhanced by gadolinium contrast demonstrating spinal cord compression by the extraosseous tumour extension.

Figure 3 Computed tomogram showing sparse, thick bone trabecular structures (vertical striations) and dotted shadows in the vertebral body and spinal cord compression by the extraosseous tumour extension.

10% to 12%, and that most of these cases were asymptomatic.²⁻⁴ Fox and Onofrio reported that 35 of 59 patients with vertebral haemangioma (59%) were asymptomatic, that 13 (22%) had only local pain, and that 11 (19%) exhibited abnormal neurological findings.⁵ The causes of spinal cord compression associated with vertebral haemangioma are considered to include compression due to the bulge of the vertebral body and or vertebral arch, extradural extension of the tumour, compression fracture, and extradural haemorrhage.

Regarding the management of vertebral haemangioma, observation of disease progress is considered sufficient for asymptomatic vertebral haemangioma.⁵ However, radiation therapy and selective arterial embolisation are indicated for intravertebral haemangioma with pain.⁵ Radiation therapy and surgical therapy are employed for the treatment of vertebral haemangioma involving spinal cord compression by extraosseous tumour extension.^{5,6} Surgical therapies have included bone cement⁷ or ethanol injection,^{8,9} laminectomy, tumour resection, and spinal reconstruction. These therapies have been employed alone or in combination.

Figure 4 Histopathological diagnosis of the tumour as a cavernous haemangioma.

Figure 5 (A) An anteroposterior radiograph after the operation showing the laminectomy of the T11 vertebra via a single posterior approach, subtotal vertebrectomy, and reconstruction of the spine using pedicle screw systems and a titanium cage filled with autogenous bone and rib. (B) A lateral view radiograph after the operation.

We took the following approach for our patient: preoperative embolisation was first performed using a coil to reduce haemorrhage during surgery, vertebral replacement was carried out employing a subtotal vertebrectomy via a single posterior approach, and the spine was reconstructed using a cage with an autogenous bone graft. Stabilisation of the spine was achieved by using a pedicle screw system for posterior

fixation. A cage with an autogenous bone graft is useful for cases, including the present one, complicated by osteoporosis in which the bone could not be expected to provide sufficient support. Although we were concerned that the patient was likely to be haemorrhagic, preoperative embolisation made it possible to reduce perioperative haemorrhage from the vertebral tumour.^{10 11} This facilitated the surgical operation and was also effective in reducing surgical invasion. Since the vertebral haemangioma was a benign tumour, the patient underwent subtotal resection and was not given radiotherapy.

At present, about one year after the operation, the patient is doing well without any recurrence. Nevertheless, plain radiographs revealed a tendency toward kyphosis of the fixed lower ends between the first and second lumbar vertebrae requiring careful follow up.

We treated a patient with vertebral haemangioma of the T11 vertebra with spinal canal stenosis. The patient underwent a subtotal vertebrectomy via a single posterior approach and reconstruction of the spine using an autogenous bone graft in a vertebral cage with a pedicle screw system. Preoperative embolisation was performed reducing the blood loss to 658 ml. At present, about one year after the operation, the back pain and numbness in her right lower extremity have disappeared completely, and the patient has a good clinical outcome.

Authors' affiliations

T Ogura, M Mori, T Hayashida, T Osawa, H Hase, Department of Orthopaedic Surgery, Kyoto Prefectural University of Medicine, Kyoto, Japan

Correspondence and reprint requests to: Dr Taku Ogura, Department of Orthopaedic Surgery, Kyoto Prefectural University of Medicine, Kawaramachi-Hirokoji, Kamigyo-ku, Kyoto 602-8566, Japan; togura@koto.kpu-m.ac.jp

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