CASE REPORT

Spinal cord damage after resection of destructive spinal lipoma resembling liposarcoma: case report

Andreas Ficklscherer^{1,4}, Anja Ziwen Zhang^{1,4}, Andrea Baur-Melnyk², Thomas Knösel³, Volkmar Jansson¹ and Hans Roland Dürr¹

A 39-year-old inpatient at a tumor orthopedic department with a history of a chondrosarcoma in the scapula presented with a destructive tumorous lesion in the staging computed tomography (CT). After ambiguous results in CT-guided biopsy and an open biopsy, a surgical removal of a tumorous lesion was performed. The histological findings showed a lipoma of the spine. Intraosseous lipomas with predisposition to pathological fracture or compression of the spinal cord with neurological symptoms should be removed. We report a case in which the patient presented with complete paraplegia due to an edema in the spinal cord immediately after removal surgery. The necessity of resection of a spinal lipoma with postoperative spinal cord damage needs to be discussed. To our knowledge, this case is one of the first to demonstrate that the diagnosis of tumors of the vertebra should be carefully evaluated and possible spinal cord damage as a complication should be kept in mind upon deciding on further therapies and interventions.

Spinal Cord Series and Cases (2016) 2, 16011; doi:10.1038/scsandc.2016.11; published online 7 July 2016

INTRODUCTION

Differentiation between lipoma and liposarcoma, and the decision for aggressive removal or controlled waiting can be difficult.

A benign lipoma does not need to be surgically excised in general. Patients are rarely symptomatic and the diagnosis is often by chance, for example, after trauma. In the case of an intraosseous lipoma that predisposes to pathological fracture or compression of other structures such as the spinal cord, the lipoma should be removed.^{1,2} Another strong indication for resection is the possibility of a malignant tumor such as a well-differentiated liposarcoma.³ They also might be referred to as an 'atypical lipoma', as they do not tend to metastasize and are not life-endangering as other sarcomas are.⁴ The usual treatment of atypical lipoma is a marginal surgical removal.^{3,5} The suggested follow-up period after surgical removal is up to 10 years. The ultimate decision on surgical removal can also lead to severe complications.

This case report emphasizes that the combination of radiological, histological and clinical findings can lead to the right diagnosis, but does not consequently help in deciding the right treatment regime. Our purpose is to discuss indications for resection of possibly malignant tumorous lesions of the spine, considering rare and severe complications for the patient.

CASE DESCRIPTION

This case report concerns a 39-year-old man with pain in the right shoulder for 10 months, who presented himself in late 2009. The pain related to a chondrosarcoma grade I in the right scapula (Figure 1). The tumor lesion was surgically removed by R0 resection and analyzed using histopathology in February 2010 (Figure 2). After resection, the patient presented no further symptoms.

Tumor screening in terms of a thoracic computed tomography (CT) was routinely performed before resection, showing a second tumor at the third thoracic vertebra. Tumor size measured 3.8 × 2.8 cm and it was isodense to fat (−100 HU). We performed a magnetic resonance imaging (MRI) of the thoracic spine, which revealed an infiltrating mass with partial destruction of the third thoracic vertebra (Figure 3), dura shifting to the right and infiltration of the corresponding rib. In T1 and T2 sequences, the mass appeared hyperintense. In short T1 inversion recovery sequences, the lesion appeared to be dark as typically seen in fatty tissues. After applying contrast medium, the mass showed central hypointense areas and only little circumferential uptake.

The patient had no neurological symptoms or any back pain before surgery and routinely performed sports. The possibility of a lipoma, liposarcoma and the unlikely presence of metastasis of a primary tumor were thoroughly discussed. The specimen from the initial CT controlled biopsy from March 2010 was too small for a definitive histological diagnosis. Therefore, an open biopsy of the mass was performed 4 weeks after the previous resection of the chondrosarcoma in the right scapula. The histological results revealed a lipoma without any sign of malignancy (Figure 4). Nevertheless, because of the radiological findings of an infiltrating mass, we recommended the resection of the tumor. An in-depth consultation was carried out. The ethical aspect of this case was discussed thoroughly in an interdisciplinary medical team and informed consent was given by the patient. In April 2010, the lipomatous tumor was completely removed showing adhesions with the parietal pleura and unusual tumor vascularization. The tumor was removed from dorsolateral via hemilaminectomy and the thoracic vertebra was reconstructed using a pelvic graft. The duration of surgery was ~2 h.

After extubation, the patient showed a complete sensible and motoric paraparesis from Th3. The immediate emergency CT scan showed no sign of hematoma or dislocation of the graft. In the

¹Department of Orthopedic Surgery, Physical Medicine and Rehabilitation, University Hospital of Munich (LMU), Munich, Germany; ²Department of Clinical Radiology, University Hospital of Munich (LMU), Munich, Germany and ³Department of Pathology, University Hospital of Munich (LMU), Munich, Germany.

Correspondence: A Zhang (anja.zhang@med.uni-muenchen.de)

⁴These authors contributed equally to this work.

Received 19 May 2015; revised 8 May 2016; accepted 28 May 2016

Figure 1. Chondrosarcoma of the right scapula in the preoperative coronal MRI scan.

Figure 2. Histopathology of the chondrosarcoma shows the tumor cells permeating and entrapping bony structure in the center.

emergency MRI, a spindle-shaped signal increase was seen in the T2 sequences at Th3, which indicated a spinal cord edema (Figure 5). The diagnosis proved to be a spinal cord infarction.

The patient was treated with high-dose cortisone and a therapeutic dose of intravenous heparin for 16 days. He recovered rapidly from the complete paraparesis and was sent to neurological rehabilitation for 3 months. In February 2011, about 10 months after resection, the patient presented himself for a follow-up examination. Meanwhile, a lung embolism had occurred and a persistent open foramen ovale had been detected, and closed minimally invasively. He was mobile without crutches for a short distance with an acceptable mobility overall. He did not report any problems with the bladder or the bowels. The initial complete paraparesis developed into paraparesis caudal to Th3 ASIA D, which remained unaltered at the annual follow-up examinations in 2012–2015. The chondrosarcoma showed no signs of recurrence or metastases in the thoracic CT and MRI scans at the annual follow-up examinations.

Figure 3. Expanding infiltrative lesion in the third thoracic vertebra in the sagittal MRI view.

Figure 4. Histologic hematoxylin and eosin (HE) staining of the operative specimen of the third thoracic vertebra. Immunohistochemical staining for mdm2- and CDK4-antigene was also performed. No sign of malignancy was detected.

DISCUSSION

A spinal cord infarction after spinal surgery is a rare event. Only a few cases have been reported in the past.^{6–9} The reasons for this severe complication may be a thrombosis of the anterior spinal artery due to compression during surgery or metabolic stress in the surgery region.^{6,10}

When compared with the former cases in literature, our case has a similar clinical outcome.^{8,9} The difference in our case was the simultaneous presence of two tumor lesions, which might have been the trigger for a more aggressive therapy regime than in other known cases in literature. To prevent neurological signs and symptoms due to further compression of the spinal cord and because of the possibility of malignancy demonstrated by the radiological findings and the uncertain findings of the biopsy, we decided to remove the spinal tumor. Unfortunately, the patient

Figure 5. Pathological signal increase in the T2 weighting of the myelon between the third and fourth thoracic vertebra is shown, indicating a vascular cause.

obtained a rare surgical complication in the form of a spinal cord infarction.

The necessity of resection of the spinal lipoma needs to be discussed as the patient showed no restricting signs and symptoms. The alternative therapy regime to monitor the lipoma using MRI may have been a wiser decision. However, we also kept

in mind that a further destruction of the bone could have led to the fracture and damage of the spinal cord with a similar outcome for the patient.

One limitation of this study shows that although a combined result of imaging, histopathology and surgery may determine the diagnosis of a tumor lesion, it does not aid in the decision making whether surgical removal or monitoring of the lesion should be wiser. As the occurrence of two non-related tumors in this case is very rare, we believe by reporting our case, a similar spinal cord damage will not be repeated. Indications for resection of possibly malignant tumorous lesions of the spine should be minded cautiously regarding the possible complication of spinal cord damage after resection and must be kept in mind while making further decisions that could cause long-term neurologic impairment for the patients.

COMPETING INTERESTS

The authors declare no conflict of interest.

REFERENCES

- 1 Campbell RS, Grainger AJ, Mangham DC, Beggs I, Teh J, Davies AM. Intraosseous lipoma: report of 35 new cases and a review of the literature. *Skeletal Radiol* 2003; **32**: 209–222.
- 2 Lin N, Ye ZM, Li WX. Intraosseous lipoma of the pelvis and spine: two cases reports. *Orthop Surg* 2009; **1**: 326–329.
- 3 Peterson JJ, Kransdorf MJ, Bancroft LW, O'Connor MI. Malignant fatty tumors: classification, clinical course, imaging appearance and treatment. *Skeletal Radiol* 2003; **32**: 493–503.
- 4 Evans HL, Soule EH, Winkelmann RK. Atypical lipoma, atypical intramuscular lipoma, and well differentiated retroperitoneal liposarcoma: a reappraisal of 30 cases formerly classified as well differentiated liposarcoma. *Cancer* 1979; **43**: 574–584.
- 5 Sommerville SM, Patton JT, Luscombe JC, Mangham DC, Grimer RJ. Clinical outcomes of deep atypical lipomas (well-differentiated lipoma-like liposarcomas) of the extremities. *ANZ J Surg* 2005; **75**: 803–806.
- 6 Park J, Lee JB, Park JY, Lim DJ, Kim SD, Chung YK. Spinal cord infarction after decompressive laminectomy for spontaneous spinal epidural hematoma-case report. *Neurol Med Chir* 2007; **47**: 325–327.
- 7 Turker RJ, Slack C, Regan Q. Thoracic paraplegia after lumbar spinal surgery. *J Spinal Disord* 1975; **8**: 195–200.
- 8 Valls PL, Naul LG, Kanter SL. Paraplegia after a routine lumbar laminectomy: report of a rare complication and successful management. *Neurosurgery* 1990; **27**: 638–640.
- 9 Weber P, Vogel T, Bitterling H, Utzschneider S, von Schulze Pellengahr C, Birkenmaier C. Spinal cord infarction after operative stabilisation of the thoracic spine in a patient with tuberculous spondylodiscitis and sickle cell trait. *Spine* 2009; **34**: E294–E297.
- 10 Cheshire WP, Cesar CS, Massey EW, Howard JF Jr. Spinal cord infarction: etiology and outcome. *Neurology* 1996; **47**: 321–330.