

Percutaneous vertebroplasty and spinal cord compression: a case report

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ABSTRACT

This report describes a 60-year-old woman with intensive back pain due to metastatic vertebral body collapse, who underwent percutaneous vertebroplasty. Subsequently, the patient developed metastatic lesion extrusion into the spinal canal because of pressure of the cement, with compression of the left anterolateral spinal cord. During percutaneous vertebroplasty procedure in patient with malignant tumors, the complication rate increases owing to the risk of leakage of cement resulting from the vertebral body destruction, but as also seen in our case, for the extrusion of the neoplastic tissue and increase of the pressure in the vertebral body due to the introduction of the cement.

CASE REPORT

INTRODUCTION

Percutaneous vertebroplasty (PV) is a minimally invasive technique of image-guided vertebral augmentation with polymethylmethacrylate (PMMA) cement, to provide stability and subsequently relieving pain after a vertebral compression fracture (VCF). Originally described by Deramond et al. in 1987 for the treatment of a vertebral hemangioma, (1), the technique has become a standard of care of VCF. Main indications for this procedure include osteoporotic vertebral fractures refractory to medical treatment, and vertebral fractures related to malignant or benign tumors (2,3,4,5). Osteolytic metastases and myeloma are the most frequent malignant lesions of the spine. Improved cancer treatment have prolonged the life of these patients, but have also increased the number who experience metastatic vertebral collapse.

The primary indication of PV is to relieve patient's long-term pain, caused by VCF. The survey of VCF is performed by Magnetic Resonance (MR) imaging to show both anatomic vertebral collapse and loss of normal signal of the marrow space. Acute, subacute, and nonhealed fractures are hypointense on T1W images and hyperintense on T2W and STIR sequences because of spinal marrow edema (3).

Polymethylmethacrylate (PMMA) is the acrylic most used as a bone filler. During the procedure, it is essential to use high-quality fluoroscopic equipment to visualize the cement injection in real time, to avoid excessive extravasation of cement, which presents the most frequent potential for complications. CT scan (Computerized Tomography) is useful to check for complications after the procedure.

This report describes a case of metastatic lesion extrusion because of pressure of the cement into the spinal canal, with compression of the left anterolateral spinal cord.

CASE REPORT

A 60-year-old female smoker, diagnosed with adenocarcinoma of the lung, sought medical help for intense back pain. The neurological examination revealed a slight deficit in strength and degree of left leg extension, without tone or sensibility deficits or atrophy of the lower extremities. The patient showed an unsteady gait and back pain intensity perceived during the previous 24 h, on a numerical rating scale (NRS, from 0 = no pain to 10 = most intensive pain ever experienced) was 9. Fast spin-echo MR imaging of the entire vertebral column demonstrated metastatic infiltration and collapse of the left element of vertebral body of T11. The posterior portions was displaced against the surface of the spinal cord without cord compression. The lesion extended also to and infiltrated the homolateral costovertebral joint (Fig. 1).

After considering the risks and benefits of such a procedure, it was decided to perform a percutaneous vertebroplasty. The PV was performed with 7 ml of PMMA under fluoroscopic guidance. At the end of the procedure, without radiological and clinical complications, the patient was maintained in prone position and a CT scan was performed to check the result (Fig. 2).

Clinical follow-up after 24 hours postoperatively showed severe back pain (NRS = 9), treated with NSAIDs and opioids in continuous infusion. During the analgesic infusion, the pain intensity perceived was 6. After 24 hours from suspension of infusion it was still 9.

We decided to perform a spinal MRI that showed PMMA inside the neoplastic tissue and also spreading into the left side component of the lesion with extrusion of tumor into the anterior subarachnoid space and causing compression of the left anterolateral spinal cord at this level (Fig. 3). Neurosurgical advice has excluded the surgery because despite excision of pathological material to the left lateral recess of T11, had not encountered conflict with the marrow. The patient underwent subsequently radiotherapy to reduce the volume of the extruded lesion with progressive pain reduction up to its disappearance.

DISCUSSION

Percutaneous vertebroplasty is an increasingly accepted treatment option for the management of intractable back pain caused by vertebral collapse, due to osteoporosis, myeloma or metastasis (2,3).

50-97% of the patients commonly experience pain relief within 24 hours postoperatively with low complication rates: fever, rib fractures, cement pulmonary embolism, radiculopathy, infection, spinal cord compression (6). Transient radiculopathy has been reported in 3% to 6% of cases and well treated with steroids and antiinflammatory medications (7,8).

In patients with malignant tumors, the complication rate may be as high as 10% and transient neurological deficit is observed in 5% of patients (3,6,9,10), owing to the risk of leakage of cement resulting from the vertebral body fractures

due to their proximity to the posterior vertebral body wall. In a report from 2003 the authors demonstrated that PV produces higher intravertebral pressures in vertebrae containing a simulated lytic metastasis than in intact vertebrae (11).

In this case, we report the experience of a further complication due to the extrusion of the neoplastic lesion under the push of the PMMA rather than leakage of the same cement. We believe however that the selection of the patient was accurate: the disruption of the posterior element is not an absolute contraindication to the PV procedure, especially in our case where the patient did not show an unstable fracture. The employment of radiotherapy has been essential to resolve the complication, producing pain remission, and complete recovery of the inferior limb motility after 30 days from the intervention.

TEACHING POINT

During percutaneous vertebroplasty procedure in patients with malignant tumors, the complication rate increases owing to the risk of leakage of cement resulting from the vertebral body destruction, but as also seen in our case, for the extrusion of neoplastic tissue and potentially compression on the spinal cord.

ABBREVIATIONS

PV = percutaneous vertebroplasty
VCF = vertebral compression fracture
MR = Magnetic Resonance
PMMA = Polymethylmethacrylate
CT scan = Computerized Tomography

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FIGURES

Figure 1 (bottom): 60-year-old woman with metastatic T11 vertebral body collapse. Preoperative T2 fast spin echo axial (a) and sagittal (b) sections of T11: metastatic infiltration and collapse of the left and posterior elements of the vertebral body. The posterior portions are displaced against the surface of the spinal cord without cord compression. The lesion infiltrates also the homolateral costovertebral joint.

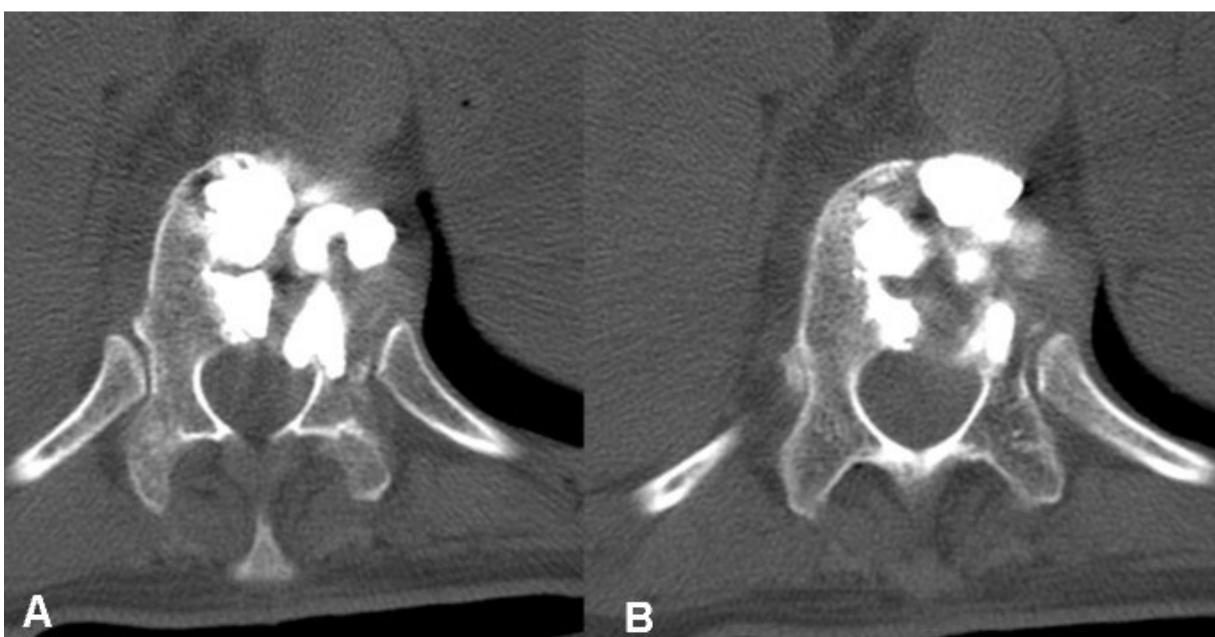
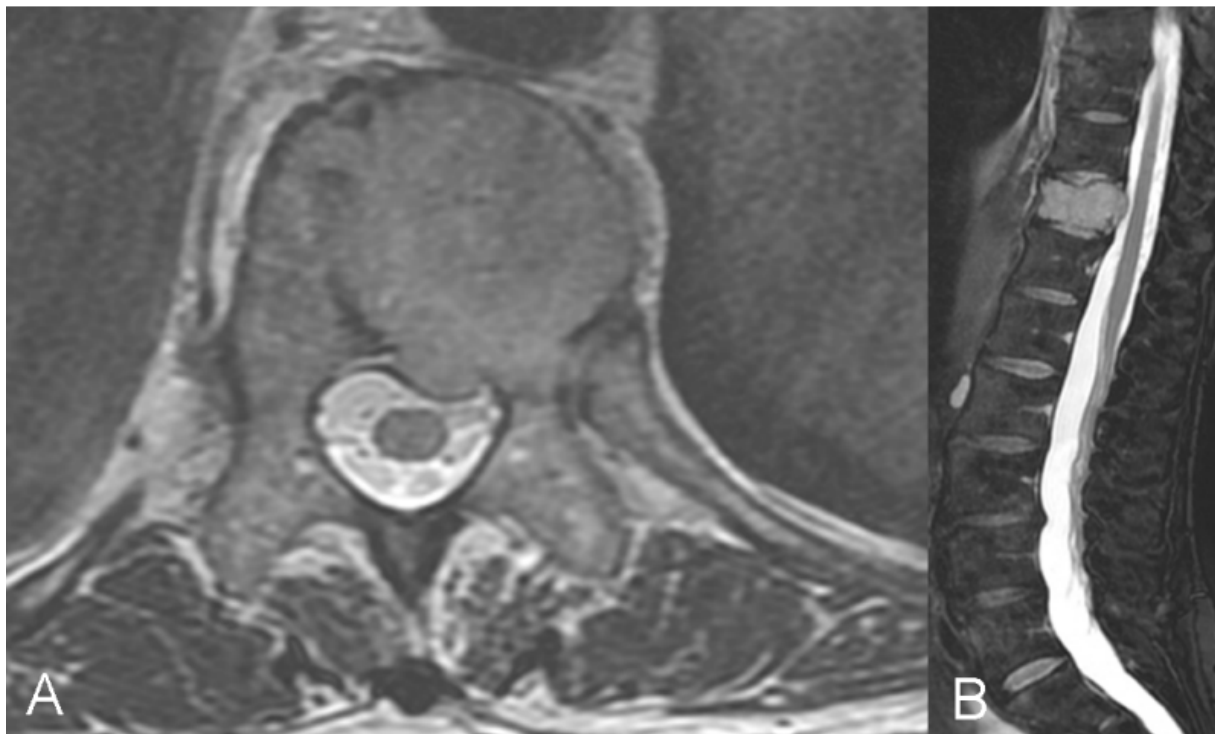


Figure 2: 60-year-old woman with tumor extrusion into the spinal canal and spinal cord compression after percutaneous vertebroplasty. Postoperative noncontrast axial CT scan in bone window at the level of T11 vertebral body: the PMMA seems in normal position inside the vertebral body.

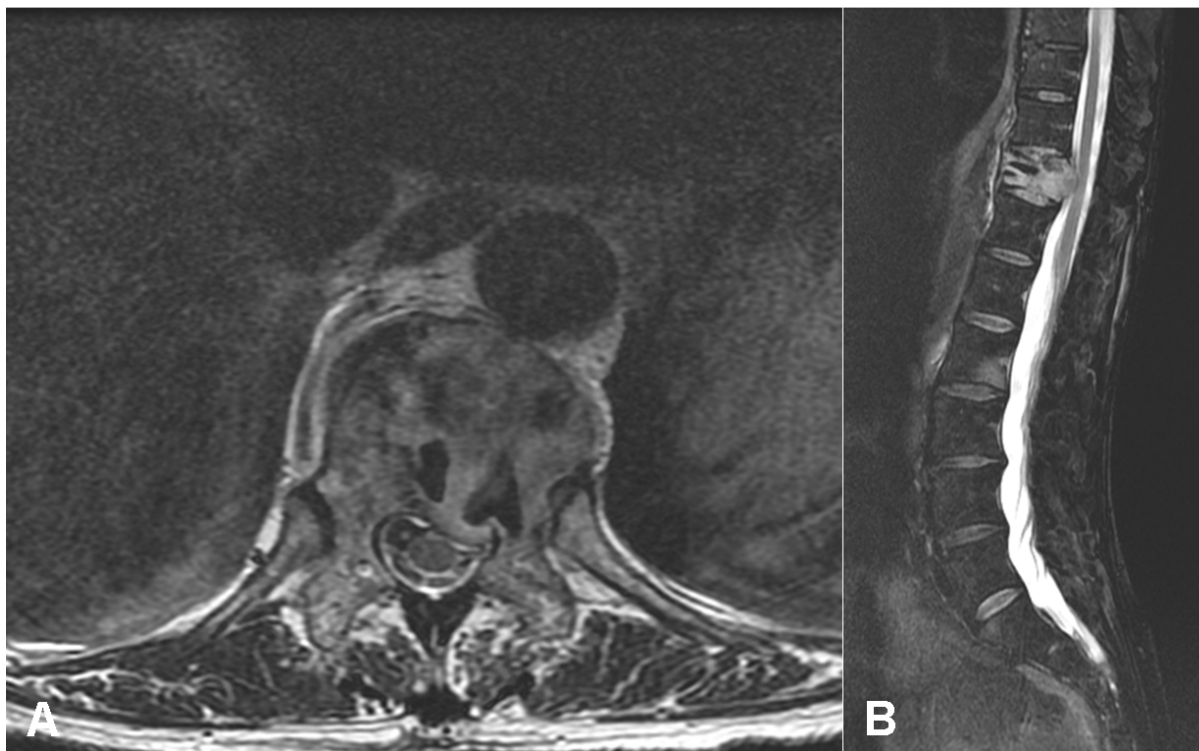


Figure 3: 60-year-old woman with tumor extrusion into the spinal canal and spinal cord compression after percutaneous vertebroplasty (PV). 24 hours after PV, T2 fast spin echo axial (a) and sagittal (b) sections of T11 demonstrate extrusion of neoplastic tissue and worsening of compression on the subarachnoid space and left anterolateral spinal cord.

KEYWORDS

Percutaneous vertebroplasty, vertebral metastasis, spinal cord compression

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