Cement Dislodgment After Percutaneous Vertebroplasty – A Rare Complication.

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Citation

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Abstract

Vertebral body cement augmentation in the form of percutaneous vertebroplasty has been demonstrated to be a relatively safe and effective procedure for relieving severe back pain induced by osteoporotic and neoplastic compression fractures. The current case presented a delayed vertebral collapse with anterior dislodgement of cement from L4 vertebral body.

PERCUTANEOUS VERTEBROPLASTY was developed in France by Deramond et al., who provided initial reports of the procedure in 1987. This minimally invasive procedure uses a large-bore bone-cutting needle to percutaneously access a vertebral body, inject bone cement, and thereby stabilize and reinforce the remaining bone structure. The procedure was used initially to treat aggressive hemangiomas, but it then was extended to the treatment of osteolytic metastases and myeloma and currently osteoporotic compression fractures refractory to medical therapy.[1]

Vertebral body cement augmentation in the form of percutaneous vertebroplasty has been demonstrated to be a relatively safe and effective procedure for relieving severe back pain induced by osteoporotic and neoplastic compression fractures. The technique has been in use for 15 years. Success rates have been reported to exceed 90% and the complication rates reported have been less than 1%.[2]

In this report, we describe a rare complication of cement dislodgment 6 months after percutaneous vertebroplasty.

CASE PRESENTATION

A 70-year-old woman had severe back pain for 2 months. The pain started after the fall during a fit 2 months before and the patient could not walk or stand. The pain was bearable earlier but progressively worsened. At admission to our hospital, the patient lay in bed all day because of back pain without neurological involvment and could not turn over by herself. Roentgenographic study revealed L4 vertebral body compression fracture with loss of less than 50 % vertebral height and extensive vascular calcification.

Figure 1

Figure 1: Pre-operative lateral view L.S spine showing compression fracture L4 vertebral body.

CT lumbar spine revealed compression fracture of the L4 vertebral body with fracture line involving the anterior and posterior cortices, no involvement of the posterior elements. Magnetic resonance imaging (MRI) studies of the lumbar spine revealed about 15 to 20% loss of vertebral height in L4 vertebral body associated with surrounding marrow edema

and fluid within L3/L4 and L4/L5 intervertebral discs. No obvious bulging of the posterior cortex or associated soft tissue was detected. The lumbar spine from L1-L3 and left hip were assessed for their bone mineral density using the technique of dual energy X-ray absorptiometry. The average BMD was between 1 and 2.5 SD below the mean young adult value and lied within the range of low bone mass. Benign osteoporotic compression fracture was confirmed.

Percutaneous vertebroplasty was performed in the L4 vertebral body under general anesthesia using unipedicular approach from left side under fluoroscopy guidance. Screwing cement injection syringe was used to control the volume and speed of injection of the cement. No leakage of the cement was seen.

Figure 2

Figure 2: Post- operative X-ray L.S Spine Lateral view.

The pain disappeared on the night of surgery, and the patient could sit on the next day of surgery, walk with help on the second day, and walk by herself on the fourth day. The patient was discharged from the hospital 7 days after surgery and lived the same life as before the injury without as of 6 months after surgery.

The patient was regularly followed in the clinics with radiograph done at each visit. At 6 months follow up, x-ray showed fracture with cement displacement anteriorly. The displaced cement was seen indenting on the calcified aorta anteriorly. At 1 year follow up, flexion and extension views L.S spine showed unstable fracture with cement dislodgement. Patient was explained for the future risks and was advised surgery but the patient denied any further procedures.

Figure 3

Figure 3: 6 months Post- operative X-ray L.S Spine Lateral view showing fracture with cement displacement anteriorly .

Figure 4

Figure 4: 1 year post- operative X-ray L.S Spine flexion and extension views showing fracture with further cement displacement anteriorly .

DISCUSSION

Indications for vertebroplasty are symptomatic (painful) vertebral compression fractures (up to 50% compression of the thoracic vertebrae and up to 75% compression of the lumbar vertebrae) without signs of instability and without displacement of the myelon or nerve radices.[3,4,5] PVP with PMMA has been considered a safe and effective procedure for the treatment of painful osteoporotic compression fracture. Pain relief is reportedly achieved in approximately 70% to 100% of osteoporotic fractures. Thus, the indications for this technique are becoming more liberal, and the procedure has been performed even in cases of minimal vertebral collapse who have had only a few weeks of conservative treatment. [6]

Complications of vertebroplasty identified in previous studies include pulmonary embolism, extravasations of cement, neurologic deficit or nerve root irritation, infection, hemorrhage, fracture of rib or posterior elements of the vertebrae, transient fever and unremitting pain, and pneumothorax. However, the most thoroughly documented complication of vertebroplasty is new vertebral compression fracture, which can cause neurologic deficit.[7]

The current case presented a delayed vertebral collapse with anterior dislodgement of cement from L4 vertebral body. A horizontal fracture line extending from anterior cortex to posterior cortex was seen on CT spine The possible explanation to this complication could be a re-fracture of the same vertebral body at the stress junction of cement and bone or the anterior cortex defect may have allowed relative motion of the cement block resulting in the final displacement with further bending load. Mathis suggested that the cavity in VCFs must be sufficiently filled in order to prevent future motion and to achieve pain relief after PV.[8]

To our knowledge, only one case with PMMA cement dislodgemnt following percutaneous vertebroplasty is reported earlier. Tsai et al[4] had reported a delayed posttraumatic vertebral collapse with the anterior cortex defect, that may have increased the chance of anterior dislodgment of the cement under weight bearing in their case.

He et al[8] reported that although an intraosseous vacuum is considered a sign for a favorable outcome in PVs, but their study indicated that the fluid may isolate the cement filling into the fractures around the intraosseous vacuum.

Tsai et al[9] reported that an intravertebral vacuum cleft has long been considered as pathognomonic for avascular necrosis. Injection of PMMA into a cystic cavity would be expected to have far less interdigitation with the surrounding bone than would injection into partially intact trabecular bone. The above mentioned reasons make PMMA cement in vertebroplasty merely a space occupying material without mechanical interlock and biocompatibility and, thus, make the potential for dislodgment. The integrity of the anterior cortex is another consideration of anterior dislodgment. The wedge-type compression fractures showed greater loss in anterior height than in posterior height, and the extravasation of the PMMA cement was most common at the anterolateral wall of the vertebral body.

We presented a rare complication of cement dislodgement 6 months after the percutanous vertebroplasty. The purpose of this case report is to emphasize the importance of this complication of which only one case has been reported earlier. Anterior displacement of cement can be a dreadful complication with vital vascular structures placed anteriorly.

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