

Case Report

Can neurological recovery occur after late decompression of an intradural cement leakage?

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ABSTRACT

Percutaneous vertebroplasty (PV) can be applied widely from osteoporotic to metastatic fractures. Pain, radiculopathy, spinal cord compression, pulmonary embolism, and infection are common complications of this procedure. However, rare complications such as intradural cement leakage have also been reported. There is little or no data on the results obtained after the late intervention. In addition, the midline total laminectomy method, which is the classical method, was predominantly used in intradural cement leaks after PV. We would like to report a 69-year-old female patient who underwent vertebroplasty for her L1 osteoporotic fracture about 3 months ago in an external center and subsequently developed paresis. The patient's surgery was successfully performed without the need for stabilization by hemilaminectomy. The improvement in the clinical findings of our case despite the late decompression shows that surgery is the most satisfactory option in such patients. As a surgical method, total excision can be achieved with the posterior hemilaminectomy approach.

Keywords: Vertebroplasty, Fracture, Lumbar, Cement, Leakage

INTRODUCTION

Compression fractures of the thoracolumbar spine commonly occur secondary to trauma and percutaneous vertebroplasty (PV) has become an increasingly common treatment modality.^[1] PV has a wide range of applications, from osteoporotic fractures to metastatic fractures.^[2] Cement injection into the collapsed vertebral body for painful osteoporotic compression is a relatively safe technique but should still be performed with great care to prevent disabling complications. Rare complications, such as intradural cement leakage, have also been reported in the literature.^[3]

It has been reported that paresis develops in cases with intradural cement leakage due to PV resolved with early intervention.^[4] However, there is little or no data on the results obtained after the late intervention. The midline total laminectomy method, which is the classical method, is predominantly used in intradural cement leaks after PV. This article describes a 69-year-old female patient who underwent vertebroplasty for her L1 osteoporotic fracture about 3 months prior in an external center and subsequently developed paresis. The patient's surgery was successfully performed without the need for stabilization by hemilaminectomy.

CASE REPORT

A 69-year-old female patient presented with a 2-year history of lumbar pain with acute deterioration that developed after a fall. About 3 months prior, the patient underwent PV with polymethylmethacrylate for osteoporotic L1 fracture in another center. Paraparesis developed after the procedure. Unfortunately, the patient did not have immediate spinal image studies following this surgery. The patient applied to our clinic 3 months after the procedure. Neurological examination demonstrated paresthesia distribution below the inguinal region, decreased muscle strength grading 2/5 over right iliopsoas and quadriceps, and 4/5 over left iliopsoas and quadriceps. Computed tomography and magnetic resonance imaging demonstrated cement leakage into the spinal canal at the L1 corpus level [Figure 1]. Hypointense intradural and epidural cement collections were revealed in the T1- and T2-weighted images. There was also the displacement of the spinal cord to the left side, secondary to the mass effect. We decided to remove the poly(methyl methacrylate) (PMMA) using a posterior approach. L1 hemilaminectomy with a paramedian durotomy was aimed to relieve pressure on possible nerve roots and the lumbar spinal cord. Thanks to this approach, the patient

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would not need stabilization. No obvious dural tear was detected. However, PMMA was felt in the intradural area with palpation and inspection. A paramedian durotomy was made and a large piece of intradural cement was identified. Under the microscope and with the help of neuromonitoring, irregularly shaped epidural and intradural cement material was excised without any rootlet injury [Figure 2]. After the watertight closure of the dura, fibrin glue was placed over it [Figure 3].

After the operation, early mobilization was supported and an effective physiotherapy program was applied to the patient. She was discharged on the 5th day. In the neurological

examination of the patient at discharge, there was no significant difference compared to the pre-operative period. However, a significant improvement was observed in the patient's neurological examination at the 3-month follow-up control.

DISCUSSION

In osteoporotic patients, vertebral fractures are common. With the use of PV procedures for fractures, serious improvements are seen in the quality of life of patients.^[1] Cement leakage is among the possible complications of this procedure and is observed in 30–60% of patients with osteoporotic fractures and 38–70% of patients with metastatic fractures.^[5] Although most patients are asymptomatic if the amount of escaping cement is low, symptoms such as deficit pulmonary embolism and neuropathic pain can be seen as the amount of escaping increases.

Various theories about how cement leaks into the intradural space have been described in the literature. Cement may escape into the intradural space due to perforation of the medial wall of the pedicle and injury to the dura while the needle or cannula is advanced through the pedicle.^[4] In our case, it is thought that the dura was damaged and leakage occurred secondary to the forcing of the posterior limit of the vertebra with cement.

The intervertebral foramen, paravertebral soft tissue, epidural space of the spinal canal, disc space, and lumbar venous plexus are some areas of cement leakage.^[6] Clinical findings can be seen in cases with intradural cement leakage, even if the amount of leakage is small. Neurologic complications secondary to PV have been reported as rare.^[3,4,6] However, when they occur, the effects of cement leakage can be devastating and permanent, depending on the location of the cement leak in the spinal canal and the success of surgical removal. In connection with this, severe paraparesis and walking difficulties developed in our case due to cement leakage.

Neuropathic pain and clinical symptoms, especially those seen in delayed cases, have been accepted by some authors as irreversible.^[4] The literature shows neurological deficits in nine of 10 patients in cement leakage studies.^[3,4,6] In most cases, patients underwent early decompressive laminectomy

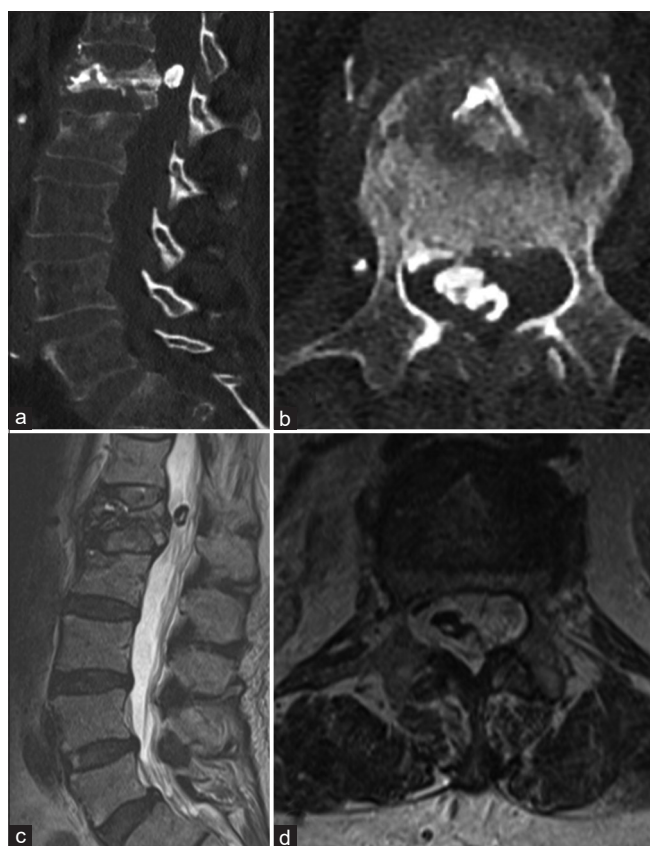


Figure 1: Computed tomography (a and b) and magnetic resonance imaging (c and d) of the patient's lumbar spine demonstrated cement leakage into the spinal canal at the L1 corpus level.



Figure 2: (a-c) Intraoperative photo showing the extent of decompression and excised cement material.

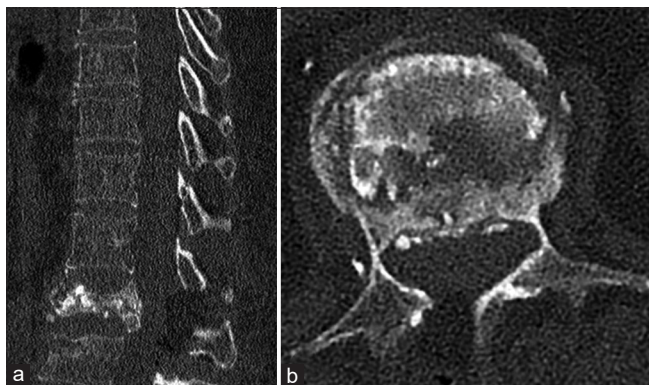


Figure 3: Post-operative thoracolumbar sagittal (a) and axial (b) computed tomography sections.

and stabilization surgery secondary to instability. In general, the cases were operated on in the acute period and significant improvements were observed in the clinical findings. Limited data in the literature on cases operated in the later period.^[7,8] In our case, the operation was performed after a very long period (3rd month) with the posterior hemilaminectomy approach, thus avoiding instability and the need for stabilization. However, there is also a chance that the patient may develop delayed kyphosis despite the minimally invasive approach that was taken. Therefore, patients should be kept under long-term clinical follow-up. In our case, no deformity development was observed in the clinical follow-ups.

CONCLUSION

Procedural complications are observed secondary to the increasing frequency of PV. When neurological findings are detected in patients and compression is revealed by radiological imaging, surgical treatment is required, even in the late period. As in our case, the decompression with surgical treatment produces satisfactory results. In addition, it has become possible to avoid the need for stabilization by a minimally invasive posterior hemilaminectomy approach. Thus, it can be ensured that the patients can overcome the post-surgical process more easily.

Declaration of patient consent

Patient's consent not required as patient's identity is not disclosed or compromised.

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Conflicts of interest

There are no conflicts of interest.

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