

# Transforaminal epidural steroid injection for the treatment of severe back pain caused by cement leakage during kyphoplasty procedure

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## ABSTRACT

Kyphoplasty is a minimally invasive procedure that is increasingly used to treat pain caused by compression fractures of vertebral bodies. A 56-year-old woman who had a compression fracture on the vertebral body of L5 vertebra was admitted to the Algology Department with a severe low back and leg pain. Kyphoplasty was planned for pain relief. She suffered severe pain in her back and left leg immediately after the procedure because of a leakage of injected cement through the fracture line. After injection of triamcinolone and bupivacaine transforaminally into the L5-S1 anterior epidural space, her pain complaints ended. If radicular pain symptoms caused by cement leakage are secondary to a chemically mediated non-cellular inflammatory reaction, transforaminal epidural steroid injection should be useful.

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Kyphoplasty is a minimally invasive procedure that is increasingly used to treat persistent or severe acute pain caused by both metastatic and osteoporotic compression fractures of vertebral bodies. The aim of kyphoplasty is to provide pain relief, combined with restoration of vertebral body height and reduction in kyphosis. This is achieved by 'expanding' the fractured vertebra with a balloon and then filling the resultant cavity

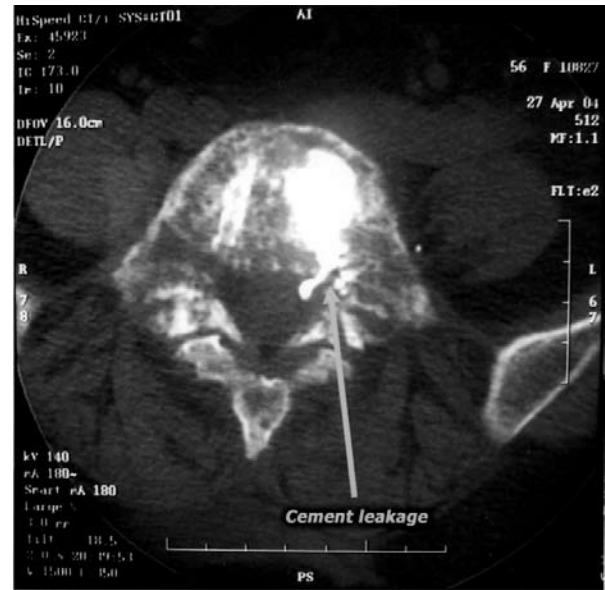
with polymethylmethacrylate bone cement.<sup>1</sup> Most of the complications during kyphoplasty procedures reported in the literature are caused by cement leakage. However, we know little on the pain therapy complications caused by cement leakage during vertebroplasty or kyphoplasty procedures. Epidural steroid injections are used to relieve back and neck pain, especially due to irritation of the sensory root or dorsal root ganglion of a spinal nerve. Although the effect of this procedure is well known in radicular pain, it is also used for the treatment of pain in such conditions as spondylosis, spondylolisthesis or chronic pain syndromes such as postherpetic neuralgia. In this report, we present a case of pain therapy with epidural steroid injection after bone cement leakage during kyphoplasty procedure.

**Case Report.** A 56-year-old woman was admitted to the Algology Department with severe low back and leg pain. After laboratory and radiologic investigations, a compression fracture on the vertebral body of the L5 vertebrae was found caused by metastasis of breast cancer to the vertebrae (Figure 1). Her pain was evaluated with Visual Analogue Scale (VAS) and her VAS score was 7 at the first visit. Kyphoplasty was planned for pain relief under general anesthesia. Before the kyphoplasty procedure, her VAS score reduced to 3 with the pain therapy including paracetamol 500 mg (4x1) and caffeine-codeine 40 mg (4x1). There was no problem during the kyphoplasty procedure, but she woke up with severe pain in her back and left leg immediately after the procedure. A leakage of injected cement through the fracture line was found on CT (Figure 2). The VAS score was 9-10 after the procedure and she was not able to walk and lie down in the supine position due to the pain. Pain therapy was started again with 40 mg caffeine + 60 mg codeine, 500 mg paracetamol daily and 25 µg transdermal fentanyl 2 times a week. Two weeks later, the VAS score was 5 and she still was not able to walk. Then, a transforaminal anterior steroid injection was planned for her, and 80 mg triamcinolone + 10 mg bupivacaine + 2 ml saline was injected transforaminally into the L5-S1 anterior epidural space where the cement contacted to the dorsal root. She was observed for 4 hours in the recovery room and discharged as VAS 0 without any analgesic medication because her pain complaints had ended. Nine months following the procedure, she still does not use any analgesic medication.

**Discussion.** Kyphoplasty is an effective treatment modality for vertebral compression fractures that cause severe pain. In a retrospective, single-arm cohort study, 360 vertebral compression



**Figure 1** - Magnetic resonance image showing compression fracture on the vertebral body of the L5 vertebrae.



**Figure 2** - Computerized tomography scan showing cement leakage after kyphoplasty procedure.

fractures were treated during 254 kyphoplasty procedures on 222 osteoporotic patients and immediate pain relief was reported in 89% of patients by the first follow-up visit.<sup>2</sup> Most of the complications during the kyphoplasty procedure reported in the literature are caused by cement leakage. We know that leakage is more common in the treatment of pathologic fractures resulting from metastatic disease such as in our case.<sup>3</sup> In a prospective study, 32 patients who had both osteoporotic and metastatic vertebral compression fractures were treated with 61 balloon kyphoplasty procedures, and it is reported that cement leakage was the only technical problem encountered, and occurred in 6/61 procedures (9.8%). In the same study, the incidence of leakage to the anterior epidural space was reported as 2%.<sup>4</sup>

Transforaminal epidural steroid injections have been used for more than 50 years for symptomatic treatment of pain secondary to dorsal root irritation. It is known that the irritation causes ectopic nerve impulses perceived as pain in the distribution of the axon and the pathophysiology is more than just mass effect; it is a combination of compression sensitizing the nerve root to mechanical stimulation, stretching, and a chemically mediated non-cellular inflammatory reaction.<sup>5</sup> In the literature, the effect of transforaminal epidural steroid injections to relieve radicular pain caused by some cases such as degenerative disc pathologies,<sup>6</sup> spinal stenosis,<sup>7</sup> and epidural lipomatosis,<sup>8</sup> are reported. However, there is no report on the usage of transforaminal epidural steroid injections to relieve radicular pain caused by cement leakage during vertebroplasty or kyphoplasty procedures. The reason might be that the kyphoplasty procedure was not successful and did not relieve pain after the procedure, or there was another condition causing pain before the procedure.

Cement leakage must be taken into account in the differential diagnosis when the intensity or character of the pain has changed after kyphoplasty procedures. We think that, if the radicular pain symptoms caused by cement leakage are secondary to a chemically mediated non-cellular inflammatory reaction, transforaminal anterior epidural steroid injection should be useful. In this case, we successfully treated the dorsal root irritation due to a leakage of cement with epidural steroid injection.

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