Facet Pain in Thoracic Compression Fractures

Raj Mitra, MD,* Huy Do, MD,† Todd Alamin, MD,‡ and Ivan Cheng, MD‡

*Stanford School of Medicine, Physical Medicine and Rehabilitation, Redwood City, California;
†Stanford School of Medicine, Radiology, Stanford, California;
‡Stanford School of Medicine, Orthopedic Surgery, Stanford, California, USA

Reprint requests to: Raj Mitra, MD, Stanford School of Medicine—Physical Medicine and Rehabilitation, 450 Broadway St., Redwood City, CA 940663, USA. Tel: 650-721-7627; Fax: 650-721-3470; E-mail: rmitra@stanford.edu.

Abstract

Objective. To determine if thoracic facet joints may be a significant secondary pain generator in patients with compression fractures. Traditionally, pain from vertebral compression fractures has been attributed to vertebral body itself. Compression fractures have been shown to increase thoracic kyphosis and thereby increase the thoracic flexion moment; these changes eventually increase the shear stress on the posterior elements.

Design. We present a small case series of patients with thoracic compression fractures managed with intra-articular facet injections.

Setting. Tertiary care academic medical center.

Participants. Two patients with thoracic compression fractures.

Interventions. The subjects received fluoroscopically guided thoracic facet steroid injections for pain management.

Main Outcome. Change in verbal analog pain score.

Results. Patients with thoracic compression fractures received significant long-lasting relief after receiving fluoroscopically guided intra-articular injections.

Conclusion. Facet joints may be abnormally stressed due to the increasing thoracic flexion moment in anterior compression fractures, which may serve as a secondary pain generator; intra-articular facet blocks may be an alternative to vertebroplasty.

Key Words. Compression Fracture; Steroids; Facet Joint

Introduction

Vertebral compression fractures (VCFs) are a common cause of morbidity in the United States [1], affecting approximately 25% of all postmenopausal women [2] and roughly 40% of women above the age of 80 [3]. Those women with a history of VCF have been found to have a 15% higher mortality rate [4].

Vertebroplasty and kyphoplasty have been shown to be effective treatments for VCF [5,6]. Significant complications, although rare, that have been reported include retropulsion of the posterior vertebral body wall elements into the spinal canal with neurological compromise, pulmonary embolism, and even death [7,8].

A prospective comparison of the management of VCF by vertebroplasty vs aggressive management with pain medications demonstrated that much of the pain relief associated with vertebroplasty occurred within the first 2 weeks [9]. One possible explanation for this finding of chronic persistent pain in patients that have already undergone vertebroplasty is that the pain generator is a source other than the vertebral body.

Some elderly patients with VCFs seeking relief of the acute painful episode are not good candidates for invasive procedures due to multiple comorbidities. Conservative management includes use of a lumbar corset, opioid medications, nonsteroidal anti-inflammatory medications, and intranasal salmon calcitonin [10]. Although bisphosphonates have been used to manage pain attributed to VCFs, there are no good data to suggest its efficacy in the acute period [11].

The origin of pain in patients with acute compression fractures is traditionally attributed to the vertebral body. Structural changes of the vertebral body morphology may change the forces placed upon the accompanying facet joints. These facet joints may in fact be a significant source of pain in VCF patients; however, we are not aware of any articles examining the effect of fluoroscopically guided facet steroid injections in the management of VCF. We report two patients with healed VCF successfully treated with intra-articular facet joint injections.
Case 1

A 61-year-old female presented with a 3-year complaint of axial midback pain after she was involved in a motor vehicle accident. At the time she suffered the immediate onset of axial midback pain. Work up at the local emergency room revealed a T12 compression fracture. The patient was treated conservatively with nonsteroidal anti-inflammatory medications without relief and managed the pain with eight tablets of acetaminophen with codeine per day. The patient initially experienced severe sharp axial pain, which eventually subsided and was replaced by a dull throbbing axial pain. The patient described the pain as being located in the midback at approximately the T12 spinous process level without any radiation. The pain intensity on the verbal analog scale (VAS) was 7 out of 10; the pain was worsened by change in position, prolonged sitting, standing, and coughing or straining. The pain was palliated by walking and lying down. She denied any bowel or bladder incontinence, saddle anesthesia, or gait instability.

An MRI of the thoracic spine was reviewed that showed a healed T12 compression fracture (without evidence of marrow edema on the T2-weighted image) with 24 degrees of segmental kyphosis (see Figure 1).

On physical examination the patient had intact strength in all lower-extremity myotomes, and sensation was intact in all thoracic and lower-extremity dermatomal distributions. Deep tendon reflexes were +2 and symmetric in the bilateral patella, and +1 and symmetric in bilateral Achilles tendons. There was no clonus, and the patient had a negative Babinski sign bilaterally. On palpation, the patient had tenderness in the bilateral latissimus dorsi and thoracic paraspinal muscles between T10 and L1.

As the patient had failed multiple conservative therapies and she had focal tenderness over the thoracic facet joints, the patient was offered intra-articular facet steroid injections. She subsequently underwent fluoroscopically guided bilateral T11/T12 and T12/L1 intra-articular facet injections with 1 mL of 1% lidocaine and 20 mg of triamcinolone acetate injected into each of the facet joints. The patient tolerated the procedure well, and her pain decreased immediately to 0/10. At 1 year follow-up, she continued to be pain free and reported that she was able to increase her ability to ambulate and discontinue use of all pain medications.

Case 2

A 38-year-old gentleman with a long-standing history of thoracic pain with T8 compression fracture that persisted after a vertebroplasty (3 years prior to his visit) presented with a 3-month exacerbation of his midback pain after he was involved in a rear-ended motor vehicle accident. The patient had intact strength in all lower-extremity myotomes, and sensation was intact in all thoracic and lower-extremity dermatomal distributions. Deep tendon reflexes were +2 and symmetric in the bilateral patella, and +1 and symmetric in bilateral Achilles tendons. There was no clonus, and the patient had a negative Babinski sign bilaterally.

Radiographs of the thoracic spine revealed thoracolumbar dextroscoliosis with an apex at L1 and a T8 vertebroplasty deformity with polymethylmethacrylate in good position and 20 degrees of segmental kyphosis; there was associated with facet joint arthrosis at the level (Figure 2). An MRI of the thoracic spine revealed a T8 vertebroplasty and mild anterior compression fracture deformity at the level. There was no significant central canal stenosis or retropulsion at the level.
The patient was diagnosed with healed thoracic compression fractures with associated facet arthopathy at T7-8 and T8-9. As he only experienced right-sided pain, the patient was treated with right-sided intra-articular thoracic facet joint steroid injections. Under fluoroscopic guidance, 40 mg/mL of triamcinolone was injected into each of the right T7-8 and T8-9 facet joints. The patient had significant relief, and his pain intensity decreased from 7/10 to 3/10; he continued to experience 3/10 pain at 3 months follow-up.

Discussion

Traditionally, the pain from VCFs has been attributed to the vertebral body. Our cases demonstrate that facet joints may be a significant secondary pain generator in thoracic compression fractures. Although a number of articles have cited significant relief from vertebroplasty/kyphoplasty in acute VCFs [12–15], other studies have identified post-procedural problems.

Patients with kyphoplasty have been found to have a higher incidence of adjacent level compression fracture that has been attributed to additional stress on adjacent levels [16,17]. Vertebral height restoration itself has not been shown to significantly decrease pain [18].

The biomechanic effect of thoracic compression fracture on the spine has not been fully characterized. Interestingly, induced anterior compression fractures in cadaveric specimens have been shown to cause a thoracic flexion moment and to increase thoracic kyphosis [19]. These changes likely increase the stress on the posterior elements of the spine including the facet joints.

Kim et al. reported that lumbar compression fracture patients who responded well to facet blocks responded well to percutaneous vertebroplasty [20]. As much of the morbidity associated with VCFs stems from immobility from pain, early pain control in a stable spine is crucial for rehabilitation [21].

Our cases suggest that the thoracic facet joint may be a pain generator in healed chronic compression fractures. There were a number of limitations in our observations, the first being the relative poor specificity of facet blocks and the second being the lack of a control group. Despite these facts, the cases and review of the literature suggest that with time, the pain generator in VCF may change from the vertebral body to the facet joints, secondary to a biomechanically induced thoracic flexion moment. For patients with multiple comorbidities who are poor candidates for vertebroplasty, fluoroscopically guided intra-articular steroid injections may offer a safe alternative and may facilitate earlier rehabilitation.

References

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Vertebral Compression Fracture and Facet Pain


