

Case Report

Fluoroscopically-Guided Injections to Treat “Kissing Spine” Disease

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Background: Any spine structure that is innervated by afferent nociceptive nerve fibers is a potential pain generator. In the lumbar spine, the most studied pain generators include: sacroiliac joints, the zygapophysial joints, the intervertebral discs, myofascial structures. Anomalous lumbosacral articulations, the spinous processes, and lumbar spine osteophytes are less commonly reported.

Objective: To describe the diagnostic and therapeutic features of “kissing spine” disease or Baastrup’s Sign with particular attention to MRI findings and fluoroscopically-guided injection therapy.

Design: A series of 3 patients with axial low back pain presented with exam findings and MRI changes suggestive of pain emanating from adjacent spinous processes that appeared to be in direct contact or very closely opposed. This has been described in the literature as “kissing spine” disease or Baastrup’s sign. Fluoroscopically-guided injections were performed and the responses were studied.

Results: The 3 patients had MRI findings consisting of inflammation and/or edema in the spinous processes and surrounding soft tissues. Fluoroscopically-guided injections provided pain relief in all 3 patients. One patient with recurrent pain eventually underwent successful surgical resection of the involved spinous processes.

Conclusion: Painful adjacent and closely opposed spinous processes can be a source of axial low back pain. We have described MRI features and the responses to fluoroscopically-guided injections in 3 patients with this condition.

Key words: Baastrup’s, kissing spine, spine injection

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Any spine structure that is innervated by afferent nociceptive nerve fibers is a potential pain generator. In the lumbar spine, the sacroiliac joints, the zygapophysial joints, the intervertebral discs, and myofascial structures are the most studied pain generators.

Less commonly reported pain generators include anomalous lumbosacral articulations, spinous processes, and lumbar spine osteophytes (1-3). We describe three patients who presented with intractable low

back pain with extensive lumbar spine degenerative disease whose pain appeared to be emanating from closely approximated spinous processes. This condition, where spinous processes form a painful pseudo-articulation was described by Dr. Christian Baastrup in the 1930s and often is referred to as Baastrup’s sign or Baastrup’s syndrome (4). In the 3 cases presented here, magnetic resonance imaging (MRI) and fluoroscopically-guided local injections were helpful in the diagnosis and/or treatment of the condition.

CASE 1

An otherwise healthy 70-year-old female presented with a 2-year history of progressive, non-radicular low back pain that improved only minimally with therapeutic exercise, NSAIDs, and physical modalities (heat, ice). She rated her average daily pain and maximum daily pain respectively at 7/10 and 9/10 on the numeric rating scale (NRS) and the pain was significantly activity limiting.

Physical examination revealed normal lower extremity strength and sensation. Pain was increased by lumbar spine extension and relieved by forward flexion. Her typical pain was reproduced by midline palpation at the L4-5 level (level verified by fluoroscopy). Plain radiographs revealed multi-segmental degenerative disc disease and severe loss of disc space height. The spinous processes of L4 and L5 appeared to be in direct contact with each other. MRI findings included marked edematous and inflammatory changes around the L4 and L5 spinous processes with cystic degeneration (geode formation) of the L4 spinous process. The edematous and inflammatory changes extended into the interspinous ligaments at L4-5 (Figs. 1 and 2).

The patient was treated on 2 separate occasions, approximately 3 weeks apart, with injection of the L4-5 spinous process/interspinous ligament complex using the technique described below. At one month and 4 month follow-up, the patient reported almost complete relief of her symptoms. Her NRS pain scores were 0 – 1/10 and she returned to her usual active lifestyle.



Fig. 1. Sagittal non-contrast T1-weighted image demonstrates a thickened interspinous ligament at L4-5 (arrow). The spinous processes at this level are closely opposed.

CASE 2

An otherwise healthy 67-year-old female presented with a one year history of progressively increasing midline low back pain. Her average daily pain was 5/10 and maximal daily pain was 7/10 on the NRS. The pain resulted in a significant functional decline from her previously active lifestyle. The pain was focal and easily localized by the patient to a midline structure. Physical examination revealed pain reproduction with lumbar spine extension and hyperextension. She had focal tenderness and pain reproduction directly over the L4 and L5 spinous processes. Plain radiographs revealed closely approximated spinous processes between L4 and L5 that appeared to be in direct contact and displayed degenerative changes along the inferior margin of the L4 and the superior margin of the L5 spinous processes (Fig. 3). Similar though less prominent changes were noted between L3 and L4. The patient was treated with fluoroscopic injection of the L4-5 interspinous ligament and spinous processes on 2 separate occasions. At 6 month follow-up, she reported significant reduction of pain symptoms and resumption of normal physical activities. Average and maximal pain scores were 2/10 and 5/10 respectively.

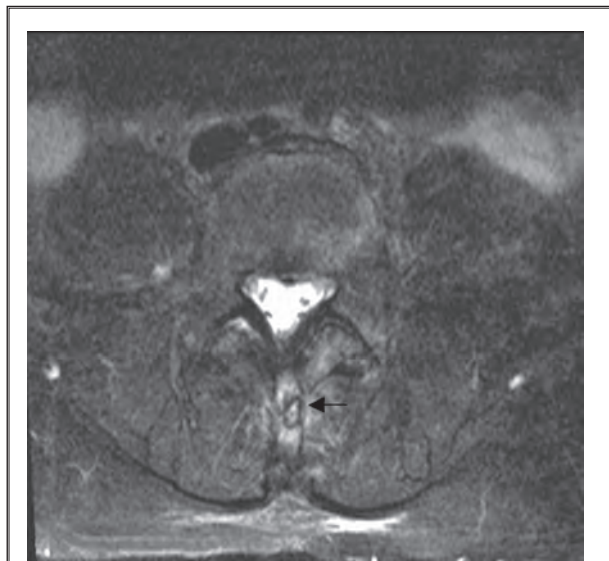


Fig. 2. Axial fat-suppressed T2-weighted image demonstrates increased signal within and surrounding the interspinous ligament as well as within the spinous process compatible with edema and/or inflammation. A degenerative geode is seen within the spinous process to the left of midline (arrow).

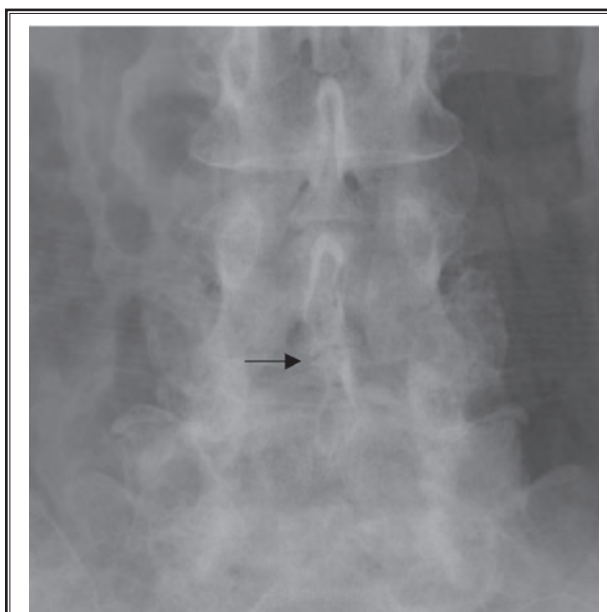


Fig. 3. PA radiograph of the lumbar spine demonstrating very closely approximated L4 and L5 spinous processes (arrow).



Fig. 4. Sagittal fat-suppressed T2-weighted image of the lumbar spine demonstrates abnormal increased T2 signal intensity in the dorsal portion of the L3-4 interspinous ligament (arrow) and degenerative geode formation in the inferior L3 and superior L4 spinous process.

CASE 3

A 71-year-old male presented with a greater than one year history of focal midline, non-radicular low back pain. Average and maximum NRS were 5/10 and 7/10 respectively. He was able to work full time as an executive, but he had to significantly curtail his previously active lifestyle. Physical exam revealed normal strength, sensation, and reflexes. Pain was exacerbated by extension, hyperextension, and rotation of the lumbar spine. He had focal midline pain over the L3 and L4 spinous processes, reproduced by palpation. MRI of the lumbar spine revealed marked degenerative changes of the posterior spinous processes of L3 and L4 with surrounding edema and inflammatory changes in the adjacent interspinous and supraspinous ligaments (Figs. 4 and 5).

He was treated on 2 separate occasions with injection of the L3-L4 interspinous ligament and spinous processes. Each time he obtained several weeks of nearly complete relief. Because of the temporary na-



Fig. 5. Axial post-contrast fat suppressed T1-weighted image demonstrates intense enhancement within and around the dorsal portion of the interspinous ligament and geode formation in the right tip of the spinous process.

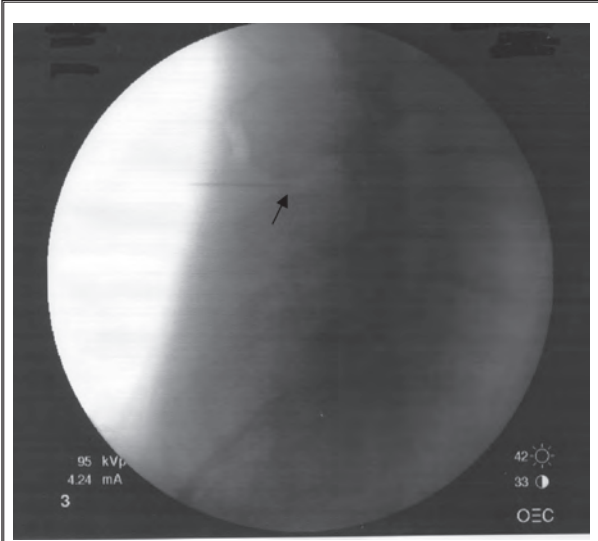


Fig. 6. Lateral view of a needle tip (arrow) placed between the spinous processes of L3 and L4 (patient 3).

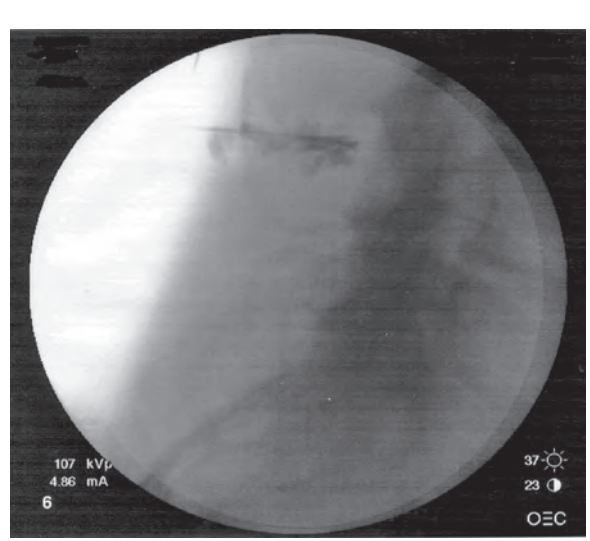


Fig. 7. Contrast injected through the needle shown in figure 6. The contrast can be seen to infiltrate a majority of the space between the L3 and L4 spinous processes.

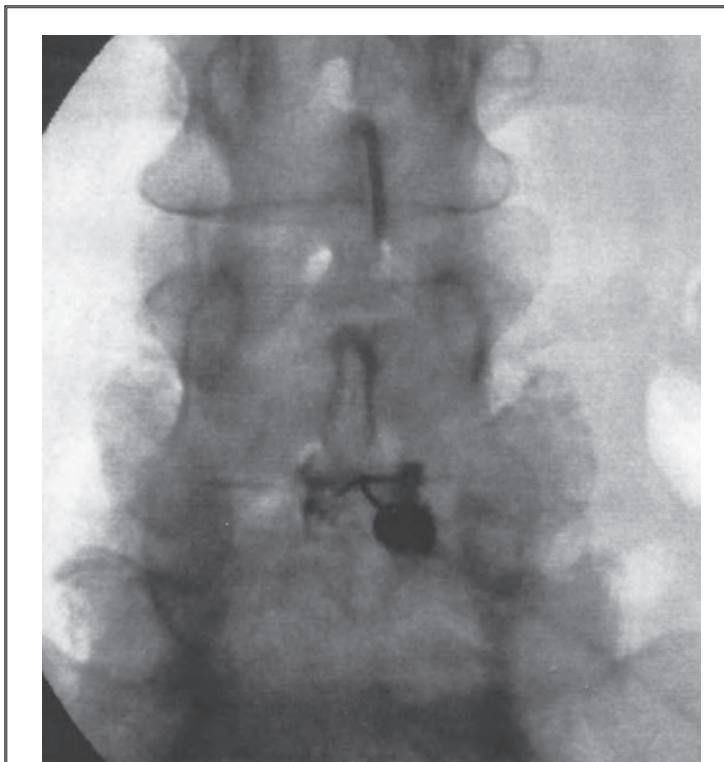


Fig. 8. PA image of interspinous injection. Contrast can be seen to infiltrate the narrowed space between the L4 and L5 spinous processes (patient 2).

ture of his pain relief, the patient elected to proceed with surgical resection of the L3 and L4 spinous processes. His pain resolved at 6 weeks follow-up.

INJECTION TECHNIQUE

The patient is placed prone and after sterile preparation and draping and following local anesthesia of the skin and subcutaneous tissues, a 22-gauge stylet needle is advanced under fluoroscopic image guidance between the affected spinous processes. On PA imaging, the tip of the needle is placed directly between the affected spinous processes. On lateral imaging, the needle is placed approximately midway along the dorsal-ventral axis of the spinous processes. One mL of iohexol contrast is injected to reveal contrast spread between the targeted spinous processes (Figs. 6, 7, and 8). This is followed by the injection of 2 – 3 mL of 0.25% bupivacaine and 3 mg of betamethasone.

Discussion

Back pain arising from closely approximated spinous processes has been described in the literature by a variety of terms including Baastrup's sign, Baastrup's syndrome, kissing spine disease, spinous impingement syndrome, and Michotte's syndrome (3-6). The frequency of this phenomenon is unknown as it is not commonly considered in the differential diagnosis and work-up of back pain. In addition, radiographic evidence of degenerative changes is nearly ubiquitous in patients over 65 years of age. The problem is that many of these radiographic changes are asymptomatic or subclinical. On the other hand, in some patients, radiographic abnormalities may correspond to the patient's symptoms. A recent study demonstrated 100% correlation of side of pain in patients demonstrating similar MR characteristics in single-level unilateral lumbar facet joints displaying intense fat-saturated T2 and fat-saturated post-contrast T1-weighted signal abnormality (7). These are the same imaging characteristics as those seen in the interspinous ligaments that we are treating in these 3 patients. The challenge confronting clinicians is to determine not only if a patient's back pain is related to radiographic degenerative changes, but also, in the most common scenario of multiple degenerative changes, which abnormality or abnormalities are the pain generators. Furthermore, most clinicians fail to consider spinous process pathology as a possible pain generator and many radiologists, for routine spine imaging, do not use commercially available fat suppression sequences that make the edematous/inflammatory changes of the spinous processes and interspinous ligaments obvious.

We propose that closely approximated spinous processes should be considered in the differential diagnosis and workup of spinal pain generators when the following clinical and radiographic criteria are identified in the workup of a patient:

1. Midline back pain
2. Pain exacerbated by extension/hyperextension of the lumbar spine.
3. Lateral view x-rays reveal spinous processes that appear to be in direct contact.
4. Midline pain reproduction with palpation of the lumbar spinous processes. If possible, fluoroscopic confirmation of the area of tenderness corresponding to the affected spinous processes.
5. MRI findings reveal edema and/or inflammation in and surrounding the spinous processes (inter-

spinous ligaments, supraspinous ligaments). Regions of non-enhancing increased fat-suppressed T2 signal intensity are consistent with edema and those areas that demonstrate enhancement on post-contrast fat-suppresses T1-weighted sequences represent inflammation.

6. Other structural sources of pain have been ruled out.
7. Pain relief with fluoroscopically-guided local anesthetic injection around the affected spinous processes.

In the diagnostic evaluation of back pain, physical examination is notoriously unreliable as a means of determining the source of the patients' pain (8-10). Similarly, for many pain generators, radiographic findings often are considered to be nonspecific and unreliable. Fluoroscopically-guided injections have been demonstrated to be helpful diagnostic tools in the case of lumbar facet pain and sacroiliac pain and lumbar discography in the case of discogenic pain (9-12). The most commonly accepted and validated protocols for diagnostic injections include concordant pain relief for the expected duration of the local anesthetic after a series of comparative double-blocks (blocks with 2 different local anesthetics) or placebo-controlled injections (9). Prior to coming to our clinic, the patients in this study had previous injections into other structures without relief, thus ruling out many of the more common pain generators. Pain location corresponding to significant inflammatory changes on MRI pointed to the spinous processes as the pain generator in each of these patients. The entire clinical picture of pain location, image findings, and pain relief after injection provided a hefty dose of clinical evidence that the spinous processes were the pain generators in these patients. In questionable cases or if more definitive diagnostic evidence is thought to be necessary then comparative double-blocks or placebo controlled blocks can be considered.

While the facet joints, the sacroiliac joints, the intervertebral discs, and myofascial structures represent the most common studied sources of low back pain, there are many other less common causes. Frequently these other causes are not considered at all or are not considered until work-up and treatment directed at the other more common structures fails to lead to clinical improvement. When history, clinical exam, and radiographic abnormalities all point to a specific geographic area or structure, diagnostic injection relieves

the pain, and other sources have been ruled out (to the degree that this is possible), then one can reasonably conclude that the structure of interest, in this case, tender and inflamed spinous process(es), are a source of back pain.

In our case series, 2 patients responded in a long term fashion to local anesthetic and corticosteroid injection. Given the inflammatory changes on MRI it may not be surprising that a local corticosteroid injection was therapeutic. On the other hand, one patient responded only temporarily to injection. Thus, the injection was helpful diagnostically (along with the additional clinical and radiographic findings) but not long-term therapeutically. This patient had more prominent osseous degenerative changes including cystic degeneration. It was felt that the exam, radiographic changes and response to injection were convincing enough to offer surgical resection of the affected spinous processes.

We recognize the hazards of making overly optimistic recommendations regarding diagnosis and treatment based upon a few case reports. A controlled trial of injection therapy for this condition using con-

trol blocks for diagnosis and comparison of the treatment group to a control group would be the ideal. This condition appears to have a low prevalence rate making such a study impractical, if not impossible. For example, we have a very busy geriatric spine practice and over the course of one year, identified only these 3 cases.

CONCLUSION

Pain from closely approximated degenerative spinous processes was first described over 70 years ago. Even today, this entity is seldom considered as a possible pain generator. When MRI, using fat-suppressed T-2 weighted or fat-suppressed post contrast T-1 weighted sequences demonstrates edema and/or active inflammatory changes in a patient with midline low back pain that has not responded to more traditional treatments, local injection of the inflamed spinous processes and associated interspinous ligaments may be diagnostic and local anesthetic/corticosteroid injection may be therapeutic. In refractory cases, surgical excision of the involved spinous process(es) can be considered.

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