

Fluoroscopic percutaneous lumbar zygapophyseal joint cyst rupture: a clinical outcome study

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Abstract

BACKGROUND CONTEXT: Lumbar zygapophyseal joint (Z-joint) synovial cysts can cause low back pain (LBP), spinal stenosis, and lower extremity radiculopathy. In the literature, there are several minimally invasive techniques described with mixed results. Typical recommended treatment is surgical resection of the cyst. Currently, there is little information available concerning the efficacy and outcome with treatment of Z-joint synovial cyst by percutaneous, fluoroscopic, contrast-enhanced distention, and rupture.

PURPOSE: To evaluate the therapeutic value and safety of Z-joint cyst rupture in symptomatic patients.

STUDY DESIGN/SETTING: Retrospective cohort study in an academic outpatient physiatric spine practice.

PATIENT SAMPLE: Thirty-two patients with moderate-to-severe LBP and leg pain (18 women and 14 men with an age range of 46–86 y; mean age, 66 y) with an average preprocedure symptom duration of 5 months. The patient's clinical symptoms correlated with magnetic resonance imaging studies documenting the presence of a synovial cyst at the corresponding level and side of symptoms. Patients had at least 6 months follow-up (range, 6–24).

OUTCOME MEASURES: Numerical Pain Rating Scale, Roland-Morris Disability Questionnaire, North American Spine Society four-point patient satisfaction survey, recurrence of synovial cyst requiring repeat rupture, and need for surgical intervention.

METHODS: Patients with symptomatic lumbar Z-joint synovial cyst were identified and their charts were reviewed. Patients included in the study either had symptomatic lumbar LBP or LBP with associated lower extremity radiculopathy. All patients in the study had magnetic resonance imaging's documenting Z-joint synovial cyst that corresponded with the patients' clinical symptoms. All patients received fluoroscopically guided, contrast-enhanced, percutaneous facet cyst distention and rupture followed by an intra-articular facet joint injection of 1 cc kenalog and 1 cc of 1% lidocaine. Seventeen of the patients also received a transforaminal epidural steroid injection just before facet cyst rupture. Telephone follow-up was conducted on all patients.

RESULTS: Excellent long-term (average follow-up 1 y; range, 6–24 mo) pain relief was achieved in 23 (72%) of 32 patients undergoing facet cyst rupture. Twelve patients (37.5%) had synovial cyst recurrence and 11 chose to undergo repeat rupture, which resulted in 5 patients (45%) obtaining complete relief of symptoms and 6 patients (55%) requiring surgical intervention for cyst removal. Fisher exact test demonstrated that all patients who did not have a cyst recurrence were a success and obtained complete relief of symptoms ($p < .0002$). Patients who underwent a repeat rupture had a 50% chance of a successful outcome. There was no statistical significance between a successful outcome and level of facet cyst rupture, the presence of spondylolisthesis, sex, age, or having a transforaminal epidural steroid injection at the time of the procedure. Wilcoxon signed-rank test demonstrated that the difference in Numerical Pain Rating Scale and Roland-Morris Disability Questionnaire scores before and after the procedure was statistically significant ($p < .0001$). No complications were reported.

CONCLUSIONS: Fluoroscopic percutaneous Z-joint cyst rupture appears to be a safe and effective minimally invasive treatment option. This procedure should be considered before surgical intervention. © 2009 Elsevier Inc. All rights reserved.

Keywords: Synovial cyst; Zygapophyseal joint; Lower back pain; Cyst rupture technique; Radicular pain; Injections

Introduction

Lumbar zygapophyseal joint (Z-joint) synovial cysts can cause low back pain (LBP), spinal stenosis, and lower extremity radiculopathy. These cysts have a predilection for the Z-joints and originate from their capsule. The cyst can be lined with synovium and contains serous, gelatinous, or hemorrhagic fluid [1–3]. The occurrence of a synovial cyst in the lumbar spine can be the result of chronic hypermobility of the spinal segmental level, which leads to excessive loading of the Z-joint. This microinstability leads to abnormal or excessive loading of the Z-joint and subsequent fibrocartilaginous accumulation and cyst formation [4]. Lumbar Z-joint synovial cysts historically have been diagnosed intraoperatively as an incidental finding. Thus, the incidence among patients identified in lumbar spine operations ranges from 0.01% to 0.8% [5–8]. Cysts detected by imaging procedures are slightly higher, ranging from 0.8% to 2.0%. The most common location for these cysts is the L4–L5 spinal level [6,9–14]. This is also the segment of the lumbar spine where degenerative spondylolisthesis occurs most frequently. According to Sauvage et al., L4–L5 is the most common area for synovial cysts to occur followed by L5–S1 and then L3–L4 [15–18]. An example of a lumbar synovial cyst is depicted in Fig. 1.

Lumbar Z-joint synovial cyst are now being detected and diagnosed more frequently as a cause of LBP, spinal stenosis, and lower extremity radiculopathy as a result of the advances in radiological techniques [19–26]. Symptoms become apparent when the cyst invades the spinal canal and compresses the neural elements resulting in radiculopathy, neurogenic claudication, and pain [8,17,27–31]. These symptoms are often mistaken for those of disc etiology, but the treatment and management of lumbar Z-joint synovial cysts are considerably different [27,32,33].

Although the possibility for spontaneous resolution of the cysts remains, intractable pain or neurologic deficits may lead to significant loss of function and prompt a more expeditious solution [12]. Nonsurgical treatment measures have included bed rest, physical therapy, chiropractic care, acupuncture, oral analgesics, and percutaneous procedures to aspirate or inject the cyst. Surgical options have expanded to include endoscopic-guided techniques in addition to the traditional laminectomy or partial laminectomy and medial facetectomy [34,35].

Complete cystectomy with laminectomy or total facetectomy is very effective for treatment. According to the study by Lyons et al. of the Mayo clinic, a large series of 147 patients over a 22 year period, reported good or excellent pain relief postoperatively in 134 of 147 (91%) patients [34]. All

of the patients were treated surgically via laminectomy and resection of the synovial cyst and cyst recurrence was uncommon if the surgeon could eliminate the cyst by ligating the stalk [21,34].

These surgical procedures were not without risks. The most common include dural tear, spinal nerve injury, epidural hematoma, seroma, cyst recurrence, and deep venous thrombosis [8,15,34,36–38]. The authors reported a complication rate of 4% with one death secondary to cardiac dysrhythmia. Another source of additional treatment failures stems from the need for surgical fusion secondary to instability of the spine [34]. Degenerative spondylolisthesis accompanying lumbar Z-joint cyst occurs in 38% to 75% of patients [6,8,9–14]. Thus, segmental hypermobility is an important consideration in the treatment of synovial cyst. Sabo et al. even advocates performing preoperative and postoperative dynamic radiological studies of the lumbar spine to assess the need for fusion after treatment of synovial cyst [17].

Minimally invasive techniques for treatment of lumbar synovial cyst seem to eliminate many of the risks of traditional surgical techniques. Sandhu et al. identified 17 patients diagnosed with a synovial cysts on magnetic resonance imaging (MRI) and treated them with surgical resection of the cyst using a minimally invasive endoscopic approach [35]. He reported excellent or good results for 16 of 17 patients (94%). Only one complication was reported in a patient who sustained a dural tear, without violation of the arachnoid membrane, resulting in no cerebrospinal fluid leakage and conservative treatment. None of the patients needed a fusion procedure postoperatively except for one patient who had preexisting spondylolisthesis and required spinal fusion for instability 4 months after facet cyst removal. Although only a small number of cases were reported, this technique may be particularly significant when synovial cysts are associated with spondylolisthesis, minimizing the risk of progressive instability and the need for fusion.

A less invasive method of treatment includes aspiration of the cysts under computed tomography or fluoroscopic guidance with subsequent injection of corticosteroids [39,40]. Yet, this technique has been met with mixed results as the cysts have recurred or shown higher failure rates than surgical options [3,41–43].

Percutaneous cyst aspiration coupled with intra-articular Z-joint injection or epidural steroid injection is another noninvasive alternative to surgery. Percutaneous treatment consists of cyst drainage via needle aspiration under fluoroscopic or a translaminar computed tomography-guided

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