

Technical Report

Percutaneous Translaminar Facet Cyst Rupture and Epidural Access—Description of a Novel Technique

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Abstract

Synovial cysts of the lumbar zygapophysial joints can be treated by percutaneous injection of corticosteroids, with distension and rupture of the cyst. Some cysts can be difficult to access, particularly when they lie deep in relation to the lamina. This technical report describes a fluoroscopy-guided technique for accessing sublaminar pathology. Crucial to the safety of the technique is visualization of the ventral margin of the lamina using a contralateral oblique view, and controlling and limiting the insertion of the needle such that only its tip passes the lamina.

Key Words. Zygoapophyseal Joint; Facet Joint; Synovial Cyst; Fluoroscopy

Introduction

Cysts of the lumbar zygapophysial joints (ZJ cysts) can present with a variety of symptoms depending on the location and size of the cyst. A review of 499 cases found that 53% had back pain, 62% had painful

radiculopathy, 24% had neurogenic claudication, 37% had motor deficits, and 38% had sensory loss [1].

Although cysts can be seen on computerized tomography, magnetic resonance imaging (MRI) is the preferred imaging modality to identify ZJ cysts. The contrast medium can enhance the visualization of the cyst beyond the joint [2]. Cysts typically appear hyperintense on T2-weighted images and hypointense on T1, with some variability depending on protein content, hemorrhage, and calcification.

Surgery is an effective treatment, with success rates of 81–97% and low rates of recurrence [3–5]. However, surgery can be avoided by distension and rupture of the cyst under image guidance, using a mixture of local anesthetic and corticosteroid [6]. Successful rupture is achieved significantly more often in cysts with high or intermediate T2 signal intensity [7], but successful rupture does not correlate with subsequent pain relief [6].

Depending on their size and location, ZJ cysts may be accessed directly or using a transarticular approach. However, cysts can elude access when they lie under the lamina. In this technical report, we describe the use of a translaminar approach to access a cyst.

Technique

The technique was devised in the course of treatment of a 42-year-old female who suffered low back pain that radiated posteriorly down the thigh to just below the knee. The pain was aching, burning, and sharp.

MRI revealed a synovial cyst underlying the right L3 lamina. The cyst demonstrated a larger ventral compartment (9 mm × 6 mm in axial cut) indenting the thecal sac and a smaller dorsal compartment eroding into the lamina (Figure 1). The cyst was felt to be in a location that would produce neural irritation concordant with the patient's symptoms.

The patient was originally treated with a transarticular epidural injection of triamcinolone, but this provided her with only 1 week of relief. The obesity of the patient



Figure 1 Corresponding axial and sagittal T2 cuts showing the facet cyst.

precluded approaching the cyst using a caudal interlaminar, then sublaminar, approach. Therefore, we elected to use a translaminar approach.

Utilizing fluoroscopic guidance, the L3 vertebral endplates were squared. The skin overlying the right lamina of L3 was infiltrated with lidocaine 1%, and a spinal needle was used to anesthetize the proposed needle track to the lamina. Using anteroposterior (AP) and contralateral oblique (CLO) views, an 18-gauge Touhy needle was advanced coaxially down to the lamina. The Touhy needle could not be advanced through the lamina given its blunt tip. Therefore, a needle-through-needle technique was used to aid advancement. A contralateral oblique view coaxial with the plane of the lamina was used to visualize the ventral margin of the lamina. A 22-gauge 7-inch spinal needle was inserted and guided through the dorsal cortex of the lamina. A fair amount of force was required to pass both the spinal needle and the Touhy needle through the dorsal lamina. Once the spinal needle was advanced through the dorsal and then ventral aspect of the lamina, the Touhy needle could be advanced over it and past the laminar margin such that the needle tip lay directly in the cyst (Figure 2). Aspiration of the cyst with both the Touhy needle and spinal needle was unsuccessful. Contrast medium was then injected, and spread in the area of the cyst was visualized. Further injection showed ventral epidural spread beyond the margins of the cyst consistent with cyst rupture (Figure 3). Triamcinolone 40mg with 2 cc of 1% lidocaine was then administered.

The patient tolerated the procedure very well and was taken to the recovery area, where she was monitored. She immediately noticed that she was able to straighten her leg without pain, something that she had not been able to do in several months.

At follow-up, she reported improved back and leg pain for a week, but had then developed weakness in the

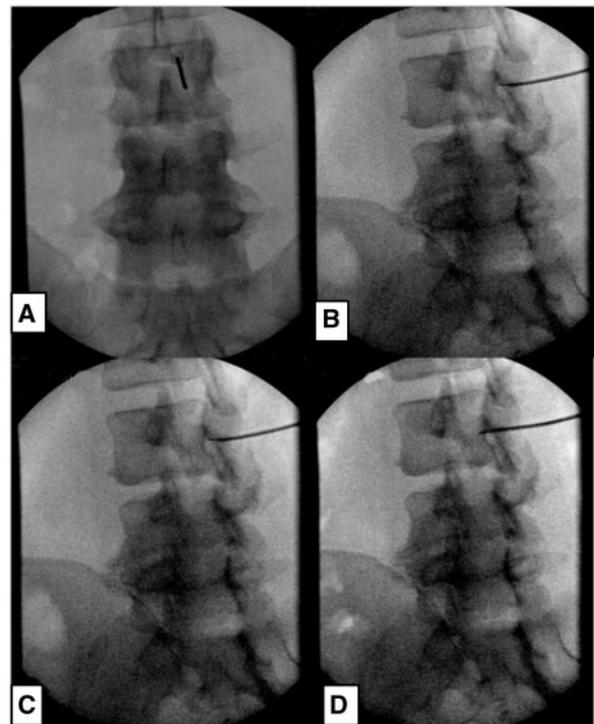


Figure 2 Anteroposterior (AP) view (A) shows the lucency related to the cyst and the needle docked into it; contralateral oblique (CLO) views (B,C,D) show Touhy needle being guided over the spinal needle into the cyst. Note that the ventral margin of the lamina is well visualized, which is a prerequisite prior to advancing the needle.

right leg and knee buckling. MRI revealed resolution of the intraspinal part of the facet cyst with no other concerning findings (Figure 4). Knee radiographs revealed severe tricompartmental arthritis accounting for the

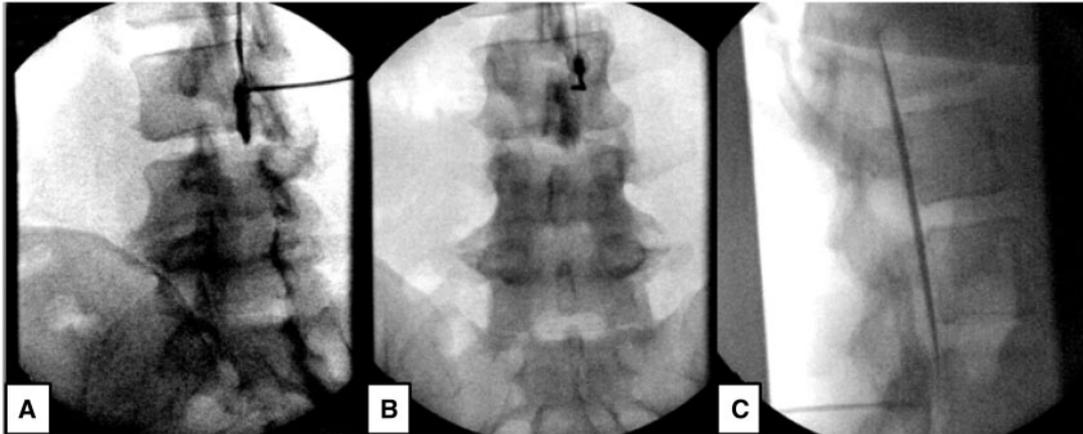


Figure 3 The contrast spread pattern as visualized in contralateral oblique view (CLO), anteroposterior (AP) view, and lateral view. (A) CLO view demonstrates spread within the cyst and epidural space. (B) AP view spread is seen to overlie the area of the cyst, and (C) lateral view demonstrates ventral epidural spread.

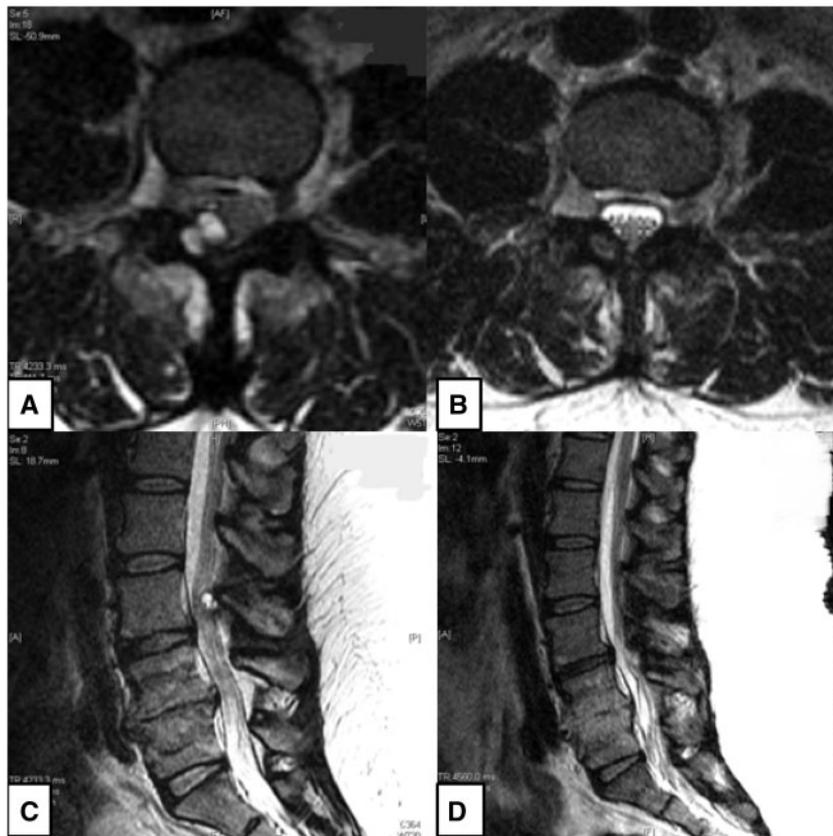


Figure 4 (A) and (B) MRI T2 axial cut pre- and postrupture. Note that in Fig 4B, no cyst is seen in the spinal canal, but the intralaminar portion of the cyst is still visualized. (C) and (D) Pre- and postrupture MRI sagittal T2 cuts; note the intraspinal cyst is no longer visualized.

knee pain and weakness. She was sent for physical therapy and orthopedic evaluation, and at further follow-up had no more symptoms or signs of neurologic deficits.

Discussion

Critical to the safe execution of the translaminar technique is the contralateral oblique view, for it displays the

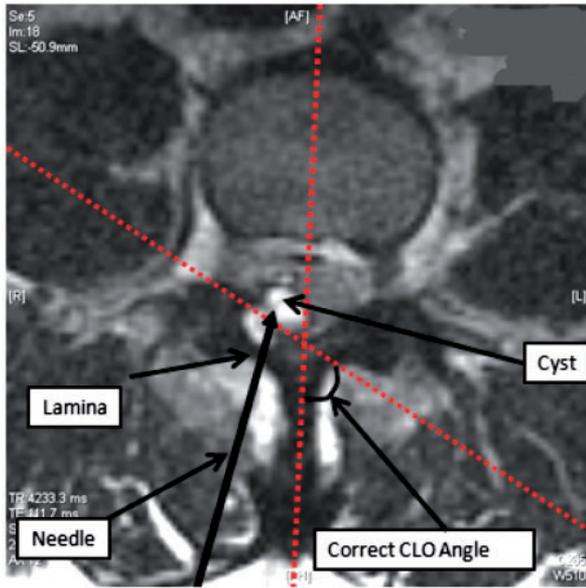


Figure 5 At the measured CLO angle, the needle tip is clearly visualized at the point of transgressing the ventral laminal margin.

true ventral margin of the lamina (Figure 5). Methods for obtaining the CLO angle have been well described [8]. Once the ventral margin of the lamina is disrupted, the needle will lie directly in the cyst. In our case, the cyst eroded into the ventral margin of the lamina, which may have facilitated entry into the cyst.

The critical feature of the translaminar technique is that once the bevel crosses the ventral laminal margin, further motion is neither desirable nor required. Injection of contrast agent should be performed at this point. If the contrast outlines the cyst and further administration reveals epidural spread, the latter signifies cyst disruption. If posterior reflux of the contrast medium occurs, then advancement may be required and should be done with utter deliberation and utmost care with a narrow-gauge needle lest the thecal sac be violated.

The last point is that laminar penetration is difficult with a blunt-tip needle. In the present case, the lamina was partially invaded by the cyst and penetration was accomplished with a 22-gauge 7-inch spinal needle. The Touhy and spinal needles both required significant force to pass through the laminal cortex. It is possible that if the lamina is robust, a diamond-tip needle such as a narrow-gauge bone biopsy needle may be needed to tap through the lamina.

There are several limitations that we want to emphasize. This is a single technical report, and further experience with this technique will help determine the feasibility and utility of the technique. The safety of this technique relies on not going beyond the laminal margin, and this cannot be overstated. One obvious limitation is that uncontrolled application of force may lead to inadvertent advancement of the needle after the lamina is penetrated. In this regard, we recommend gentle application of force with ever-present counterforce as the needle advances, similar to what is done when accessing the epidural space.

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