

## Case Report

# Successful treatment of facet joint synovial cyst through percutaneous rupture: a case report

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**Abstract:** Facet joint synovial cysts can cause significant back pain and radiculopathy. Treatment options for symptomatic facet joint synovial cysts include surgical excision, facet joint steroid injections, and cyst aspiration. Herein, we report our experience of successfully rupturing a lumbar facet joint synovial cyst through a percutaneous approach with two needles using forceful pressure under C-arm fluoroscopic guidance. The patient experienced immediate symptom improvement that persisted throughout the 24-month follow-up. Our experience highlights that the volume effect technique is a valuable treatment option for symptomatic facet joint synovial cysts under fluoroscopic guidance.

**Keywords:** Back pain, radiculopathy, volume effect, synovial cyst

### Introduction

Facet joint synovial cysts, also known as zygapophysial joint cysts, are one cause of spinal canal stenosis and radiculopathy in older adults [1-4]. These cysts typically develop from the synovial membrane surrounding the facet joints (small joints that help facilitate movement and connect the vertebrae) in the spine [4-6]. The cysts can grow large enough to compress adjacent nerve roots or the spinal cord, leading to other symptoms - such as back and leg pain, numbness, and weakness [2, 7].

While the exact cause of facet joint synovial cysts remains unknown, it is believed to be related to degenerative changes in the spine associated with aging [2, 3]. Other risk factors include previous spinal surgeries, spine trauma, and genetic predisposition [1-3, 8]. Diagnosis involves combining imaging tests (such as magnetic resonance imaging [MRI] and computed tomography [CT] scans) with a clinical evaluation that assesses symptoms and neurological function [9-12].

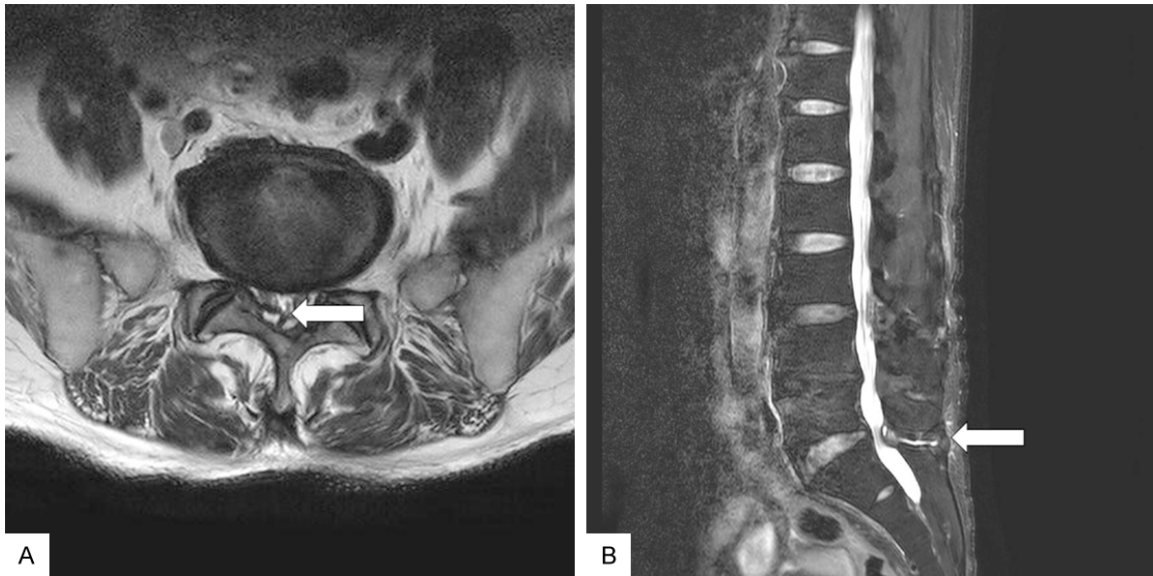
Facet joint synovial cysts can cause significant spinal pain and dysfunction if left untreated [2, 7, 11, 12]. Early recognition and appropriate

management can help improve patient outcomes and quality of life [1]. Treatment options for facet joint synovial cysts depend on the severity of symptoms and the extent of compression on the nerves or spinal cord [13]. Conservative management may include physical therapy, medications, and spinal injections [1]. Even though cyst aspiration is a valuable treatment approach [14, 15], few cases exist where the cyst has been treated by utilizing rupture [16]. Our study aimed to assess the therapeutic efficacy and clinical outcomes associated with percutaneous ruptures and identify the procedural factors that can predict clinical success.

### Case presentation

A 60-year-old outpatient male (height 183 cm, weight 75 kg) presented to the anesthesiology department with lower back and right leg pain, without a history of trauma. The man had a visual analog scale (VAS) score of 7 and associated radiating right leg pain. He had no previous history of surgery or procedure on the spine or back. Physical examination revealed light tenderness around the right L5-S1 facet joint and a positive ipsilateral straight leg raising test. The patient's spine MRI showed a ventral cystic

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**Figure 1.** Magnetic resonance (MR) images (A, B). Axial and sagittal MR images of the lumbar spine reveal the presence of a facet joint synovial cyst positioned in the right L5/S1 facet region. The cyst's dimensions were measured as 7×6×13.2 mm.

lesion on the right L5-S1 facet region (**Figure 1**). No other abnormalities that could have caused the patient's symptoms were identified. Conservative treatments, including pain relief medication and physiotherapy were attempted, but did not lead to any substantial improvement. Facet joint steroid injections were administered; however, the symptoms persisted. Since the patient did not want to undergo surgery, performing a cyst aspiration through a facet joint injection was decided.

After injecting contrast into the L5-S1 facet joint using a 25-G Quincke needle, the shape of the facet joint became visible in a contrasted image. Although the facet joint could be visualized through the needle, the target cystic lesion could not be found. Another attempt to locate the cyst was made by inserting a second 25-G Quincke needle into the facet joint of L5-S1, thus revealing the appearance and position of the cyst on an image enhanced with contrast (**Figure 2**). However, it was unsuccessful when two 25-G Quincke needles were used to attempt cyst aspiration. While attempting to access the cyst via the C-arm, the MRI showed that the needle was positioned behind the lamina, thus precluding from achieving the desired approach angle. Therefore, we planned to rupture the cyst by applying volume effect pressure through the two needles. Normal saline

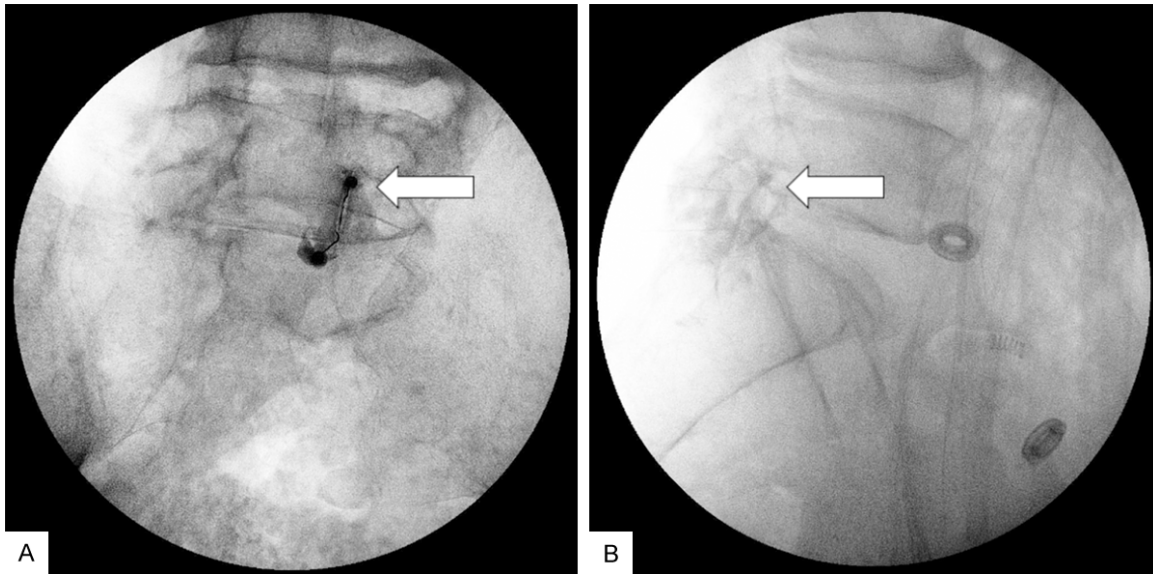
was injected through each syringe connected to two 25-G Quincke needles, and forceful pressure was applied. The patient complained of radiating pain in the right leg as the normal saline was administered using two syringes while gradually applying pressure. However, upon applying slight additional pressure, the pain subsided. The cyst ruptured and disappeared from its original location, as seen in the C-arm imaging, where the dye spread into the epidural space. The dye exiting through the root was also visible on C-arm imaging (**Figure 3**).

The patient was monitored for 3 h in the recovery room after the procedure. He was discharged without neurological complications. At the 1-week follow-up, his lower back and right leg pain had subsided, with a VAS score of 1-2. During the 24-month follow-up period, there were no signs of recurring pain.

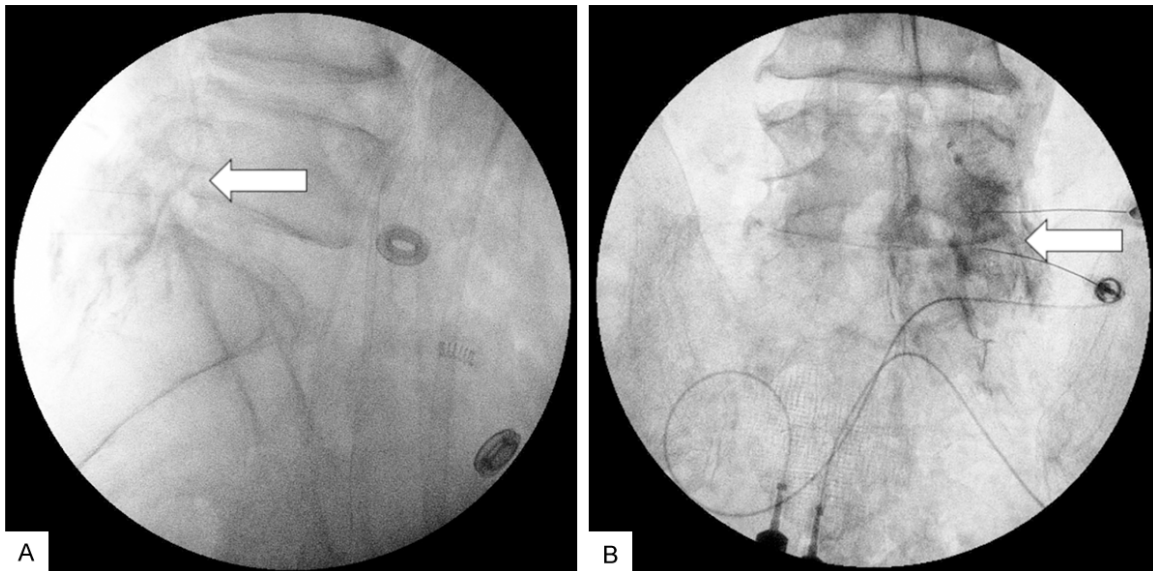
### Discussion

Synovial cysts typically manifest in the joints of the limbs, such as the wrist, knee, ankle, and foot [4, 17]. Intraspinal juxtafacet cysts, although rare, are being identified more frequently owing to imaging methods advancements [4, 17]. Individuals with spinal synovial cysts typically experience back and radicular pain, neurogenic claudication, or cauda equina

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**Figure 2.** C-arm fluoroscopic images of the L5/S1 facet region illustrating two needles, both 25-G in size, inserted using intra-articular approaches. In image (A), a dye-filled facet joint synovial cyst (pre-rupture) is visible at the L5/S1 level of the 25-degree oblique view. (B) Lateral view depicting the same facet joint cyst.



**Figure 3.** C-arm fluoroscopic images of the L5/S1 facet region illustrating two needles, both 25-G in size, inserted using intra-articular approaches. In the lateral (A) and anteroposterior (B) views, the dye-filled facet joint synovial cyst can be observed, as demonstrated in **Figure 2**, which ruptured and disappeared from its previous location.

syndrome [1, 2, 8]. The predominant initial manifestation is a gradual onset of back pain and radiculopathy, which is subsequently followed by the development of neurogenic claudication [17].

Conservative management options for facet joint synovial cysts may include physical therapy, medications, and steroid injections [1, 17].

In symptomatic patients, facet joint steroid injection yielded improvement in 36% of the cases; however, one-third of the patients required additional injections one month later [18]. Furthermore, facet joint injections for spinal synovial cysts have shown effectiveness in providing short-term pain relief [19]; however, over time, efficacy decreases [19]. Furthermore, aspiration of cysts under CT or fluoroscopic

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guidance, followed by steroid injection, has yielded mixed results [15, 20]. Some studies have reported higher recurrence rates or failure rates compared to surgical options when utilizing this approach [20, 21].

Surgical intervention may be necessary for severe or worsening symptoms that do not respond to conservative measures [22]. The most common surgical approach is cyst removal and decompression [23]. In some cases, spinal fusion may be necessary to stabilize the spine after cyst removal [24]. Bydon et al. reviewed 82 studies involving 966 patients who underwent synovial cyst excision, either with or without concurrent spinal fusion [25]. Throughout a 25-month follow-up period, it was found that 22% of the patients experienced recurring back pain, with 6% of them requiring reoperation [25]. Recurrence of synovial cysts at the same level was observed in 1.8% of the patients who underwent decompression alone. In contrast, no recurrences were reported in patients who underwent decompression and spinal fusion [26]. The overall surgical complication rate was 4.8%, including dura tear, cerebrospinal fluid leak, deep venous thrombosis, and one fatality [22, 24].

One of the challenges in managing facet joint synovial cysts is that the condition can recur, with cysts re-forming after surgical removal in some cases [25, 27]. According to Xu R et al., approximately 10-20% of patients experienced pain recurrence [27]. In our case, the patient did not desire surgical intervention, and previous attempts with medication therapy and facet joint injections proved ineffective. Therefore, the planned course of action involved either cyst aspiration or rupture.

Two needles were inserted using an intra-articular approach to visualize the cyst using a dye before attempting aspiration. However, the aspiration was unsuccessful, prompting the utilization of the volume effect technique to induce rupture. The rationale behind this decision was that the MRI revealed the presence of the lamina overlying the cyst, preventing direct needle access to the cyst itself. This alternative approach involved a simple procedure that required minimal effort and cost. We noted a procedure time of 10 min and a low medical cost borne by the patient. Additionally, hospital stay was kept minimal, up to just a few hours.

A limitation in this case was the lack of post-procedure imaging, as the patient reported substantial symptom improvement and declined a follow-up MRI. Nonetheless, we suggest that follow-up MRIs be performed to assess cyst size and confirm complete resolution. Furthermore, extended follow-up may be required to determine the rate of recurrence.

We successfully treated the synovial cyst-related symptoms by inducing cyst rupture. Both surgical and steroid injection treatments have approximately 10-20% recurrence rates [18, 19, 24-27], and while cyst aspiration can be an alternative method [14], needle access was not possible in this case. To our knowledge, this is the first instance where multiple syringes were used to rupture the cyst through a volume effect, resulting in symptom relief. For patients who are hesitant to undergo surgical treatment, this non-invasive method may be suitable for managing facet joint synovial cysts.

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### Disclosure of conflict of interest

None.

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