



## Technical note

## Lateral lumbar retroperitoneal transpsoas approach in the setting of spondylodiscitis: A technical note



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## ABSTRACT

Thoracolumbar spondylodiscitis is a morbid disease entity, impacting a sick patient population with multiple comorbidities. Wherever possible, surgical measures in this population should limit the extent of soft tissue disruption and overall morbidity that is often associated with anteroposterior thoracolumbar decompression and fusion. The authors describe the rationale, technique, and use of the lateral lumbar transpsoas retroperitoneal approach in tandem with posterior decompression and instrumented fusion in the treatment of circumferential thoracolumbar spondylodiscitis with or without epidural abscesses. The authors have routinely implemented the lateral lumbar transpsoas retroperitoneal approaches to address all pyogenic vertebral abscesses, spondylodiscitis, and ventral epidural abscesses with anterior column debridement and reconstruction with iliac crest autograft, posterior decompression, and pedicle screw instrumentation. In five consecutive patients, the mean blood loss and operative duration was 275 mL and 259 min, respectively. There were no instances of major vascular injury as this corridor obviates the need for retraction of inflamed retroperitoneal structures. The use of the lumbar lateral retroperitoneal transpsoas approach to the lumbar spine for the treatment of destructive and pyogenic spondylodiscitis is a potential alternative to the traditional anterior lumbar retroperitoneal approach in tandem with posterior spinal decompression and instrumented stabilization.

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## 1. Introduction

Vertebral spondylodiscitis is a growing problem in North America, ranging from 0.2 to 2.4 per 100,000 people annually, owing to a host of modifiable and non-modifiable conditions [1,2]. As a consequence of recreational intravenous drug use, it is costly both to society and the care facility [3]. The vast majority of cases in North America are pyogenic, with granulomatous and parasitic etiologies largely confined to the developing world [4]. The indications for surgical intervention in lumbar spondylodiscitis are numerous and include neurological decline, failure of antibiotic therapy, need for diagnosis, mechanical instability, and medically refractory pain in the setting of medical therapy [5].

Lumbar spondylodiscitis typically begins with involvement of the disc space, and spreads to the adjacent vertebral body [4]. Pyogenic vertebral abscesses may spread into the adjacent spinal

canal, forming an epidural abscess. Epidural abscesses in the lumbar spinal canal are a cause for clinical concern as rapid growth can become symptomatic through compression of nerve roots and the conus at the thoracolumbar junction. Erosion of the ventral annulus and anterior longitudinal ligament not only destabilizes the spinal column and predisposes the spine to deformity, but spread from the disc space into the prevertebral space can result in myositis from infiltration into the bilateral psoas muscles, painful neuritis from inflammatory involvement of the lumbar plexus, and the formation of psoas abscesses. It is not uncommon for large psoas abscesses to be observed in the setting of osteomyelitis and discitis, requiring image-guided aspiration and drain placement.

The management of suspected discitis often begins with image-guided biopsy, initiation of broad-spectrum antibiotics, bacteriologic culture, and sensitivity. In the event of persistent disease in the setting of antibiotic therapy, the formation of neurologic deficit, or symptoms attributed to mechanical instability, the treatment is surgical debridement, restoration of spinal alignment, and stabilization with instrumentation and ultimately arthrodesis through structural bone graft placement [2].

The authors describe key considerations and technical nuances in the surgical treatment of lumbar and thoracolumbar

Abbreviation: PEEK, poly ether ether ketone.

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spondylodiscitis with a specific emphasis on the novel application of the lateral lumbar transposas approach with a 'less-invasive' retractor system in the treatment of spondylodiscitis.

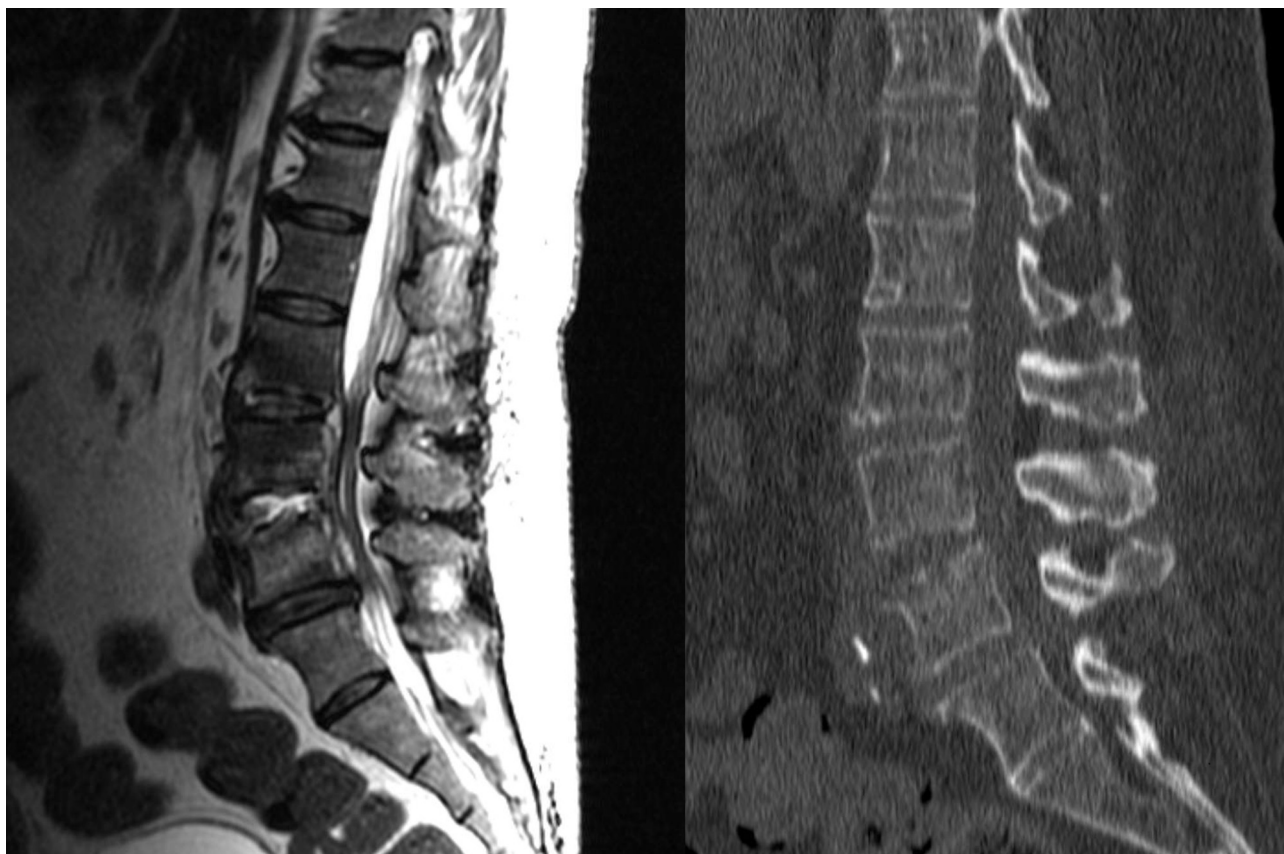
## 2. Surgical technique

### 2.1. The initial use of the posterior approach to address lumbar spondylodiscitis

In practice, the posterior lumbar laminectomy is often the initial surgical treatment of choice, as canal compromise and the sudden development of neurologic symptoms or even sepsis may be the presenting finding (Figs. 1–3). More often, the most common complaint is low back pain [6]. Epidural infiltration of pus most often arises from the lumbar disc and the posterior midline lumbar approach affords the surgeon the opportunity for not only urgent evacuation of lumbar epidural abscesses but decompression of the neural elements, deformity correction, and/or stabilization via transpedicular instrumentation. The authors prefer the use of the Jackson or Wilson frame for multilevel lumbar pathology and pathology at the thoracolumbar junction. A midline subperiosteal dissection is performed in the standard fashion, and a lumbar laminectomy is performed at the involved levels. Subperiosteal exposure of the transverse processes is a clinical consideration for several reasons. This allows for visualization of landmarks for pedicle screw trajectories. This can be particularly valuable for understanding pedicle screw starting points and trajectories when resultant kyphotic deformity is present after anterior column collapse. In this scenario, the use of intraoperative navigation by

way of two-dimensional fluoroscopy or perhaps even three-dimensional image-guidance with a digital reference array is greatly helpful. The authors advocate for the use of whatever means available in the armamentarium with the goal to optimize placement of instrumentation, spinal alignment, and limit operative duration, blood loss, and damage of neurovascular structures. Lastly, decortication of the facets and transverse processes will assist in a posterolateral fusion mass that has the potential to be a vigorous fusion in the setting of inflammatory generators. Prior to bone graft placement, antibiotic saline is irrigated throughout the posterior wound. Vancomycin powder has been shown in numerous retrospective studies [7–15] and meta-analyses [16] to lower the incidence of postoperative surgical site infection (SSI). Vancomycin powder is not benign when applied to a wound, and has been shown in one study to increase the frequency of gram-negative and polymicrobial wound infections in the setting of lumbar fusions [17]. Another laboratory study has shown that high concentrations of vancomycin may even impair osteoblasts and thus limit fusion potential (ref), but that has not been shown clinically.

One final set of considerations with the posterior approach is that it is an indirect method of approach to the anterior corridor. The disc space and endplate can be approached posterolaterally via retraction of the thecal sac at the lower lumbar levels, but is generally not advisable at the level of the conus. Additionally, in the setting of subacute epidural disease, inflammation and adherence increases the risk of a cerebrospinal fluid leak. Exposing the subarachnoid space to potentially pathogenic microorganisms and thus opening the blood–brain barrier to infection where a previous route did not exist could be potentially devastating to the



**Fig. 1.** T2-weighted sagittal magnetic resonance imaging (MRI), lumbar spine in a 66-year-old woman with dialysis-dependent end-stage renal disease with L3–4 spondylodiscitis with ventral epidural phlegmon at the L3–4 level (A). Antibiotic therapy was tailored by CT-guided biopsy of the L3–4 disc, which was positive for *Pseudomonas aeruginosa* discitis (B). Targeted antibiotic therapy was insufficient in maintaining relief of painful symptoms, and another MRI was obtained two weeks later upon development of bilateral proximal leg weakness.

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