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# Commentary: Complications Associated With Oblique Lumbar Interbody Fusion at L5-S1: A Systematic Review of the Literature

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The authors<sup>1</sup> present a systematic review of the literature regarding the oblique approach to the L5-S1 area. This is a topic worthy of study given the increasing popularity of the relatively new technique. L5-S1 oblique lumbar interbody fusion (OLIF), which is essentially an anterior lumbar interbody fusion (ALIF) performed in a lateral position, is an evolution of the left-sided retroperitoneal corridor, which has become the predominant approach for supine ALIF. The biggest theoretical benefit of this technique is to facilitate lateral lumbar interbody fusion (LLIF) in either an ante or a transpoas fashion at more proximal lumbar levels without having to change positions. Additionally, in cases where posterior fixation and arthrodesis are also necessary, this can also be done from the same positioning, eliminating the need to flip the patient prone. This review is particularly useful as it essentially provides meta-analysis of important complication rates that are not easily determined based on single-case series due to relatively “infrequent” complications.

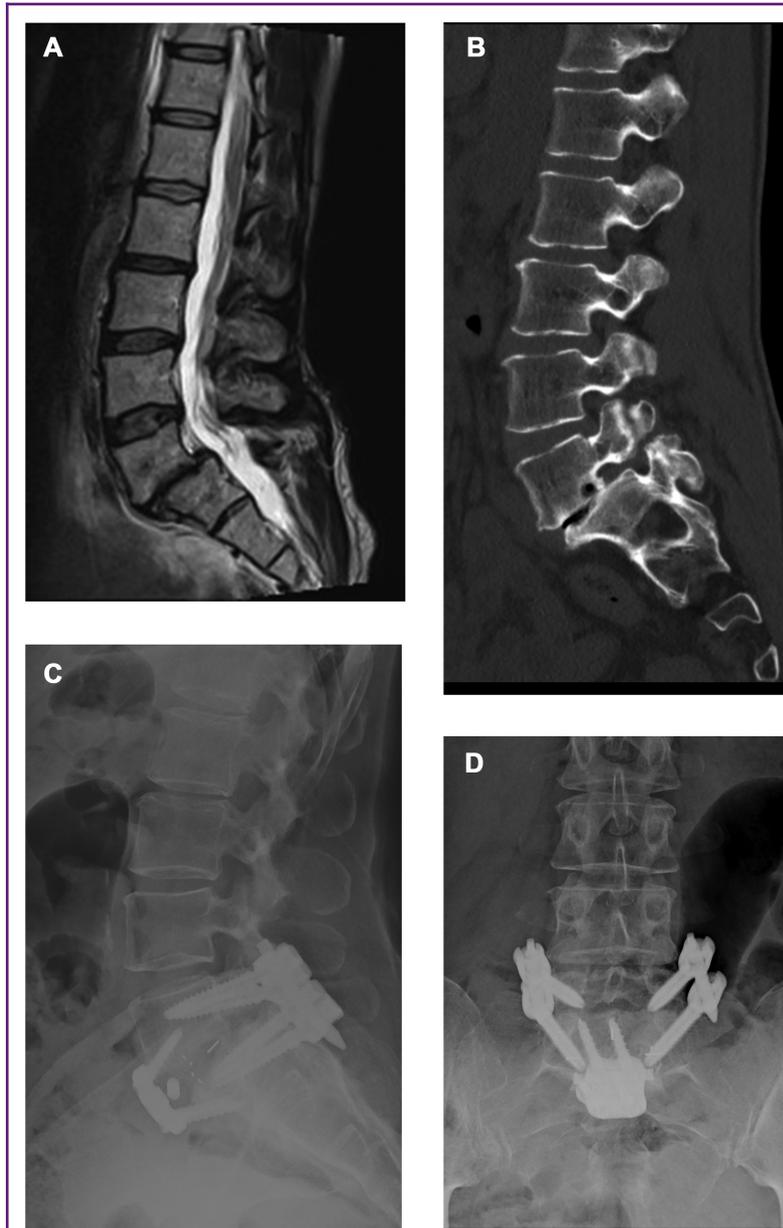
In summary, this manuscript demonstrated a vascular complication rate of 2.5%, bowel-associated complication rate of 0.5%, neurological injury rate of 1.9%, pseudarthrosis rate of 7.3%, and reoperation rate of 2.2%. It should be noted that a pseudarthrosis rate of 7.3% is not insignificant depending on its clinical context. For example, a randomized controlled trial by Jalalpour et al<sup>2</sup> demonstrated 0% reoperation rate for symptomatic pseudarthrosis from 68 transforaminal lumbar interbody fusion (TLIF) cases with 2-yr follow-up. The authors<sup>1</sup> explain that it may be from a heterogenous patient population with long-segment multilevel fusion ending at the sacrum level. However, one must consider whether there was any difference in fusion rate with posterior augmentation with a pedicle screw as opposed to a stand-alone interbody cage. L5 and S1 pedicle screws may be easily placed with a large target area via a minimally invasive technique using intraoperative fluoroscopy or navigation. Using navigation or robotic assistance, pedicle screws can even be placed with the patient in lateral decubitus position without having to reposition and prep to enhance operative efficacy. If there is a reasonable improvement in outcome and fusion rate with posterior augmentation, surgeons should consider adding

this procedure with a relatively small additional cost. We have been augmenting our L5-S1 OLIF interbody cage with posterior pedicle screws with robotic assistance, as illustrated in the [Figure](#).

Also, the conclusion of the authors<sup>1</sup> that L5-S1 OLIF is a safe approach is somewhat debatable based on their analysis. Although 2.5% and 0.5% chance of vascular and bowel complications appear to be rare events, they can have life-threatening consequences. Typical adverse consequences encountered with the posterior approach include incidental durotomy, neurological injury, and approach-related pain, which usually do not have long-term sequelae and, more importantly, are almost never life-threatening. Most spine surgeons would rather risk 0.3% to 8.6% chance of durotomy than 2.5% chance of vascular injury.<sup>3</sup> This comparison raises the question: Is it worth risking a potentially devastating complication that may require another expert's (ie, vascular surgeon) assistance just to reduce hospital stay by a few days and diminish postoperative pain that is expected to improve with time?

On the other hand, minimally invasive TLIF (MI TLIF) utilizing a tubular retractor is an excellent alternative that provides similar advantages to OLIF, namely reduced postoperative pain and shorter hospital stay.<sup>4</sup> The L5-S1 OLIF has the same inherent advantages as an ALIF over TLIF: a larger graft window associated with the cage and greater potential for restoration of segmental lordosis with anterior column release. However, the authors' reported 7.5% pseudarthrosis rate begs the question whether the larger cage from this technique translates into an outcome superior to existing techniques. In addition, 2.2% reoperation rate may not be low enough depending on the follow-up period of the included studies. To illustrate, a systemic meta-analysis of 24 TLIF studies (1967 patients) demonstrated that reoperation rates following both minimally invasive and open TLIF were 0.4% and 0.5%, respectively, but the study did not provide sufficient details pertaining to how revision rate was influenced by follow-up period.<sup>5</sup> Of course, direct comparison is difficult due to the heterogeneity of studies included in the review.

Nevertheless, L5-S1 OLIF or lateral ALIF is a technique that is gaining wider acceptance and can be a useful tool to



**FIGURE.** 54-yr-old female presented with low back pain and right lower extremity pain for over 1 yr. Patient had tried physical therapy for 14 wk, piriformis injection, sacroiliac joint block, and epidural steroid injection without sustained relief. She was referred to us and her **A**, sagittal T2 magnetic resonance imaging and **B**, computed tomography showed an isthmic spondylolisthesis at L5-S1 with bilateral L5 pars defects. Patient was taken to the operating room for L5-S1 OLIF with posterior minimally invasive (MIS) fusion using percutaneous pedicle screws with complete resolution of symptoms. Her construct is still durable on **C**, lateral and **D**, AP radiographs taken 2 yr after surgery.

approach common surgical pathology. As is often the case in spine surgery, new technologies emerge at a high frequency and are adopted without a great deal of evidence to support their efficacy especially compared to existing techniques. Therefore, we applaud the authors for publishing this systematic review of morbidity associated with this technique from an individual case series by early adopters of this technology. As was the case with LLIF, the early experience with L5-S1 OLIF will likely see a complication profile that may not compare favorably with existing techniques, in this case TLIF or traditional ALIF. However, as surgeons gain experience and learn from prior errors, we would expect the morbidity rate of this procedure to improve to a rate comparable to other approaches.

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### REFERENCES

1. Pham MH, Hassan O, Diaz-Aguilar LD, Lehman RA. Complications associated with oblique lumbar interbody fusion at L5-S1: a systematic review of the literature [published online ahead of print: 2021]. *Neurosurg Open*. doi: 10.1093/neuopn/okab018
2. Jalalpour K, Neumann P, Johansson C, Hedlund R. A randomized controlled trial comparing transforaminal lumbar interbody fusion and uninstrumented posterolateral fusion in the degenerative lumbar spine. *Global Spine J*. 2015;5(4):322-328.
3. Weiss H, Garcia RM, Hopkins B, Shlobin N, Dahdaleh NS. A systematic review of complications following minimally invasive spine surgery: transforaminal lumbar interbody fusion. *Curr Rev Musculoskelet Med*. 2019;12(3):328-339.
4. Parker SL, Mendenhall SK, Shau DN, et al. Minimally invasive versus open transforaminal lumbar interbody fusion for degenerative spondylolisthesis: comparative effectiveness and cost-utility analysis. *World Neurosurg*. 2014;82(1-2):230-238.
5. Xie L, Wu WJ, Lian Y. Comparison between minimally invasive transforaminal lumbar interbody fusion conventional open transforaminal lumbar interbody fusion: an updated meta-analysis. *Chin Med J (Engl)*. 2016;129(16):1969-1986.