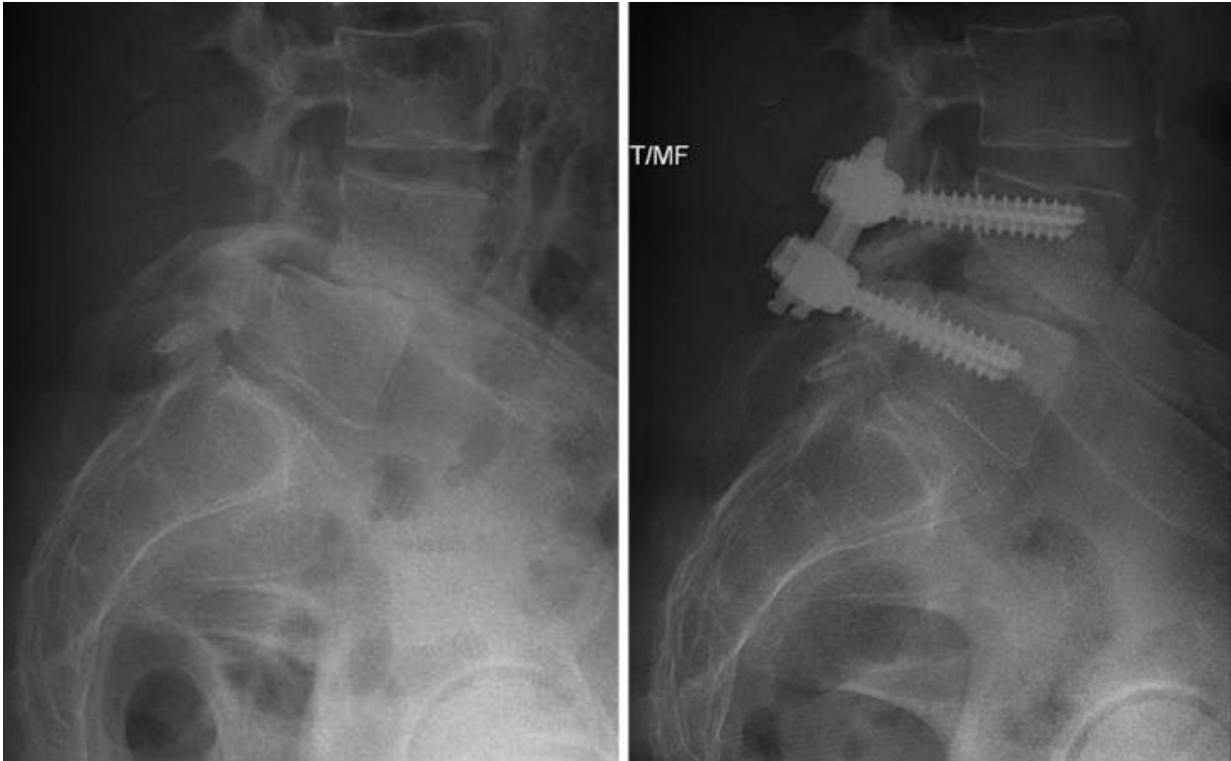


Awake lumbar interbody fusion

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Representative case of a patient before and after awake TLIF. Preoperative (left) and postoperative (right) radiographs demonstrating proper fusion and reduction of spondylolisthesis. Credit: 2019 AANS

As one can infer from the article title, "Endoscopic transforaminal lumbar interbody fusion without general anesthesia: operative and clinical outcomes in 100 consecutive patients with a minimum 1-year follow-up," by John Paul G. Kolcun et al. (published today in

Neurosurgical Focus, provides the reader with a glimpse of how effective lumbar surgery in select patients can be when performed without general anesthesia, open surgery, or a long convalescence in the hospital.

Background. Transforaminal lumbar interbody fusion (also known as TLIF) is a [surgical procedure](#) used to stabilize the spine and reduce low-back pain in [patients](#) with one or more damaged spinal discs or other degenerative changes to the spine affecting the adjacent nerves.

Accessing the spine through an incision in the patient's back, the surgeon removes the damaged disc, which is located between two vertebrae, and replaces it with a spacer to provide adequate height between adjacent vertebrae. This spacer, often a cage, contains bone graft and possibly a preparation of bone-inducing protein. Often surgeons insert pedicle screws and rods or attach additional bone grafts to form a bridge across neighboring vertebrae. Over time, new bone grows, fusing the two vertebrae together.

TLIF can be performed at one spinal level or multiple levels. The procedure is most often performed as open [surgery](#), but in recent years it has also been performed with minimally invasive percutaneous techniques, now with the integration of endoscopic methods for a portion of the procedure.

People with severe low-back pain require relief. Those who face the possibility of surgery have usually exhausted medical and physical therapies. However, the prospect of surgery can be daunting: a prolonged stay in the hospital, significant blood loss during surgery, postoperative pain, and the fear of becoming addicted to opioid medications.

Surgery that is minimally invasive and does not require [general anesthesia](#) would be an attractive option for most people in this situation.

Present Study. In this paper, the authors reviewed the first 100 cases of

single- or two-level awake, endoscopic, minimally invasive, transforaminal lumbar interbody fusion (MIS-TLIF) at the University of Miami Hospital—all performed by senior author Michael Y. Wang, M.D., between July 2014 and August 2017. The authors also provide details on how this procedure differs from conventional open and MIS-TLIF surgeries.

Awake endoscopic MIS-TLIF achieves vertebral fusion in select patients without the need for general endotracheal anesthesia and with far less dissection of muscles and other soft tissues than occurs in [open surgery](#). Patients ideally receive slight to moderate sedation and local analgesia; while remaining conscious, they are able to provide feedback to both surgeon and anesthesiologist. The endoscopic approach limits damage to surrounding tissues, making postoperative recovery quicker, less painful, and possibly less prone to complication.

The patients in this report included 56 women and 44 men with a mean age of 66 years. Single-level TLIF was performed in 84 patients and two-level TLIF in 16. The most common site of TLIF was L4-5. To assess operative and [clinical outcomes](#), the authors looked at patients' length of stay in the hospital, the duration of surgery, intraoperative blood loss, and patients' scores on the Oswestry Disability Index both before surgery and at the most recent follow-up examination (1 year or longer).

The authors state that, compared with reports of conventional MIS-TLIF in the literature, the durations of hospital stay (mean 1.4 days) and surgery (mean 84.5 minutes for one-level surgical procedures and 128.1 hours for two-level procedures), and the intraoperative blood loss (mean 65.4 ml for one-level procedures and 74.7 ml for two-level procedures) were lower in cases of awake endoscopic MIS-TLIF. They also state that after a minimum of 1-year follow-up, there was no suggestion of mechanical instability determined by clinical examination and X-ray imaging.

The difference between preoperative (mean 29.6) and postoperative (mean 17.2) Oswestry Disability Index scores in patients in this study demonstrates clinical improvement with strong statistical significance (p

There were few complications in this series. In four patients, the surgical plan was revised to include general endotracheal anesthesia; surgery was successful in all cases. Another four patients experienced early postoperative complications requiring revision: cage migration (two cases), bone infection, and endplate fracture. Three of the four postoperative complications occurred during the first half of the study period.

The awake endoscopic MIS-TLIF procedure was developed before the University of Miami initiated protocols based on the principles of Enhanced Recovery After Surgery (ERAS). The authors point out, however, that this procedure matches the aims of ERAS ("minimal soft-tissue destruction, reduced blood loss, and less reliance on intraoperative narcotic analgesia") and they expect additional benefits in future patients who undergo awake endoscopic MIS-TLIF combined with the nonsurgical components of ERAS.

When asked about the study, Dr. Wang said, "As more and more people every year suffer from spinal disease both in America and around the world, spine surgeons have worked tirelessly to develop the safest, most effective, and least daunting therapies to offer our patients. We believe this study demonstrates that the awake TLIF procedure is one such new technique to afford patients relief from disabling pain, without a debilitating surgery."

The paper is accompanied by an editorial by Drs. Marcus D. Mazur and Andrew T. Dailey, focusing on the paper and its integration of awake minimally invasive surgery and the principles of ERAS. Enhanced recovery after spine surgery is the topic of this month's *Neurosurgical*

Focus. "Endoscopic transforaminal lumbar interbody fusion without general anesthesia: operative and clinical outcomes in 100 consecutive patients with a minimum 1-year follow-up" is one of 15 articles in that issue.

More information: Kolcun JPG, Brusko GD, Basil GW, Epstein R, Wang MY: Endoscopic transforaminal lumbar interbody fusion without general anesthesia: operative and clinical outcomes in 100 consecutive patients with a minimum 1-year follow-up. *Neurosurgical Focus* 46(4):E14, 2019. [DOI: 10.3171/2018.12.FOCUS18701](https://doi.org/10.3171/2018.12.FOCUS18701)

Mazur MD, Dailey AT: Editorial: Reducing the burden of spine fusion. *Neurosurgical Focus* 46(4):E15, 2019. [DOI: 10.3171/2019.1.FOCUS1945](https://doi.org/10.3171/2019.1.FOCUS1945)

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