Lateral retroperitoneal transpsoas approach

Lateral lumbar interbody fusion (LLIF) via a transpsoas approach is a workhorse minimally invasive approach for lumbar arthrodesis that is often combined with posterior pedicle screw fixation. There has been increasing interest in performing single-position surgery, allowing access to the anterolateral and posterior spine without requiring patient repositioning. The feasibility of the transpsoas approach in patients in the prone position has been reported

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The lateral transpsoas approach to the lumbar spine is a well-defined procedure for the management of discogenic spinal pathology necessitating surgical intervention.

Lordotic cage insertion through the Lateral retroperitoneal transpsoas approach is being used increasingly for restoration of sagittal alignment. However, the degree of correction achieved by varying cage angle and ALL release and posterior element resection is not well defined.

Intervertebral device subsidence is a postoperative clinical risk that can lead to recurrence of symptomatic pathology and the need for surgical reintervention.

A investigation shows that increased trialing required for a static spacer may lead to additional iatrogenic endplate damage, resulting in less distraction and increased propensity for postoperative implant subsidence secondary to endplate disruption [1)].

Stab et al. present the first reported use of the lateral retroperitoneal transpsoas approach for interbody fusion in a patient with achondroplastic dwarfism.

The patient was a 51-year-old man with achondroplastic dwarfism who had a history of progressive claudication and radicular pain despite previous extensive lumbar laminectomies. The lateral retroperitoneal transpsoas approach was used for placement of interbody cages at L1/2, L2/3, L3/4, and L4/5, followed by posterior lumbar decompression and pedicle screw instrumentation. The patient tolerated the procedure well with no complications. Postoperatively his claudicatory and radicular symptoms resolved and a CT scan revealed solid arthrodesis with no periimplant lucencies. [2)].

Minimally invasive lateral retroperitoneal transpsoas interbody fusion

see Minimally invasive lateral retroperitoneal transpsoas interbody fusion

Position

Some authors have suggested that thigh extension during the prone lateral transpsoas approach to the lumbar spine provides the theoretical advantage of providing posterior shift of the psoas muscle and plexus and is responsible for its lower rates of nerve injury. We aimed to elucidate the effects of surgical positioning on the femoral nerve within the psoas muscle via a cadaveric study. In the supine position, 10 fresh frozen adult cadavers had a metal wire secured to the pelvic segment of the

femoral nerve and then extended proximally along with its L2 contribution. Fluoroscopy was then used to identify the wires on the femoral nerves in a neutral position and with the thigh extended and flexed by 25 and 45°. Additionally, a lateral incision was made in the anterolateral abdominal wall to mimic a Lateral retroperitoneal transpsoas approach to the lumbar spine, and measurements were made of the amount of movement in the vertical plane of the femoral nerve from neutral to then 25 and 45° of thigh flexion and extension. On fluoroscopy, the femoral nerves moved posteriorly at a mean of 10.1 mm with thigh extension. Femoral nerve movement could not be detected at any degree of this range of flexion of the thigh. Extension of the thigh to about 30° can move the femoral nerve farther away from the dissection plane by approximately one centimeter. This hip extension not only places the femoral nerve in a more advantageous position for lateral lumbar interbody fusion procedures but also helps to promote accentuation of lumbar lordosis [3].

Case reports

A 73-year-old female patient with a history of degenerative lumbar scoliosis, L4-5 pseudarthrosis, and resulting L5-S1 adjacent segment following prior unsuccessful lateral L4-5 interbody fusion presented to the clinic with severe lower back pain and lower extremity radiculopathy. The decision was made to proceed with surgical correction via a robotic-guided prone transpsoas approach, which is a novel approach similar to lateral lumbar interbody fusion (LLIF) with the patient in a prone decubitus position. Excellent spinal alignment was achieved with no complications. On two-month follow-up, imaging revealed pedicle screws at the L3, L4, L5 levels and at the sacrum without change and continued interbody cages position with no signs or symptoms of infection.

Minimally invasive spine surgery have demonstrated benefit especially for at risk populations. The LLIF procedure has been well established for use in a wide range of spinal pathologies given its noted benefits in increasing spinal column stability through posterior fixation and indirect decompression. However, only marginal improvements in segmental lordosis are expected and there are reports of neurological complications. The robotic-guided prone transpsoas approach procedure has emerged as an alternative to LLIF for the treatment of spinopelvic pathologies. This approach enables greater improvements to spinal lordosis through single-position surgery while simultaneously reducing intraoperative repositioning and providing the known benefits of lateral interbody surgery.

These experience suggests that the PTP approach is safe and effective because it does not require patient repositioning, easily interfaces with robotic guidance, and achieves increased lordosis gains via the prone positional effect compared to LLIF and comparable approaches [4].

1)
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