Anterior lumbar interbody fusion (ALIF)

Indications

Radiographic adjacent segment disease ASD is relatively common long-term finding associated with instrumented lumbar fusion. However, radiographic evidence of ASD does not necessarily correlate with a poor outcome. Results suggest that advanced age, anterior lumbar interbody fusion, and the restoration of the preoperative standing lumbar lordosis may have a protective effect against the development of ASD.

In degenerative disc disease if conservative extensive care fails, anterior lumbar interbody fusion has proven to be an alternative form of surgical management.

ALIF Cages

see ALIF Cage

Anterior lumbar interbody fusion (ALIF) with percutaneous pedicle screw fixation (PPF) provides successful surgical outcomes to isthmic spondylolisthesis patients with indirect decompression through foraminal volume expansion. However, indirect decompression through ALIF followed by PPF may not obtain a successful surgical outcome in patients with isthmic spondylolisthesis accompanied by foraminal stenosis caused by a posterior osteophyte or foraminal sequestrated disc herniation. The microscopic anterior foraminal approach provides successful foraminal decompression. Combined with ALIF and PPF, this approach shows a good surgical outcome in patients with isthmic spondylolisthesis accompanied by foraminal stenosis caused by a posterior osteophyte or those with foraminal sequestrated disc herniation.

Posterior pedicle screw supplementation without posterolateral fusion improves the fusion rate of ALIF when using anterior cage and screw constructs.

ALIF is an effective treatment for degenerative disc disease (with and without radiculopathy) and spondylolisthesis. Although results were promising for scoliosis, failed posterior fusion, and adjacent segment disease, further studies are necessary to establish the effectiveness of ALIF in these conditions.

Complications

The procedure is performed in close proximity to the large blood vessels.

Damage to these large blood vessels may result in excessive blood loss. Quoted rates in the medical literature put this risk at 1% to 15%, although this should be an uncommon complication in the hands of experienced vascular and spine surgeons.

Retrograde Ejaculation after ALIF Surgery

For males, another risk unique to this approach is that approaching the L5-S1 (lumbar segment 5 and sacral segment 1) disc space from the front has a risk of creating a condition known as retrograde ejaculation.

There are very small nerves directly over the disc interspace that control a valve that causes the ejaculate to be expelled outward during intercourse. By dissecting over the disc space, the nerves can stop working, and without this coordinating innervation to the valve, the ejaculate takes the path of...
least resistance, which is up into the bladder.

With retrograde ejaculation, the sensation of ejaculating is largely the same, but it makes conception very difficult (special harvesting techniques can be utilized). Fortunately, retrograde ejaculation happens in less than 1% of cases and tends to resolve over time (a few months to a year). This complication does not result in impotence as these nerves do not control erection.

**Case series**

**2017**

Study retrospectively reviewed 82 patients who underwent MO-ALIF with self-anchored standalone cages (n = 42) or TLIF (n = 40) for the treatment of lumbar disc herniation between April 2013 and October 2014. Patient demographics, intraoperative parameters, and perioperative complications were collated. Clinical outcomes were evaluated using the visual analog scale (VAS) scoring, the Oswestry Disability Index (ODI) for pain in the leg and back, and radiological outcomes, including fusion, lumbar lordosis (LL), disc height (DH), and cage subsidence were evaluated at each follow-up for up to 2 years.

Patients who underwent TLIF had a significantly higher volume of blood loss (295.2 ± 81.4 vs. 57.0 ± 15.2 mL) and longer surgery time (130.7 ± 45.1 vs. 60.4 ± 20.8 min) than those who had MO-ALIF. Compared with baseline, both groups had significant improvements in the VAS and ODI scores and DH and LL postoperatively, though no significant difference was found between the two groups regarding these indexes. All patients reached solid fusion at the final follow-up in both groups. Three patients (3/42) with three levels (3/50) suffered from cage subsidence in the MO-ALIF group; meanwhile, no cage subsidence occurred in the TLIF group.

MO-ALIF with self-anchored stand-alone cages is a safe and effective treatment of lumbar disc herniation with less surgical trauma and similar clinical and radiological outcomes compared with TLIF.

**2015**

84 consecutive patients who underwent anterior lumbar interbody fusion from 2004 to 2009 were reviewed. The operative time, intraoperative blood loss, hospital stay, Oswestry Disability Index (ODI), visual analog scale (VAS) results, and complication rate were recorded separately. Medical indications were degenerative disc disease (73.8%), postdiscectomy disc disease (16.1%), and disc herniation (9.5%). Patients with severe spondylolysis or disc degeneration, with more than 3 or multilevel lesions, were excluded. The mean operative time was 124.5 ± 10.9 min (range 51-248 min), the mean intraoperative blood loss was 242.1 ± 27.7 mL (range 50-2700 mL), the mean hospital stay was 3.9 ± 1.1 days (range 3-6 days), the mean preoperative VAS score was 7.5 ± 1.4, and the mean preoperative ODI score was 60.0 ± 5.7. At the 1-year follow-up, the mean postoperative VAS score was 3.3 ± 1.3 and the mean postoperative ODI score was 13.6 ± 3.4 (P < 0.05). L4-L5 disc fusion led to better clinical results than 2-level L4-L5/L5-S1 disc fusion. Additionally, the 2-level fusion of L4-L5/L5-S1 had better clinical results than the L5-S1 disc fusion at both the 1 and 2-year postoperative follow-ups regarding the VAS score and the ODI score. The rate of complications was more frequent in the 2-level L4-L5/L5-S1 group (27.3%) (group C) than in the L4-L5 group (9.1%) (group A) and the L5-S1 group (12.5%) (group B). There was no difference between the L4-L5 group (9.1%) and the L5-S1 group (12.5%). A venous tear occurred during surgery and was successfully repaired in 6 of the 84 patients. Also, out of the 84 patients, 6 were found with pseudarthrosis during the follow-up, and these patients underwent a spinal fusion with instrumentation, with a posterior approach after a mean of 1 year. The complications secondary to the surgical approach were persistent abdominal pain.
Anterior lumbar interbody fusion (ALIF) (1/84, 1.2%) and wound dehiscence (1/84, 1.2%). Anterior lumbar interbody fusion for L4-L5 had better clinical results than the 2-segmental L4-L5/L5-S1 disc fusion, and the 2-segmental L4-L5/L5-S1 disc fusion had better clinical results than the L5-S1 disc fusion. Also, the 2-segmental L4-L5/L5-S1 disc fusion had a higher complication rate (27.3%), but there was no difference between the L4-L5 group (9.1%) and the L5-S1 group (12.5%) ⁶.