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Commentary

Brief study on lumbar interbody fusion

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Abstract

Posterior Lumbar Interbody Fusion (PLIF) and Transforaminal Lumbar Interbody Fusion (TLIF) are two types of spinal fusion surgeries that fuse (mend) the lumbar spine bones together utilizing a posterior (back area incision) method (using an interbody fusion technique). The intervertebral disc is removed and replaced with a bone spacer (metal or plastic may also be utilized) utilizing a posterior approach in interbody fusion. When one or two spinal levels are fused, the posterior method is frequently utilized in conjunction with posterior decompression (laminectomy) and instrumentation (metal screws/rods). The procedures for posterior interbody fusion are divided into two categories. The typical PLIF surgery involves putting two tiny bone graft spacers on each side of the interbody space, with moderate retraction of the spinal nerves and neurologic structures (right and left). A recent procedure is known as TLIF (Transforaminal Lumbar Interbody Fusion) includes only one bone graft spacer being placed in the center of the interbody space, without the spinal nerves being retracted.

Spondylolisthesis and degenerative disc degeneration, among other painful spinal disorders, are often treated using PLIF and TLIF surgeries.

Keywords: Posterior Lumbar Interbody Fusion (PLIF), Transforaminal Lumbar Interbody Fusion (TLIF), bones, spinal studies

INTRODUCTION

The unilateral transforaminal technique for lumbar interbody fusion is gaining favour as an alternative to anterior and classic Posterior Lumbar Interbody Fusion (PLIF) with pedicle screw instrumentation. Although there have been reports on specific problems and cost efficiency, there is currently no prospective study employing a standardised tool for outcome measurement following Transforaminal Lumbar Interbody Fusion (TLIF) with a follow-up of at least 3 years in the current literature. As a result, a TLIF study was conducted. Fifty-two consecutive patients were enrolled in the study, with a minimum follow-up of three years and a mean follow-up of 46 months. The indications were 22 isthmic spondylolistheses and 30 lumbar spine degenerative diseases [1].

There were 39 one-level fusions, 11 two-level fusions, and two three-level fusions in all. The Oswestry Disability Index (ODI) and a Visual Analogue Scale (VAS) were used to assess pain and disability status in a prospective study [2,3]. An independent radiologist used anterior-posterior and lateral radiographs to assess the status of bone fusion. One-level fusions took an average of 173 minutes, while multiple-level fusions took an average of 238 minutes. The average blood loss for single-level fusions was 485 mL and 560 mL for multiple-level fusions. A deep infection, a prolonged radiculopathy, a symptomatic contralateral disc herniation, and a pseudarthrosis with implant loosening were all reported as significant consequences [4-6]. At follow-up, pain alleviation on the VAS and a drop in the ODI were both significant ($P=0.05$).

The rate of fusion was 89 percent. Significant changes in the ODI were not identified between isthmic spondylolistheses and degenerative illnesses, nor between one- and multiple-level fusions, at the most recent follow-up [7]. In conclusion, the TLIF approach produces results that are equivalent to those of other interbody fusion techniques such as the PLIF and ALIF. Avoiding the anterior approach and reducing approach-related posterior damage to the spinal canal are two potential benefits of the TLIF procedure [8,9].

The procedure is carried out under general anesthesia. During the surgery, the patient is given a breathing tube (endotracheal tube) and is ventilated. Antibiotics are given intravenously before to surgery. Patients are placed in the prone position (lying on their stomach) on a dedicated surgical table/bed with special cushioning and supports. A particular cleaning solution is used to clean the surgery area (low back area). To preserve a bacteria-free environment, sterile drapes are used, and the surgical team wears sterile surgical attire such as gowns and gloves.

A 3-6 inch longitudinal incision is made in the midline of the low back, directly over the implicated spinal levels (depending on the number of levels). Retractors are utilized to see the posterior (back section) vertebral arches when the fascia and muscle are gently split in the midline. An x-ray is taken once the retractor is in place to check that the appropriate spinal level(s) has been identified.

When the compressive lesions are removed, a complete laminectomy (removal of the lamina section of bone) and foraminotomy (removal of bone spurs from the aperture where the nerves leave the spinal column) is usually performed, allowing the nerves to return to their natural size and shape. The nerve roots and neurologic systems are gently withdrawn to allow for the visualization and removal of the bone spurs. The arthritic, hypertrophic (overgrown) bone spurs and ligamentum flavum are removed with small dental-type devices and biting/grasping instruments (such as a pituitary rongeur and Kerrison rongeur). There are also checks in the surrounding areas to make sure there are no compressive spurs or disc fragments [10-13].

To see and remove the intervertebral disc, the PLIF procedure involves conducting a broad laminectomy and bilateral partial facetectomy. A complete unilateral (one side only) facetectomy is used in the TLIF

procedure to facilitate visualization and removal of the intervertebral disc. Using specific biting and grabbing equipment, the intervertebral disc is subsequently extracted (such as a pituitary rongeur, Kerrison rongeur, and curettes). Special distractor instruments are utilized to restore the disc's natural height and to identify the proper size spacer to be used. The disc space is then carefully filled with a bone spacer (metal or plastic spacers may also be utilized).

Small metal rods and screws are inserted into the upper and lower vertebral bodies to offer immediate stability while the bone heals and to speed up the fusion process (percentage of patients where the bone successfully mends together) [14]. To make sure the spacer is in the right place, fluoroscopic x-rays are taken.

The wound is routinely rinsed out with antibiotic-laced sterile water. A few strong sutures are used to seal the deep fascial and subcutaneous layers. Stitches or surgical staples are used to seal the wound. While in the hospital, a sterile bandage is worn and changed every day.

Depending on the number of spinal levels involved, the overall surgery time ranges from 3 hours to 6 hours. Most patients are able to return home after 3-5 days of surgery. Physical therapists and occupational therapists help with patients before they leave home, teaching them proper procedures for getting in and out of bed and walking independently. To avoid a strain injury, patients are advised to avoid bending at the waist, lifting (more than five pounds), and twisting in the first 2-4 weeks after surgery. After 4-6 weeks, patients can gradually begin to bend, twist, and lift as the discomfort diminishes and the back muscles strengthen [15].

After surgery, patients are usually not required to wear a back brace. Patients may be given a soft or firm lumbar corset to wear in the early postoperative period to provide additional lumbar support if needed. A gauze bandage should be used to cover the wound, which should be taped in place. It's important to keep the area clean and dry. Changing the bandage every 1-2 days is recommended, especially after showering. Patients can shower right after surgery as long as they keep the incision region covered with a bandage and tape and avoid getting water directly on the surgical area.

Patients should change their bandages and dry out the surgical area after showering. When at home, the dressing should be changed every 2-3 days. Patients should not bathe until the wound has healed fully, which normally takes around two weeks after surgery.

Depending on when the surgical discomfort has decreased, patients may be able to return to light work activities as soon as 2-3 weeks after surgery. If the surgical discomfort has reduced and the back strength has recovered sufficiently with physical therapy, patients may return to moderate level job and light leisure activities as early as 3 months after surgery. When the postoperative discomfort has faded and the back strength has restored suitably with physical therapy, patients who have had a fusion at only one level may resume heavy lifting and sporting activities. Heavy lifting, strenuous work, and impact sports should be avoided by patients who have had a fusion at two or more levels. Patients can drive once the pain has subsided to a manageable level, which usually takes 7-14 days after surgery. Patients who are taking pain relievers should not drive (narcotics).

Patients should only drive for a short distance following surgery and have someone with them in case the pain flares up and they need assistance driving back home. Patients can begin driving longer distances on their own once they have mastered a short drive. Patients will return to see the doctor 12-14 days after surgery for a follow-up visit. An examination of the incision will take place.

The stitches or staples will be removed when the incision has been evaluated. If necessary, medications will be replenished. Patients should see Dr. Spoonamore every 4-6 weeks after that, and an x-ray will be taken to ensure that the fusion location is stable and healing properly

[16]. Patients will be given a prescription to begin physical therapy for gentle back exercises 8-12 weeks after surgery.

DISCUSSION

In the treatment of symptomatic spondylolisthesis and degenerative disc degeneration, the results of Posterior Lumbar Interbody Fusion

(PLIF) and Transforaminal Lumbar Interbody Fusion (TLIF) surgery are generally satisfactory. Numerous research studies published in medical publications show that PLIF and TLIF surgery produce 90-96 percent satisfactory or outstanding results. The majority of patients report significant improvement in their back discomfort and are able to resume most, if not all, of their daily and leisure activities.

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