Anterior Lumbar Interbody Fusion (ALIF)

Mesfin A. Lemma, MD
Minimally Invasive Spine Surgery, Scoliosis Surgery, Baltimore, MD

What does ALIF stand for?

- **Anterior** – ALIF is performed through the front, or anterior, aspect of the body.
- **Lumbar** – The mobile spine can be divided into 3 areas: Cervical (the neck area), thoracic (chest area), and lumbar (lower spine). The sacrum makes up the tail bone portion of the spine.
- **Interbody fusion** – Refers to the joining, or fusion, of 2 or more bones in the spine through the disc space.

When is ALIF indicated?

ALIF may be recommended for the treatment of:

- Lumbar spondylolisthesis
- Lumbar degenerative disc disease
- Scoliosis
- Non-union following posterior lumbar fusion

Who performs ALIF surgery?

ALIF is best performed by a **fellowship-trained spine surgeon**. A **vascular surgeon** typically performs the access portion of the procedure. Ask your surgeon about their training, especially if your case is complex or you have spinal surgery.

What are the advantages of anterior surgery?

- A minimally invasive approach, ALIF has the advantage that, unlike a posterior approach, the back muscles and nerves remain undisturbed.
- A much larger bone graft implant can be inserted through an anterior approach, which increases the likelihood of a successful fusion.
- ALIF is also more effective in restoring the normal alignment of the spine.

What to expect before the procedure:

- In the weeks prior to your surgery, **pre-operative testing** will be conducted either by your primary care physician or the pre-admission testing department of the hospital.
- One week prior to surgery, you will need to **stop taking aspirin, NSAIDs** or other medications that thin your blood and may increase bleeding.
- If you smoke, it is important you stop well before surgery and **avoid smoking** for a period of at least 6 months afterwards, as this will impede proper healing.
- You will be given instructions and supplies to **cleanse** your stomach area the day prior to your procedure.
- You are to have **nothing to eat or drink after midnight** on the night before.

What to expect during the procedure:

- Just before the procedure starts you will have an intravenous (IV) line started so you can receive fluids and medications to make you relaxed and sleepy. The procedure is performed under **general anesthesia** (you are asleep). Medications will be given through the IV to put you to sleep and a tube is inserted in your throat to supplement your breathing. **IV antibiotics** are administered and monitors are placed to check your heart, blood pressure, and oxygen level. Once you are asleep, Foley catheter is placed into your bladder.
- The actual procedure typically lasts **about 2 hours,** depending on the specifics of the case. This is what happens once the procedure begins:

1. Surgical approach

- You are positioned on your back (supine) on a specialized, cushioned operating table.
- The area of your abdomen where the incision will be made is cleansed with a special solution to kill the germs on the skin.
- An incision is made either in the midline (horizontal) or the left side of the abdomen (vertical).
- Muscles are not disrupted, and are instead gently moved to the side along with the abdominal contents. The large blood vessels that continue to the legs are retracted allowing access to the front of the spine.

2. Disc removal

- The **diseased disc is excised**. An empty space now exists between the vertebral bodies above and below.

3. Placement of Bone Graft and Instrumentation

- The surfaces of the vertebral bodies are meticulously prepared for bone graft. Specialized instruments are then used to template the height, width, and depth of bone graft that is needed.
- The bone graft material most suitable for the specific condition is selected and inserted into position. Once the graft has been firmly placed within the disc space it is secured with bone screws with or without a metallic plate.

4. Closure

- The incision is closed and a small dressing is applied over the incision. You are then taken to the recovery area.

What materials may be used to replace the disc?

- **Allograft** bone comes from a deceased donor (cadaver).
- **PEEK** spacers are synthetic, plastic alternatives to bone spacers. Often called 'cages', they are carefully engineered for use in the spine. Bone graft is placed within the opening in the middle of the cage to p
- romote the fusion.

What to expect after the procedure:

- Patients are typically in the hospital for **about 2 nights**.
- In the recovery area, you will be observed until you recover from the anesthesia, then transferred to the floor.
- You will be encouraged to get out of bed and move around as soon as you are able to. A brace may be ordered to provide additional support while healing.
- It is normal for bowel function to temporarily slow down following any abdominal procedure. Therefore, only ice chips and small sips of water will be allowed until your bowel function returns. Intravenous fluids will be continued in the meantime.
- Pain pills on an empty stomach may result in nausea, so initially IV pain medications are self-administered through a PCA, or **patient-controlled analgesia**.
- Once normal bowel sounds return and you are passing gas, your diet will be advanced and you will be switched to pain pills.
- **Physical therapy and occupational therapy** will see you prior to your discharge from the hospital to make sure you are comfortable walking, escalating stairs and performing other activities of daily living.

Recovery and rehabilitation at home:

- Keep in mind, everybody is different, and therefore the amount of time it takes to return to normal activities is different for each individual.
- Patients are encouraged to **walk as much as possible** but to **avoid lifting or bending** early on. Discomfort should decrease a little each day, like a dimmer switch as opposed to an on-off switch.
- Most patients are able to return to most activities by 6 weeks, although complete recovery may take between 6 and 12 weeks. You will **not be able to drive a car for about 6 weeks**, depending on the specifics of your case.
- **Refrain for smoking**, as nicotine is a direct toxin to bone healing/fusion.
- **Do not take any NSAIDs** (non-steroidal anti-inflammatory medications or **aspirin**) as these, too, are detrimental to the fusion process.
- **Signs of infection** such as **swelling, redness, wound draining, or fever > 101.5°F** should be brought to our attention immediately.
- It is important to keep your incision **dry** for a period of 2 weeks to give your incision time to seal. You may sponge bath during this period.
- It should be noted that the time to fusion can vary. It usually takes **approximately 3 months**, but may take up to 6 to 9 months for the fusion to take. Heavy lifting, bending, and twisting are usually limited until the fusion is noted to be solid.
- You will be seen in the office at **2 weeks**, then at regular intervals thereafter. Radiographs will be obtained periodically to assess the fusion.

What are the possible risks?

In skilled hands, ALIF is a very safe procedure. However, no surgery is without possible risks. These risks can be minimized by choosing an experienced surgeon to perform your procedure, and by adhering to your surgeon's instructions before and after your procedure. General complications of any surgery include bleeding, infection (1%), blood clots, and reactions to anesthesia. Specific complications related to ALIF may include but are not limited to:

- **Vertebrae failing to fuse (non-union)**. There are many reasons why bones do not fuse together. Common reasons include smoking, osteoporosis and malnutrition. **Smoking is by far the greatest factor that can prevent fusion**.

  Non-union rates are also higher for patients with a history of:

  - Prior lower back surgery
  - Obesity
  - Multiple level fusion surgery
  - Radiation treatment for cancer.

  It is important to note that not all patients who have a nonunion will need to have another fusion procedure. As long as the joint is stable, and the patient's symptoms are better, additional surgery may not be necessary.

- **Bleeding (1 - 15%).** The procedure is performed in close proximity to the large blood vessels that go to the legs. Although this should be an uncommon complication in the hands of experienced vascular and spine surgeons, injury to these large blood vessels may result in excessive blood loss.

- There is also a small risk of injury to the bowel or ureter, since they are in the proximity of the lower lumbar discs.

- **Retrograde ejaculation.** For males, another risk unique to this approach is that approaching the L5-S1 disc space from the front has a risk of creating a condition known as retrograde ejaculation.

  The nerves that control ejaculation lay over the front of the L5-S1 disc. They are very sensitive, and therefore even with retraction the normal coordination of ejaculation can be disrupted resulting in the ejaculation occurring backward into the bladder.

  It should be noted that erection and sex drive are **not affected**.

  Fortunately, retrograde ejaculation occurs in **less than 1%** of cases (but in some studies it is higher) and tends to resolve over time (a few months to a year).

- **Other potential risks may include:**

  - Incisional hernia (**less than 1%)**
  - Nerve pain (**very rare as none of the nerves are accessed through this approach**)
  - Successful fusion, but the pain does not subside