Fusion with Interbody Cages

A Patient's Guide to Anterior Lumbar Interbody Fusion with Intervertebral Cages

Introduction

Back pain is a very common problem that may affect up to 80% of the population at some time during life. The vast majority of back problems get better without needing any type of surgical procedure. There are many different causes of back pain. The specific cause of your back problem will need to be determined before any type of surgery will be suggested as a treatment option. To learn more about how your back works and various treatments that are available, you may want to review the document, entitled:

A new type of surgical treatment is now available for patients who have been unsuccessful at controlling their back pain with non-surgical treatments. The procedure uses a new type of device called an intervertebral fusion cage to perform a spinal fusion between two or more vertebrae in the lumbar spine (the lower back).

This document will discuss:

- The lumbar spine anatomy
- The rationale for the surgery
- How the surgery is performed
- Some of the devices that are used
- The use of bone graft
- What to expect during your rehabilitation
- Some possible complications

Anatomy

To better understand how a lumbar spinal fusion is performed, it helps to know some anatomy of the overall spine, and more specifically the parts of the spine that are involved in the surgery: the lumbar spine, pedicles, nerve roots, and laminae.
Rationale

What type of back problems is the intervertebral fusion cage used for? One of the most common causes of chronic back pain is degenerative disc disease. Degenerative disc disease occurs when the intervertebral disc between two vertebrae begins to wear out. The degeneration probably starts after an injury to the disc, or many small injuries to the disc over time. Degeneration of the disc usually takes several years to occur. The process of degeneration causes the disc to lose its ability to act as a shock absorber between the vertebrae. The disc becomes thinner and allows the vertebrae to move closer together. As the vertebrae grow closer, the openings (foramina) in the back of the spine where the nerve roots leave the spinal canal become narrower. This can lead to pinching and irritation on the nerves, which causes pain into the legs.

The problem is made worse by the development of segmental instability. Segmental instability is a term used by spinal surgeons to describe what occurs when the disc degeneration allows more movement between the vertebrae than normal. This movement, or instability, can cause mechanical pain in the back and further irritation on the nerve roots. The intervertebral cage was designed to make it easier for surgeons to perform a spinal fusion to treat the problem of degenerative disc disease.

If you would like further information about degenerative disc disease, you may wish to review the separate document, entitled:

Degenerative Disc Disease

The intervertebral fusion cage is a large, hollow cylinder made of some type of metal, usually titanium. It is designed as a "cage" so that bone graft can be placed inside the hollow cylinder to allow a spinal fusion to occur between two vertebrae. The holes that are throughout the cage allow bone to form around and through the cage connecting the two vertebrae with solid bone.

Many of the newer types of intervertebral fusion cages are also designed to allow performing the spinal fusion either using an open incision or a laparoscopic procedure. An open incision is the traditional way of performing surgery, where larger incisions are made to allow the surgeon to see where he is operating and perform the procedure. A laparoscopic procedure is performed using much smaller incisions and using a special TV camera inserted into the abdomen to allow the surgeon to see where he is operating and perform the procedure. The laparoscopic approach can be much less damaging to normal tissue and can speed recovery. On the other hand, the laparoscopic approach is sometimes very difficult to perform and may not be possible in all cases.

The intervertebral fusion cage is designed to do several things. First, the cage is used to spread the two vertebrae apart, which allows several things to occur. The openings in the back of the spine where the nerve roots leave the spine become larger - making more room for the nerves. This decreases the pinching and irritation on the nerves. The strong ligaments that surround the
disc tighten as the cage forces the vertebrae back apart. This decreases the segmental instability between the two vertebrae and decreases the mechanical pain in the spine. Second, the intervertebral fusion cage sits between the two vertebrae to replace the disc and hold the two vertebrae in the correct position until a fusion occurs between the vertebrae.

Simply because you have back pain does not mean you need surgery. Your doctor will try many other options to treat your back pain before suggesting surgery. The intervertebral fusion cage is not designed to treat all spinal problems requiring surgery. Your doctor will carefully assess whether or not you are a candidate for the procedure. If your major problem appears to be degenerative disc disease combined with segmental instability of the spine, you may be a candidate at some point in your treatment for surgery with the intervertebral fusion cage.

The Operation

Intervertebral fusion cages are designed to be used in several different ways. One way is by making an incision in the back of the spine and inserting the cage between the vertebrae from the back side. This is usually done if you need to have other surgery done at the same time to remove bone spurs or a herniated disc from the spinal canal. More commonly, the procedure is done from the front of the spine using either an open incision - or the laproscopic approach, as described above. It is not uncommon for the surgeon to start out using the laproscope and have to stop and perform the surgery through an open incision. This usually occurs because the surgeon cannot see well enough with the laproscope.

To perform the operation from the front, either the laproscope is inserted or an open incision is made so that the surgeon can see the front of the spine. The disc that is to be replaced with the intervertebral fusion cage is located using a fluoroscope (a fluoroscope is a special X-ray machine that shows the images on a TV screen). In most cases, two intervertebral fusion cages are used in each disc and are placed side by side using special instruments. Two holes are drilled into the disc to place the intervertebral fusion cages side by side. The fluoroscope is used throughout the procedure to visualize the use of the drills.

Bone graft is then placed inside the hollow intervertebral fusion cage. This bone graft will probably be taken from your pelvis through a small incision. The cage will then be inserted into place between the vertebrae. The second intervertebral fusion cage is placed in the same way. Once the fluoroscope is used to ensure that the intervertebral fusion cages are placed in the correct position, the operation is over.

To learn more about what bone graft is and how it is used, please review the document, entitled:

- Understanding Bone Graft

Rehabilitation

You will spend about two days in the hospital recovering from your surgery. While you are there, an orthotic specialist will visit you to fit you with a custom brace. You will be required to wear the brace for approximately two to three months following surgery, or until proper fixation
of your new intervertebral fusion cages occurs. This process varies in time depending upon how each person advances with his or her recovery.

Once you go home, we encourage a gradual return to normal activities starting with early ambulation wearing your new custom fitted brace. Driving privileges will be restricted for the first two weeks after your surgery and will resume upon the doctor's approval.

You are encouraged to begin aerobic exercises, such as walking, as soon as possible after your surgery. Your goal is to resume many of the activities you were doing before your surgery, but in a gradual progression.

Since your intestines have been manipulated during the procedure to gain exposure, they may not work normally for a few days following surgery. We recommend small meals for the first few days, gradually increasing to your normal portions.

For your convenience, we have provided a set of post-operative instructions. This page can be downloaded and printed if you lose the copy you received when you were discharged. This document includes things you should do - and things to avoid.

You will probably be sent for outpatient physical therapy (PT) for a period of up to six to twelve weeks. There, a physical therapist will do an evaluation of your needs and tailor a specific exercise program for you to follow. They will illustrate these exercises and make sure you are doing them properly. They will also provide you with an exercise program that you can do while at home. The physical therapy staff reports directly to your doctor, keeping him or her aware of your progress.

**What are the success rates?**

The intervertebral fusion cage is a fairly new device, however, it has been studied in the U.S. for over ten years. There have been well over 10,000 procedures performed using intervertebral fusion cages. Several of the devices have been approved for use by the United States Food and Drug Administration (FDA).

**Complications**

With any surgery, there is a risk of complications. When surgery is done near the spine and spinal cord these complications (if they occur) can be very serious. Complications could involve subsequent pain and impairment and the need for additional surgery. You should discuss the complications associated with surgery with your doctor before surgery. The list of complications provided here is not intended to be a complete list of complications and is not a substitute for discussing the risks of surgery with your doctor. Only your doctor can evaluate your condition and inform you of the risks of any medical treatment he or she may recommend.
Injury to the Spine or Nerves

When operating around the spine, injury to the nerves around the spine is always a possibility. In the study mentioned above, there were nerve injuries in 2.7% of the patients. It is twice as common to have nerve problems after a posterior approach - mainly because the surgeon is operating closer to more of the spinal nerves.

Injury to Blood Vessels Causing Bleeding

The large blood vessels that lead to the legs lie right in front of the spine where the intervertebral fusion cage is inserted. In many cases, the vessels must be moved aside to perform the surgery. Performing the anterior fusion through either the anterior open approach or the laproscopic approach can result in damage to the blood vessels in the abdomen, and can lead to bleeding problems. You may require a blood transfusion. Excessive bleeding is also one of the main reasons that the surgeon will have to stop performing the procedure with the laproscope and switch to an open incision. This is not uncommon. In most research studies of the procedure major injury to blood vessels occurred in only 1% of the cases reviewed.

Implant Migration

Implant migration is a term used to describe the fact that the intervertebral fusion cage has moved from where the surgeon placed it initially. This usually occurs fairly soon after surgery - before the healing process has progressed to the point where the cage is firmly attached by scar tissue or bone growth. If the cage moves too far it may not be doing its job of stabilizing the two vertebrae. If it moves in a direction towards the spine or large vessels, it may damage those structures. If you have a problem with implant migration, your surgeon may have to perform a second operation to replace the cage that has moved.

Infection

Infection is a possibility in every type of surgery. You will probably be given antibiotics before surgery and for a short time after surgery to reduce the risk of infection.

Blood Clots

Thrombophlebitis, sometimes called Deep Venous Thrombosis (DVT), can occur after any operation. DVT occurs when the blood in the large veins of the leg forms blood clots within the veins. This may cause the leg to swell, become painful, and warm to the touch. If the blood clots in the veins break apart, they can travel to the lung, where they are lodged in the capillaries of the lung and cut off the blood supply to a portion of the lung. This is called a pulmonary embolism (pulmonary means lung; embolism means fragment of something traveling through the vascular system). Most surgeons take preventing DVT very seriously. There are many ways to reduce the risk of DVT. Probably the most effective is getting you moving as soon as possible!
Summary

Surgery of the spine continues to be a challenging and difficult area. The intervertebral fusion cage is another tool for the spine surgeon to use in helping treat the various problems occurring in the low back. For patients that require surgery to treat their degenerative disc disease, the intervertebral fusion cage has been shown to be effective for the following reasons:

- The procedure has been found to have a low overall complication rate.
- Postoperative pain may be minimized through a decrease in the amount of surgical intervention.
- Operative procedures and lengths of stay in the hospital can be less than other fusion methods.
- Return to daily activities can be much quicker.