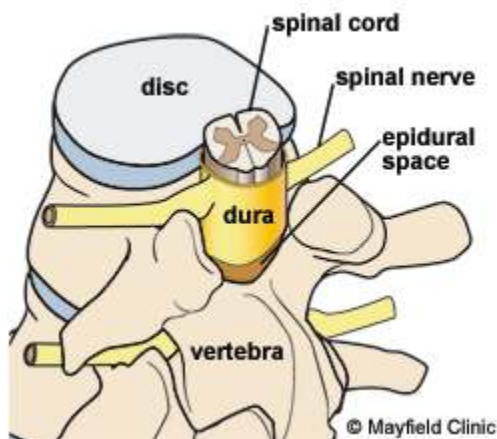


## Overview

An epidural steroid injection (ESI) is a minimally invasive procedure that can help relieve neck, arm, back, and leg pain caused by inflamed spinal nerves. ESI may be performed to relieve pain caused by spinal stenosis, spondylolysis, or disc herniation. Medicines are delivered to the spinal nerve through the epidural space, the area between the protective covering of the spinal cord and vertebrae. The effects of ESI tend to be temporary. Pain relief may last for several days or even years. The goal is to reduce pain so that you may resume normal activities and a physical therapy program.

## What is an epidural steroid injection (ESI)?

An epidural steroid injection includes both a long-lasting corticosteroid (e.g., betamethasone) and an anesthetic numbing agent (e.g., ropivacaine). The drugs are delivered into the epidural space of the spine, which is the area between the protective covering (dura) of the spinal cord and the bony vertebrae (Fig. 1). This area is filled with fat and small blood vessels (see [Anatomy of the Spine](#)).



**Figure 1.** The epidural space, which lies between the dura mater and the bony vertebra, is filled with fat and blood vessels. The dural sac surrounds the spinal cord and nerve roots and contains cerebrospinal fluid.

Corticosteroid injections can reduce inflammation and can be effective when delivered directly into the painful area. Unfortunately, the injection does not make a herniated disc smaller; it only works on the spinal nerves. The pain relief can last from days to years, allowing patients to improve your spinal condition with physical therapy and exercise programs.

## Who is a candidate?

Patients with pain in the neck, arm, low back, or leg (sciatica) may benefit from ESI. Specifically, those with the following conditions:

- **Spinal stenosis**: A narrowing of the spinal canal and nerve root canal can cause back and leg pain, especially when walking.

- **Spondylolysis**: A weakness or fracture between the upper and lower facets of a vertebra. If the vertebra slips forward (spondylolisthesis), it can compress the nerve roots causing pain.
- **Herniated disc**: The gel-like material within the disc can bulge or rupture through a weak area in the surrounding wall (annulus). Irritation, pain, and swelling occur when this material squeezes out and comes in contact with a spinal nerve.
- **Degenerative disc**: A breakdown or aging of the intervertebral disc causing collapse of the disc space, tears in the annulus, and growth of bone spurs.
- **Sciatica**: Pain that runs along the sciatic nerve in the buttocks and down the legs. It is usually caused by compression of the 5th lumbar or 1st sacral spinal nerve.

ESI has proven helpful for some patients in the treatment of the above painful inflammatory conditions. ESI can also help determine whether surgery might be beneficial for pain associated with a herniated disc. When symptoms interfere with rehabilitative exercises, epidurals can ease the pain enough so that patients can continue their physical therapy.

ESI should NOT be performed on people who have an infection, are pregnant, or have bleeding problems. It may slightly elevate the blood sugar levels in patients with diabetes, typically for less than 36 hours. It may also temporarily elevate blood pressure.

### **Who performs the procedure?**

The types of physicians who administer epidural steroid injections include physiatrists (PM&R), anesthesiologists, radiologists, neurologists, and surgeons.

### **What happens before treatment?**

The doctor who will perform the injection reviews the medical history and previous imaging studies to plan the best approach for the injections.

Patients who take anticoagulant medication (Coumadin, Heparin, Plavix, Ticlid, Fragmin, Orgaran, Lovenox, aspirin) may need to stop taking it several days before the ESI.

Patients that are of child bearing age (10-55) or who are trying to get pregnant will be screened with a pregnancy screening tool and/or urine HCG. Fluoroscopy x-rays used during the procedure may be harmful to the fetus.

### **Day of the procedure**

We recommended that patients have something light to eat prior to their appointment. It is ok for them to take their medications prior to the procedure except anticoagulants. They will have to make arrangements to have someone drive them home the day of the injection. Patients arrive at registration and are brought to the prep/recovery room. Paperwork and computer charting are completed. Patients wash their hands and put on a gown.

### **What happens during treatment?**

The goal is to inject the medication as close to the pain site as possible, using either a translaminar or transforaminal injection. The right type of injection depends on your condition and which procedure will likely produce the best results and the least discomfort or side

effects. Studies have shown that use of fluoroscopy (X-ray) to guide the needle into the epidural space is more effective than when the ESI is performed without fluoroscopy. The procedure usually takes 15-20 minutes and is followed by a recovery period.

### **Step 1: prepare the patient**

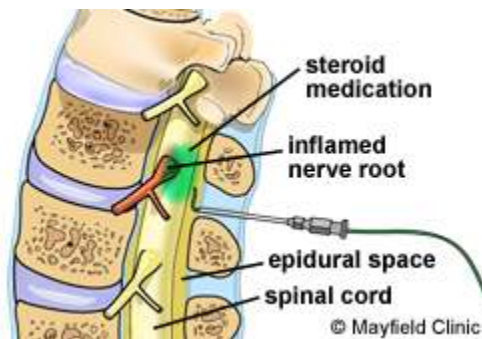
Patients can remain awake for the entire process. Sedatives can be given to help lessen anxiety. This is usual only done for nerve blocks. Patients lay face down on the table. The injection site is prepped and draped. The patient receives a local anesthetic which will numb the skin before the injection is given. If IV sedation is used, blood pressure, heart rate, O2 sat and respirations are monitored during the procedure according to hospital policy.

### **Step 2: insert the needle**

With the aid of a fluoroscope (a special X-ray), the doctor directs a hollow needle through the skin and between the bony vertebrae into the epidural space. Fluoroscopy allows the doctor to watch the needle in real-time on the fluoroscope monitor, thus ensuring that the steroid medication is delivered as close to the inflamed nerve root as possible. Some discomfort may occur but patients typically feel more pressure than pain.

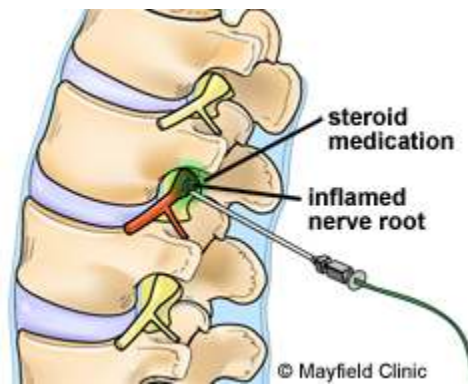
There are three ways to deliver epidural steroid injections: translaminar, transforaminal, or caudal approaches. The best method depends on the location and source of pain.

- **Translaminar ESI.** The needle is placed between the lamina of two vertebrae directly from the middle of the back. Also called interlaminar, this method accesses the large epidural space overlying the spinal cord. Medication is delivered to the nerve roots on both the right and left sides of the inflamed area at the same time (Fig. 2).



**Figure 2. Translaminar injection (cross-section view of vertebral column) shows the needle inserted into the epidural space behind the spinal cord to deliver steroid medication to the inflamed nerve root.**

- **Transforaminal ESI.** The needle is placed to the side of the vertebra in the neural foramen, just above the opening for the nerve root and outside the epidural space. Use of a contrast dye helps to confirm where the medication will flow when injected. This method treats one side at a time. It is preferred for patients who have undergone a previous spine surgery because it avoids any residual scars, bone grafts, metal rods, and screws (Fig. 3).



**Figure 3. Transforaminal injection (side view of vertebral column) shows the needle placed in the neural foramen to deliver steroid medication to the inflamed nerve root.**

- **Caudal ESI.** Similar to the epidural, the caudal epidural injection is performed very low in the spine at a location called the sacral hiatus. The needle is placed in a small opening in the bottom of the sacral bone located just above the tail bone between the butt cheeks. This is also an alternative approach for patients that are unable to hold their anticoagulants. (Fig.4)



**Figure 4. Caudal injection shows the needle placement to deliver steroid medication**

- **Step 3: inject the medication**  
When the needle is in place, the local anesthetic and steroid medication are delivered to the epidural space. The needle is then removed.

### **What happens after treatment?**

Most patients can walk around immediately after the procedure. After being monitored for 15 minutes while discharge instructions are given, the patient may then leave the suite via wheelchair. Someone must drive them home.

Typically patients resume full activities on the third day following the procedure. Soreness around the injection site may be relieved by alternating ice and heat as well as taking a mild analgesic. Patients are provided with complete discharge instructions that include potential complications or side effects.

Our office follows up with the patient via telephone 7 to 10 days after the procedure to ask about remaining symptoms and the level of pain relief obtained. We also check for possible complications. Remind patients to record their levels of pain during the next couple of weeks and to note even minor improvement. Any improvement is a positive sign that the injections may help. For patients whose pain is greatly improved, further procedures may be unnecessary. For patients whose pain relief is minimal or none at all, the next steps in their care are to discuss repeat injections with their referring physicians.

### **What are the results?**

Many patients experience some pain relief benefits from ESI. For those who experience only mild pain relief, one to two more injections may be performed, usually in 2-week intervals, to achieve full effect. Typically patients may receive 3 injections in a 6 month time frame. The benefits and duration of pain relief varies, lasting for weeks or years. More importantly, timing of injections should coincide with the start of a physical therapy and/or home exercise program to strengthen their back muscles and prevent future pain episodes. Unfortunately some patients do not get adequate pain relief with the injections and require surgery.

### **What are the risks?**

With few risks, ESI is considered an appropriate non-surgical treatment for some patients. The potential risks associated with inserting the needle include spinal headache from a dural puncture, bleeding, infection, allergic reaction, and nerve damage / paralysis (rare). Corticosteroid side effects may cause water retention, flushing (hot flashes), mood swings, insomnia, and elevated blood sugar levels. Any numbness or mild muscle weakness usually resolves within 8 hours in the affected arm or leg (similar to the facial numbness experienced after dental work). Patients are advised to seek medical assistance or call 9-1-1 if they have any severe complications at home.

### **Sources & links**

#### **Links**

[www.spine-health.com](http://www.spine-health.com)  
[www.spineuniverse.com](http://www.spineuniverse.com)

#### **Sources**

1. Weinstein SM, Herring SA: NASS. Lumbar epidural steroid injections. Spine J 3(3 Suppl):37S-44S, 2003.
2. Lutz GE, VAd VB, Wisneski RJ: Fluoroscopic transforaminal lumbar epidural steroids: an outcome study. Arch Phys Med Rehabil 79:1362-1366, 1998.