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 due to 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 nerves and bony vertebrae. 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?
A steroid injection includes both a corticosteroid (e.g., triamcinolone, methylprednisolone, dexamethasone) and an anesthetic numbing agent (e.g., lidocaine or bupivacaine). The drugs are delivered into the epidural space of the spine, which is the area between the protective covering (dura) of the spinal nerves and the bony vertebrae (Fig. 1).

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 by flushing away the proteins that cause swelling. The pain relief can last from days to years, allowing your spinal condition to improve with physical therapy and an exercise program.

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
- Spondylolisthesis
- Herniated disc
- Degenerative disc
- Sciatica

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 or have bleeding problems. The injection may slightly elevate blood sugar levels in patients with diabetes. It may also temporarily elevate blood pressure and eye pressure for patients with glaucoma. You should discuss this with your physician.

If you think you may be pregnant or are trying to get pregnant, please tell the doctor. Fluoroscopy x-rays used during the procedure may be harmful to the baby.

Who performs the procedure?
Physicians who administer epidural steroid injections include physiatrists (PM&R), radiologists, anesthesiologists, neurologists, and surgeons.

What happens before treatment?
The doctor who will perform the procedure reviews your medical history and previous imaging studies to plan the best approach for the injections. Be prepared to ask questions at this appointment.

Patients who take aspirin or a blood thinning medication may need to stop taking it several days before the procedure. Discuss any medications with your doctors, including the one who prescribed the medication and the doctor who will perform the injection.
The procedure is usually performed in an outpatient special procedure suite that has access to fluoroscopy. Make arrangements to have someone drive you to and from the office or outpatient center the day of the injection.

**What happens during treatment?**
At the time of the procedure, you will be asked to sign consent forms, list medications you are presently taking, and if you have any allergies to medication. The procedure may last 15-45 minutes, followed by a recovery period.

The goal is to inject the medication as close to the pain site as possible, using either transforaminal or interlaminar 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.

**Step 1: prepare the patient**
The patient lies face down on an x-ray table. Local anesthetic is used to numb the treatment area. The patient experiences minimal discomfort throughout the procedure. The patient remains awake and aware during the procedure to provide feedback to the physician. A low dose sedative, such as Valium or Versed, is usually the only medication given for this procedure.

**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, ensuring that the steroid medication is delivered as close to the inflamed nerve root as possible. Some discomfort occurs but patients typically feel more pressure than pain.

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

- **Transforaminal ESI (from the side).** 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 (Fig. 2). 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.

- **Interlaminar ESI (from the back).** The needle is placed between the lamina of two vertebrae directly from the middle of the back (Fig. 3). 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.

**Step 3: inject the medication**
When the needle is in the correct position, the anesthetic and corticosteroid medications are injected into 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 a short time, you usually can leave the office or suite. Someone must drive you home.

Typically patients resume full activity the next day. Soreness around the injection site may be relieved by using ice and taking a mild analgesic (Tylenol).

You may want to record your levels of pain during the next couple of weeks in a diary. You may notice a slight increase in pain as the numbing medicine wears off and before the corticosteroid starts to take effect.
Patients should schedule a follow-up appointment with the referring or treating physician after the procedure to document the efficacy and address any concerns the patient may have for future treatments and expectations.

**What are the results?**
Many patients experience pain relief benefits from ESI [1,2]. For those who experience only mild pain relief, one to two more injections may be performed, usually in 1-4 week intervals, to achieve full effect. Duration of pain relief varies, lasting for weeks or years. Injections are done in conjunction with a physical therapy and/or home exercise program to strengthen the back muscles and prevent future pain episodes.

**What are the risks?**
With few risks, ESI is considered an appropriate nonsurgical 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 temporary weight gain, water retention, flushing (hot flashes), mood swings or insomnia, and elevated blood sugar levels in people with diabetes. 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 who are being treated for chronic conditions (e.g., heart disease, diabetes, rheumatoid arthritis, glaucoma, uncontrolled blood pressure) or those who cannot temporarily discontinue anti-clotting medications should consult their personal physician for a risk assessment.

**Sources & links**
If you have more questions, please contact Mayfield Brain & Spine at 800-325-7787 or 513-221-1100.

**Links**
http://www.spine-health.com
http://www.spineuniverse.com

**Sources**

**Glossary**
anesthetic: an agent that causes loss of sensation with or without the loss of consciousness.
chronic: a condition of slow progression that continues over a long period of time.
corticosteroid: a hormone produced by the adrenal gland or synthetically. Regulates salt and water balance and has an anti-inflammatory effect.
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.
edpidural space: the area between the membrane surrounding the spinal cord and the vertebral wall that is filled with fat and small blood vessels.
fluoroscopy: an imaging device that uses x-ray or other radiation to view structures in the body in real time, or “live.” Also called a C-arm.
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.
interlaminar: through the lamina.
sciatica: pain that courses along the sciatic nerve in the buttocks and down the legs. Usually caused by compression of the 5th lumbar or 1st sacral spinal nerves.
spinal stenosis: A narrowing of the spinal canal and nerve root canal can cause back and leg pain, especially when walking.
spondylolisthesis: 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.