

A brief note on epidural steroid injections.

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Abstract

Chronic low back pain (LBP) and neck pain are the leading causes of long-term disability worldwide. There are various causes that can lead to LBP, such as herniated discs, arthritis of the face, and pain in herniated discs. Epidural steroid injections have been used since 1952 to relieve the pain of these conditions. Epidural steroid injections, when indicated, are invaluable non-surgical treatments for low back pain that radiates to the lower extremities and, rarely, neck pain that radiates to the arms. Procedures include administration of steroids to the epidural space to treat the cause of the disc-induced pain. If successful, epidural steroid injections provide pain relief that allows recovery of function and / or return to the physiotherapy regimen.

Keywords: Low back pain, Steroid, Injections.

Anatomy and Physiology

The spinal cord and brain are covered with three protective layers called the meninges. The innermost layer is the pia mater, which is directly connected to the surface of the spinal cord by joints. The middle layer is known as the arachnoid. Finally, the dura mater is the outermost, and therefore hardest, protective layer of the spinal cord. It is separated from the vertebrae by the epidural space. The epidural space contains the dural sac, blood vessels, fat, connective tissue, and spinal nerves. The contents of the dural sac include the spinal cord (ending at L1/L2) and the cauda equina. The spinal dura mater is critical to the peripheral nervous system as it creates pathways (via dural sheaths) by surrounding exiting nerve roots from the spinal cord. The vertebral column also acts to protect the spinal cord. It consists of 33 bones (vertebrae), many of which are separated by an intervertebral disc. These include 7 cervical vertebrae, 12 thoracic vertebrae, 5 lumbar vertebrae, 5 sacral vertebrae (fusion), and 4 coccyx (fusion). Spinal nerve roots exit the spine through two lateral openings called intervertebral foramen formed between two adjacent vertebrae [1].

Indications

Epidural steroid injections treat inflammation of the spinal nerve roots and pain caused by inflammation. A particular type of pain, known as radiculopathy, causes radiation along the cutaneous nodes of the affected spinal nerves. Many conditions can irritate the spinal nerve roots, the most common of which is low back pain (back pain) that spreads to the buttocks or legs (such as sciatica). A wide range of patients have neck pain that spreads to their arms [2-4].

Disc disease is the most common cause of inflammation of the spinal nerve roots. In a herniated disc, the central part of the disc (the nucleus pulposus) pushes the outer layer (the annulus

fibrosus), exerting pressure and "pinching" the adjacent spinal nerve roots. This pressure causes pain, weakness, and / or numbness in the distribution of inflamed nerves. Similarly, in degenerative disc disease, as the disc collapses over time, the disc cavity may collapse and the spinal nerve roots may be compressed. Another common indication for epidural steroid injections is inflammation of the nerve roots due to spinal canal stenosis. Spinal stenosis is a condition causing narrowing (stenosis) of the spinal canal or the canals of exiting nerve roots. Spinal stenosis is most commonly caused by arthritis of the vertebral joints (facets) or intervertebral disc pathology as discussed above [3].

Other conditions in which epidural steroid injections may be indicated are:

- Non-specific radiculitis.
- Vertebral bone spurs impinging spinal nerve roots.
- Thickening of ligamentum flavum.
- Postlaminectomy syndrome.
- Facet or nerve root cyst with radicular pain.
- Post-herpetic or post-traumatic (including intercostal) neuralgia.
- Compression fracture with radicular pain.
- Spondylolysis
- Spondylolisthesis
- Scoliosis causing nerve root irritation.

One of the published systematic reviews evaluated 70 studies on lumbar epidural steroid injections. Evidence of efficacy was good for lumbar disc hernias, moderate for spinal canal stenosis, and inadequate for failback surgical syndrome.

Another meta-analysis published showed good efficacy for use of epidural steroid injections for spinal stenosis and lumbar radiculopathy. The evidence for the effectiveness of epidural steroid injections is strong, but the duration of analgesia is not yet long and patients require other forms of treatment for sustained analgesia [4].

Contraindications

- Absolute contraindications to epidural steroid injection include:
- Systemic infection or local infection at the site of injection.
- Bleeding diathesis or full anticoagulation.
- Significant allergic reaction/hypersensitivity to contrast, anaesthetic, or corticosteroid.
- Local malignancy
- Patient refusal

Relative contraindications to epidural steroid injections

- Uncontrolled diabetes mellitus
- Congestive heart failure
- Pregnancy (due to fluoroscopy)
- Equipment

Epidural steroid injections require

- Fluoroscopic C-arm x-ray device
- Epidural spinal needles
- Local anaesthetics (lidocaine or bupivacaine)
- Steroids (methylprednisolone acetate, triamcinolone acetate, betamethasone acetate, and phosphate or dexamethasone phosphate)
- Loss of resistance syringe
- Contrast solution
- Sterile gloves and drapes
- Betadine

Epidural steroid injections can only be completed under local anesthesia or intravenous (IV) sedation. In both cases, a sphygmomanometer, heart monitor, and pulse oximeter are required to monitor vital signs.

Personnel

Staffs include doctors, nurses or assistants trained in epidural steroid injections, fluoroscopic calm operators, and anesthesiologists who monitor the patient's vital signs. All staff should be trained to deal with potential complications of the procedure [5].

Preparation

The risks and benefits of the procedure must be discussed with the patient, and if agreed, the patient must sign a written consent form. A time-out is required before the injection to

confirm the patient's identity and injection site. The patient should be prone on the fluoroscopy table, and once the injection site is identified, the area should be marked, washed with betadine, and covered with a sterile drape [2-4].

Complications

- Although rare, possible complications include:
- Bleeding
- Infection
- Allergic reaction
- Nerve injury
- Transient lower or upper extremity numbness and/or tingling.
- Dural puncture causing positional headache.
- Epidural abscess
- Epidural hematoma
- Transient back or lower extremity pain.
- Side effects of steroids (transient flushing/hot flashes, fluid retention, weight gain, elevated blood sugars, and mood swings)
- Adrenal suppression
- Paralysis (very rare)

Clinical Significance

When performed by an experienced physician, epidural steroid injections are a safe and comprehensive treatment for back, leg, neck and arm pain caused by multiple medical conditions. Epidural steroid injections are not necessarily aimed at treating back and neck pain, but provide temporary relief so that the patient can return to normal activity or continue physiotherapy. Pain relief with epidural steroid injections varies from a week to a year, and patients may need a single or series of injections for maximum relief [5].

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