



Spine epidural and sacroiliac joints injections – when and how to perform



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ABSTRACT

Objectives: To review the state-of-the-art of image – guided techniques used to treat painful syndromes of the lower back, their indications, how they should be performed, their related risks and the expected results.

Methods: We describe the actual standards about image-guided infiltrative therapies both on spine and on sacroiliac joints.

Results: Both spinal epidural and sacroiliac injections appear useful in a large percentage of treated patients to get control of the perceived pain. Performing these therapies under CT or fluoroscopic guidance is the best and safest way to obtain satisfactory results because it is possible to target the use of drugs directly to the involved painful structures.

Conclusions: Image-guided injections of the epidural space and of the sacroiliac joints are effective techniques for the treatment of pain; their effectiveness is sometimes not lasting for long periods of time but considering the low associated risk when performed by trained personnel, they can be easily repeated.

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1. Introduction

This paper aims to review the available image-guided techniques used to treat low back pain, (should it be caused by discopathy, diffuse arthrosic degeneration of spine, painful sacroiliac dysfunction, or after unsuccessful spinal surgery for disk herniation (FBSS)). The rationale for these interventions is simple: injecting local anesthetics and corticosteroids close to the nerve roots involved in the transmission of pain caused by a herniated disc/other degenerative spine changes (or in the joint cavity of an inflamed joint), can allow to achieve significant reduction of the perceived pain, acting both on its inflammatory and irritative components.

2. Materials and methods

Every treatment was administered under CT guidance using a single slice CT scanner (Somatom Plus 4; Siemens Siemens[®])

Abbreviations: FBSS, failed back surgery syndrome; CT, computed tomography; MR, magnetic resonance; MRI, magnetic resonance imaging; SIJ, sacroiliac joint; SI, sacroiliac; RF, radiofrequency; LS, lumbosacral.

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Medical Systems, Erlangen, Germany). Transverse scans (3 mm thick) were used to choose the needle path and to calculate the entry point. Before proceeding to the injection, the patients received a pre-medication with intravenously administered 1 g of sonic cefuroxime (Curoxim[®]; GlaxoSmithKline SpA) and 50 mg of ranitidine (Ranidil[®]; Menarini, Florence, Italy). The injections were performed by using a 9 cm or 15 cm 22G spinal needle; the side of access was chosen on the basis of the main location of symptoms. When the epidural space (or the joint cavity, in case of SIJ injection) was reached, a mixture of steroids was injected (triamcinolone acetonide 40–80 mg) with local anesthetic (2–3 mL of Ropivacaine 2%) and O₂–O₃ gas mixture, achieved by using an ozone generator (OZO2 Futura; Alnitec, Cremona, Italy).

2.1. Epidural injections

2.1.1. Fields of application

Epidural steroid injections can be used to get relief from radicular or spinal pain, which might arise from discopathy, arthrosic degeneration of spine (compressing neural structures), and after unsuccessful spinal surgery for disk herniation (FBSS).

2.1.2. Indications and contraindications to treatment

There is indication to steroid epidural injections in patients with radiculopathy caused by discopathy or degenerative stenosis

of the spinal canal. They can be useful also in patients with back pain secondary to spondylosis with or without significant associated radiculopathy. Patients referring an axial pain not irradiating to a specific territory, myofascial pain, or neurogenic claudication and severe or worsening neurological deficit do respond less to treatment [1]. It is important also to evaluate if pain might be (even partially) caused by a facet syndrome, sacroiliac dysfunction or coxo-femoral pathology. It is always recommended viewing a recent CT or MR exam to exclude other eventual pathologies and to confirm the level(s) to treat. Contraindications include uncorrectable coagulopathies, thrombocytopenia, anti-coagulative therapies, local or systemic infections, known allergies to drugs to be administered. Furthermore, the steroid injection must be avoided or performed with caution in patients with diabetes, uncontrolled glaucoma, and immune deficits.

2.1.3. Techniques of treatment

2.1.3.1. Interlaminar injections. Interlaminar approach is a simple and safe way of approach to the epidural space; the metameric level to treat is chosen on the basis of an accurate clinical evaluation and of the symptoms referred [1,2]. At lumbar level, the injection can be performed under fluoroscopic or CT guidance.

2.1.3.1.1. Lumbar interlaminar injections

2.1.3.1.1.1. Fluoroscopic guidance. In frontal projection the access site is chosen on the median line and after anesthesia of the cutaneous, subcutaneous and muscular planes, the needle is advanced to the supraspinous ligament which is perceived by operator because of an increase in resistance. Once the interspinous ligament is reached the mandrel is removed and the needle is connected to a syringe (better in case of a loss of resistance syringe) containing saline. The needle is little by little advanced through the ligament and in this phase, the C arm is positioned in lateral view, to check the needle's depth. (Fig. 1)

Immediately after passing through the yellow ligament a loss of resistance is felt and, at that time, it is necessary to verify the position of the needle's tip, which must be extra-tecal and extra-vascular too: thus, in case of aspiration, neither liquor nor blood must be found in the syringe. After making sure of this, it is possible to proceed to the injection.

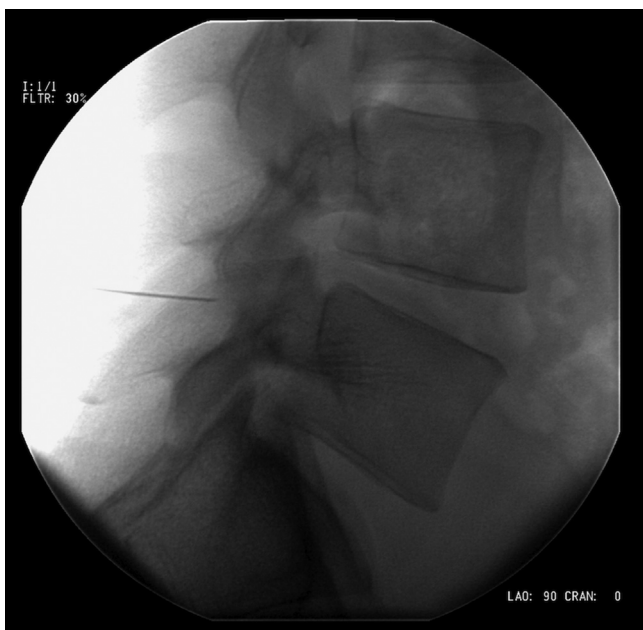


Fig. 1. Under fluoroscopic guidance (lateral view) a spinal needle is inserted obliquely through the interlaminar space of spinous process at L4 and L5 level.

2.1.3.1.1.2. CT guidance. The navigation of the spinal needle is made following the same theoretical principles. Before injecting drugs, it is possible to inject air or ozone, to demonstrate its diffusion in the epidural space [1]. (Fig. 2)

2.1.3.1.2. Thoracic interlaminar injections. For interventions performed at thoracic level, it will be necessary to keep the needle with more cranio-caudal tilt because of the different orientation of spinous processes [1].

2.1.3.1.3. Cervical interlaminar injections. At cervical level the procedure is more difficult and involves higher risks; thus, it should be performed only by expert operators and on well selected patients.

2.1.3.1.3.1. Fluoroscopic guidance. The technique under fluoroscopic guidance is similar to the one described above for lumbar injections, but when passing through the interspinous ligaments there are minor differences on resistance that can be felt by operator. That is the reason why it is considered fundamental the injection of contrast medium before administering drugs in the epidural space. The total volume of drugs injected must respect the upper limit of 4–8 mL and the injection must be immediately interrupted in case of pain or other disorders [1].

2.1.3.2. Transforaminal injections

2.1.3.2.1. Fluoroscopic guidance. Under fluoroscopic guidance (Fig. 3a and b), the patient is in prone position and the C arm is placed in lateral oblique projection to display as better as possible the “target foramen”. The needle is obliquated following the same angle of the C arm, trying to introduce it in the postero-superior aspect of the foramen to obtain a better diffusion of the injected drugs both at periradicular and epidural level, and also to reduce risk of radicular puncture.

2.1.3.2.2. CT guidance. A paravertebral access is executed with the patient in prone position. With CT guidance the nerve root is well displayed, and it will be easier to avoid its accidental puncture, which is anyway easily recognizable because of typical radicular pain [1–3].

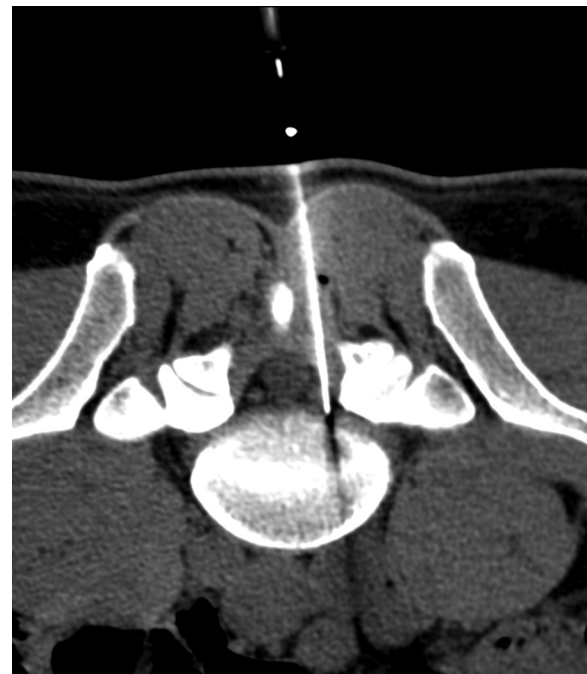


Fig. 2. CT scan. The image shows a spinal needle inserted through interlaminar access. The right spinal nerve root is medial to the needle tip.

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