ELSEVIER

European Journal of Radiology 55 (2005) 362–383

EJR
EUROPEAN JOURNAL OF RADIOLOGY

www.elsevier.com/locate/ejrad

Interventional spine procedures

A.D. Kelekis [a,*], T. Somon [b,1], H. Yilmaz [b,1], P. Bize [b,1], E.N. Brountzos [a], K. Lovblad [b,1], D. Ruefenacht [b,1], J.B. Martin [c,1]

[a] *Attikon University Hospital, 2nd Radiology Department, University of Athens, Rimini 1, 124 61 Athens, Greece*
[b] *Geneva University Hospital, Department of Radiology, Neuroradiology, 24, Rue Micheli-du-Crest, 1211 Geneva 14, Switzerland*
[c] *Clinique Générale Beaulieu 12 chemin Beau Soleil 1206 Geneva, Switzerland*

Received 3 March 2005; received in revised form 7 March 2005; accepted 10 March 2005

Abstract

Minimally invasive techniques for the treatment of some spinal diseases are percutaneous treatments, proposed before classic surgery. By using imaging guidance, one can significantly increase accuracy and decrease complication rates. This review report physiopathology and discusses indications, methods, complications and results of performing these techniques on the spine, including different level (cervical, thoracic, lumbar and sacroiliac) and different kind of treatments (nerve block, disc treatment and bone treatment). Finally the present article also reviews current literature on the controversial issues involved.

Keywords: Spine procedures; Interventional radiology; Infiltrations; Discography; Vertebroplasty; Bone biopsy; Neural blocks; Kyphoplasty

1. Introduction

Neck or lumbar pain due to radiculopathy, are a common problem, but quite costly to society. Effective management is a challenge. Most cases are successfully treated conservatively (analgesics or physical therapy), but in a small percentage of cases, surgery may also be performed.

Percutaneous treatment is a minimal conservative technique, proposed before surgery. By using imaging guidance, one can significantly increase accuracy and decrease complication rates [1–3]. This review report physiopathology and discusses indications, methods, complications and results of performing these techniques, including different level (cervical, thoracic, lumbar and sacroiliac) and different kind of treatments (nerve block, disc treatment and bone treatment).

In order to perform interventional procedures of the spine, the interventional radiologist should be aware of the following issues:

1.1. Legal aspect

Before the procedures, knowledge of the medical history, clinical and imaging data is necessary. The verification of normal blood coagulation is realized 1 or 2 days before procedure.

For all procedures, benefits and potential risks are discussed between the interventional radiologist and the referral doctor/or the patient. The procedure is explained to the patient by the interventional radiologist, with an information letter to the patient about the technique and the post-procedure care. Informed consent is obtained [4,5].

1.2. Aseptic technique (Fig. 1)

It is one of the most important points of these procedures. Rigorous skin disinfection is performed with alcohol and an iodine solution. The skin is draped. A sterile set is used including forceps, sterile gauze swabs, sterile gloves, surgical

* Corresponding author. Tel.: +30 210 58 31 800; fax: +30 210 72 58 550.
E-mail addresses: akelekis@cc.uoa.gr (A.D. Kelekis), jbmartin@beaulieu.ch (J.B. Martin).
[1] Tel.: +41 22 839 56 33; Fax: +41 22 372 70 72.

0720-048X/$ – see front matter © 2005 Elsevier Ireland Ltd. All rights reserved.
doi:10.1016/j.ejrad.2005.03.024

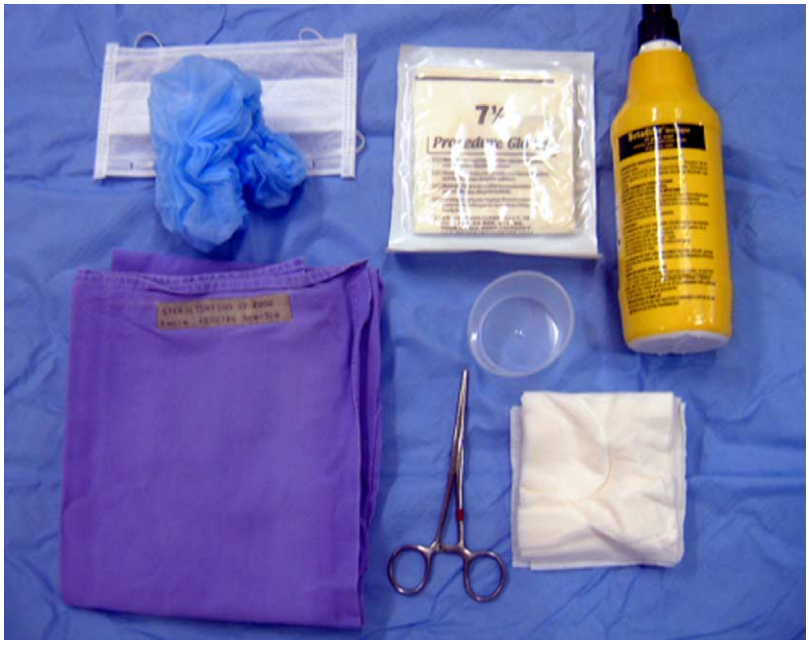

Fig. 1. Sterile set for use in percutaneous back treatments.

mask and gown [5]. Local infection at the injection site is contraindication.

1.3. Contraindication

The contraindications are [2]:

a. Coagulopathy.
b. Use of anticoagulant: it may be prudent to stop aspirin, Lovenox® and Plavix®, 7 days before injection, Coudamine® 5 days before injection.
c. Local infection at the injection site.
d. Pregnancy.
e. Allergy without antiallergenic treatment.
f. Motor deficit.
g. Medullar cone symptoms.

A corticosteroid injection cannot be performed if there is:

a. Uncontrolled diabetes
b. Cushing syndrome
c. Allergy (can be tested)

For a local anesthetic injection (with or without adrenaline):

a. Congestive heart failure.
b. Allergy (can be tested).

1.4. Medication (Fig. 2)

1.4.1. Local anesthetic

For cutanneous and tract local anesthesia [6,7] we commonly use Xylocaine® 1–2%, (Lidocaine Hydrochloride, AstraZeneca SA), because of its fast action and low toxicity.

For long-acting anesthesia Bupivacaine® (bupivacaine chlorhydrate anhydre, B. Braun medical SA) can be used, which has longer effect, but also a longer delay before acting. Bupivacaine® is more toxic than lidocaine, thus the patient must be observed in a short stay unit for 1–2 h.

The toxic effects of local anesthetics can be:

a. Allergy: allergic reaction happens immediately with hypotension, bronchospasm, edema and nausea.
b. Toxicity: There is a relationship between neuralgic toxicity and anesthetic blood concentration, starting with behavioral disorder and seizure (toxic dose: Xylocaine® 3.5 mg/kg - Bupivacaine® 1.5 mg/kg), followed by cardiac disorder with arrhythmia (toxic dose: Xylocaine® 7.5 mg/kg–Bupivacaine® 3.5 mg/kg). *Do not inject local anesthetic in a vessel*.

1.4.2. Corticosteroid

a. *Altim*® (Cortivazol, Aventis SA-1.5 ml/3.75 mg) is a long acting steroid (1–6 weeks). Can be used in: intra articular, peri-articular, epidural space.
b. *Celestone Chrondose*® (Betamethasone, Shering-Plough-1 ml/3 mg) is a long acting steroid. It can be used in: intra articular, peri-articular, epidural space.
c. *Medrol*® (Prednisolone, Aventis SA – 5 ml/125 mg) is also a long acting steroid. Can be administered in: intra articular, peri-articular, epidural space.

There is no data about the relation between the dose and the effect. Usually, if there is reduction of pain more significant than 50%, a second injection is performed 1 week later, and a third injection at one month with a maximum of five injections per years [3].