

A blunt needle (Epimed®) does not eliminate the risk of vascular penetration during transforaminal epidural injection

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Received: 06 August 13 Accepted: 22 August 13 Published: 29 October 13

This article may be cited as:

Ilkhchoui Y, Koshkin E. A blunt needle (Epimed®) does not eliminate the risk of vascular penetration during transforaminal epidural injection. *Surg Neurol Int* 2013;4:S404-6.

Available FREE in open access from: <http://www.surgicalneurologyint.com/text.asp?2013/4/6/404/120784>

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Abstract

Background: Transforaminal epidural injection of local anesthetics and corticosteroids is a common practice in patients with radicular pain. However, serious morbidity has also been reported, which can be attributed to an arterial or venous injection of the medication especially particulate glucocorticoid preparations. Using a blunt needle in contrast to sharp needle has been suggested to reduce this risk in a study on animals.

Case Description: We present a 59-year-old female with L5 lumbar radicular symptoms and left L5-S1 foraminal narrowing who underwent transforaminal epidural injection with fluoroscopic guidance using a 22-gauge blunt curved needle (Epimed®, Johnstown, NY). Intravascular needle placement was detected during real-time contrast injection under live fluoroscopy after a negative aspiration and local anesthetic test dose. The needle was slightly withdrawn and correct distribution of the contrast was confirmed along the target nerve root and into the epidural space.

Conclusion: This case report discusses vascular penetration utilizing an Epimed® blunt needle to perform transforaminal injections in a clinical setting. This topic was previously discussed in earlier animal studies. We also reemphasize that neither negative aspiration or local anesthetic test doses are reliable techniques to ensure the safety of transforaminal epidural injections.

Key Words: Blunt needle, fluoroscopy, intravascular penetration, radicular pain, transforaminal epidural injection

Access this article online

Website:

www.surgicalneurologyint.com

DOI:

10.4103/2152-7806.120784

Quick Response Code:



INTRODUCTION

Transforaminal epidural injection of anesthetics and corticosteroids is a common practice in patients with radicular pain and generally considered to be safe with a complication rate of 9.6% in the lumbar spine.^[3] Serious morbidity reported for intravascular injections include transient paraplegia, spinal cord infarction with myelopathy, subdural hematoma, cerebellar infarct, and death.^[1,6]

The incidence of inadvertent vascular injection ranges from 9% to 26% in fluoroscopically guided transforaminal epidural injections depending upon the level of injection.^[4] Complications of arterial or venous injections are typically attributed to the particulate matter present in glucocorticoid preparations.^[1] Using a blunt needle rather than a sharp needle has been suggested to reduce this risk.^[7] Although successfully utilized in animal studies, this case report uniquely describes the risk of

intravascular injection using a blunt needle (Epimed®) in a 59-year-old female who underwent an L5-S1 transforaminal epidural steroid injection (TFESI) under fluoroscopic guidance.

CASE REPORT

A 59-year-old female presented with chronic lumbar radiculopathy attributed to L5-S1 foraminal stenosis documented by magnetic resonance imaging (MRI) [Figure 1]. She underwent a TFESI at the L5-S1 level. Negative aspiration was confirmed, and a 0.5 ml of 1% lidocaine was administered as a test dose; there were no neurological changes. Next, a 22-gauge blunt curved Epimed® needle was slowly advanced into the foramen. Despite negative aspiration, the spread of contrast under live fluoroscopy was clearly consistent with an intravascular injection [Figure 2]. The needle was, therefore, slightly withdrawn and repositioned until contrast spread along the nerve root and epidural canal (epidurogram). There was neither vascular uptake nor intrathecal spread, and aspiration revealed neither blood nor cerebrospinal fluid [Figure 3]. Next, 80 mg of methylprednisolone acetate with 3 ml of lidocaine 0.5% was injected, and the needle was removed with a flash of 1% lidocaine. She tolerated the procedure well without apparent complications.

DISCUSSION

The number of epidural injections performed in the United States has increased dramatically during the past decade. These injections are generally considered to be safe with a reported incidence of minor complications in the lumbar spine of up to 9.6%.^[3,7]

However, inadvertent intravascular needle placement within the epidural space occurs commonly in cervical and lumbar transforaminal epidural injections (range 9-26%), with the incidence depending on the TFESI site.^[8,10] In the literature, at least four cases of spinal cord injury and paraplegia resulted from intraarterial injection into abnormally low-lying arteries of Adamkiewicz.^[6,9] Although greater risks follow intraarterial injections, intravenous injections should also be avoided as they fail to deliver adequate medication to the pathological site.^[10]

Several methods have been proposed in order to avoid intravascular injections; using a short bevel or blunt vs. sharp needle, aspiration with a syringe, utilizing an anesthetic test dose, and employing real-time fluoroscopy or digital subtraction angiography during contrast injection. Animal studies have demonstrated that blunt needles are less likely than sharp needles to enter blood vessels.^[8] Notably, sharp-bevel needles provide a steering advantage, and allow the use of a smaller gauge, while blunt-tip needles lack the steering ability, and are difficult



Figure 1: Sagittal T1 weighted image demonstrating L5-S1 foraminal stenosis (Arrow)

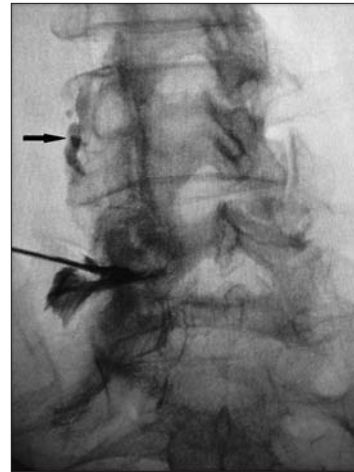


Figure 2: Intravascular flow pattern (arrow) detected by fluoroscopy

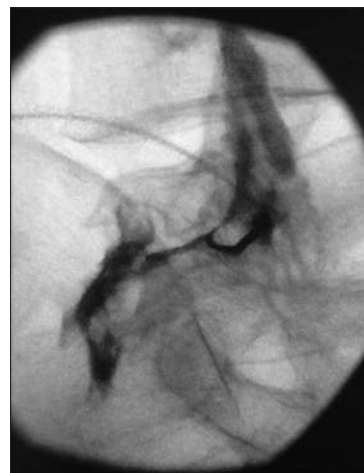


Figure 3: Appropriate distribution of contrast media along target nerve root and epidural space after needle was repositioned

to pass through the skin, ligaments, and other dense tissues.^[2,5] In the case presented, we utilized a blunt-tip needle specifically designed to deflect vascular structures

and minimize intravascular penetration. Its design characteristics included a 22-gauge blunt-tip needle with a tip diameter of 2.9 mm (defined as “Length from the tip to the beginning of the orifice”), orifice length of 1.2 mm, and a distance from orifice to the tip of 3 mm (Epimed®, Johnstown, NY).

This report focuses on the utilization of an Epimed® blunt tip needle to perform a TFESI in a single patient. Our case emphasizes that live fluoroscopy is critical for observing dynamic contrast flow while performing TFESIs, and is still a reasonable adjunct to detect intravascular injections even with newer blunt needles. Future randomized controlled clinical trials are needed to further study the safety/efficacy of such blunt tip needles for performing TFESI in the lumbar spine.

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