


# Sacral Bone Breach During Caudal Epidural Steroid Injection A Hazard of the Osteoporotic Sacrum

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## Introduction

Caudal epidural steroid injection (CDESI) is a commonly used neuraxial procedure for lumbosacral radicular pain and neurogenic claudication [1]. Although generally considered safe, incorrect needle placement remains a recognized complication. Intraosseous needle placement within the sacrum is rarely described and is not typically included among the conventional failure patterns of CDESI. In elderly patients with osteoporosis, reduced cortical thickness and decreased trabecular bone density may allow an 18-gauge Tuohy needle to penetrate the sacral cortex with minimal tactile feedback.

## Case Report

An 89-year-old woman with lumbar spinal stenosis with neurogenic claudication and chronic bilateral posterior hip pain presented for repeat CDESI. Her history was significant for osteoporosis, prior bilateral sacroplasty for sacral insufficiency fractures, lumbar degenerative disc disease, recurrent falls, CAD with prior NSTEMI, CKD, diabetes, hypertension, peripheral arterial disease, anemia, and hypothyroidism.

The sacral hiatus was identified fluoroscopically, and the skin was anesthetized with 2 mL of 1% lidocaine. A 9-cm 18-gauge Tuohy needle was advanced toward the caudal epidural space under fluoroscopy.

Position was assessed with 0.5 mL of iohexol under continuous fluoroscopy. Instead of the expected cephalad epidural spread, contrast remained focal at the needle tip and demonstrated a persistent stippled trabecular blush, consistent with intraosseous contrast deposition (Figure 1).

The needle was withdrawn, redirected, and repositioned. Repeat contrast injection demonstrated appropriate epidural spread in AP and lateral views. (Figure 2). The patient tolerated the procedure without neurologic deficit, hemodynamic instability, new sacral pain, or delayed complications.

## Fluoroscopy Imaging

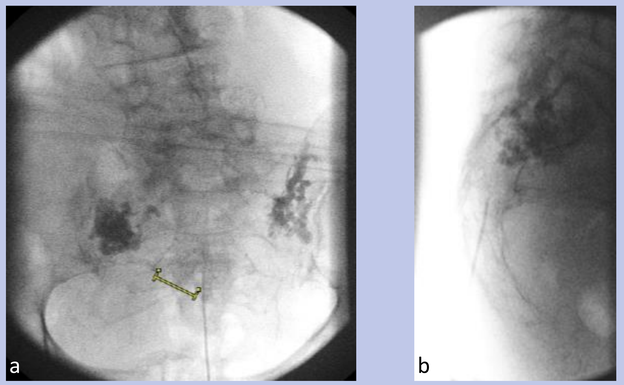



**Figure 1** : AP (a) and lateral views (b) at the time of interosseous access noted due to trabecular contrast spread.

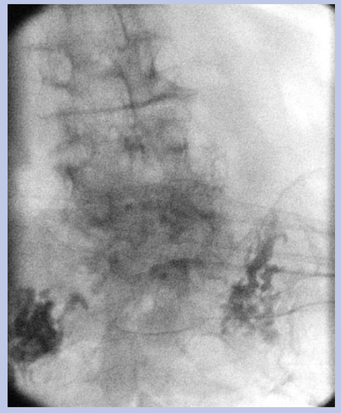


**Figure 2** : AP views after needle was withdrawn, redirected, and repositioned within the epidural space, with contrast confirming appropriate spread.

## Discussion

This case illustrates a mode of CDESI failure that may be underrecognized despite its plausibility in the older population that most commonly receives these injections. In this patient, intraosseous needle placement was not suspected based on tactile feedback or pre-contrast fluoroscopic imaging, as the needle appeared to be positioned appropriately within the sacral canal. The abnormal needle position became apparent only after contrast administration, when anteroposterior and lateral fluoroscopic images demonstrated focal trabecular contrast uptake rather than the expected epidural spread. This finding is particularly important because a focal trabecular blush could potentially be mistaken for an atypical epidural contrast pattern. Failure to recognize this finding could result in inadvertent injection of corticosteroid directly into cancellous bone, leading to treatment failure and systemic rather than epidural drug delivery.

This case also highlights a potential risk of continued needle advancement when intraosseous placement is not recognized. If the needle is advanced through the sacral cortex, deeper penetration could result in injury to adjacent sacral nerve roots, with the potential for persistent pain, neurologic impairment, or other complications.

An additional teaching point is the absence of expected patient feedback. Although the periosteum is richly innervated and intraosseous needle placement may be expected to produce significant pain, this patient reported minimal discomfort despite confirmed intraosseous positioning. Thus, the absence of procedural pain should not be used to reassure the operator that the needle remains within the epidural space. In osteoporotic patients, altered sacral anatomy and compromised bony integrity may permit unintended osseous penetration with little or no warning from patient discomfort. Contrast fluoroscopy therefore remains essential for confirming appropriate needle placement before therapeutic injection [3,4].

## Citations

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3. Caudal Epidurals: The Accuracy of Blind Needle Placement and the Value of a Confirmatory Epidurogram. Barham G, Hilton A. European Spine Journal : Official Publication of the European Spine Society, the European Spinal Deformity Society, and the European Section of the Cervical Spine Research Society. 2010;19(9):1479-83. doi:10.1007/s00586-010-1469-8.

4. Analysis of Caudal Epidurogram in Single Center: A Preliminary Study of Lumbar Radiculopathy Management. Koo BS, Kang WB, Park JW, et al. Medicine. 2018;97(41):e12810. doi:10.1097/MD.0000000000012810.