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Case Report
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Sonographic Guidance for Caudal Epidural Steroid Injection: A Diagnostic Tool

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Abstract

Ultrasound (US)-guided caudal epidural injection is a method of drug administration into the epidural space through the sacral hiatus for both chronic pain management and perioperative analgesia. Here, we describe the usefulness of US sacral examination performed before a caudal epidural injection procedure, in which the results revealed a sacrococcygeal ligament ossification prompting us to avoid its puncture by placing the Thouy needle in the appropriate direction. This prevented an unwanted calcification rupture with a possible drag of material into the sacral canal. US has already been used as a diagnostic tool in caudal epidural injection, mainly to detect the agenesis of sacral hiatus or to measure its diameter. Our case underlines the possibility of finding ossification and calcification using US, which can make the injection difficult or impossible and be a side effect if not recognised.
Keywords: Caudal epidural steroid injections, pain management, patient safety, sacral hiatus, sacrococcygeal ligament ossification, ultrasound

Introduction

Caudal epidural (CE) injection is a method of drug administration into the epidural space through the sacral hiatus. It has a lower risk of thecal sac puncture than the interlaminar approach. Thus, it is often preferred in those patients who have already undergone spinal surgery when epidural steroid injections are needed.[1]

The use of sonographic guidance to facilitate CE injection and improve patient safety and satisfaction has already been described.[2,3]

CE injection can be more difficult when anatomic variations of the sacral hiatus occur; thus, a careful ultrasound (US) examination of the region should be performed before proceeding to CE injection.[4]

Case Presentation

Here, we describe an example of the benefit of performing a pre-procedure ultrasound scan to detect anatomical anomalies of the sacral hiatus and the sacrococcygeal ligament. A 47-year-old woman with no relevant history suffered from sciatica for 3 months caused by an L5–S1 disc herniation and right S1 radiculopathy.

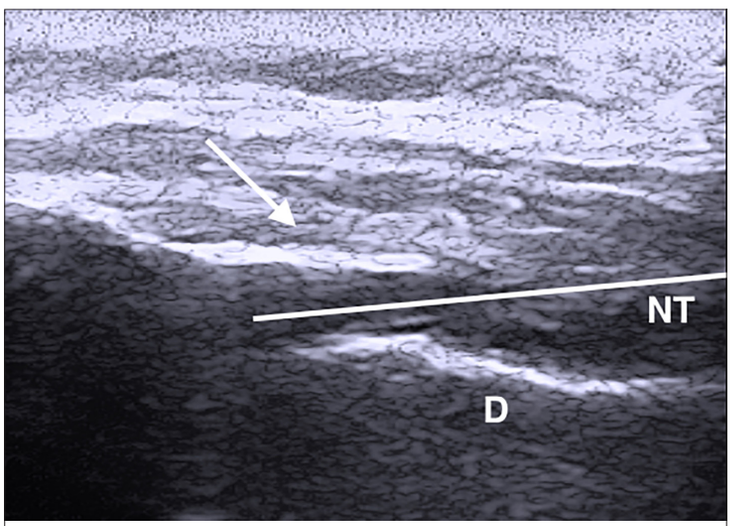

Figure 1. The picture shows a long-axis ultrasound view of the sacral canal. Dorsal surface of the sacral bone is marked by a 'D'. The partial sacrococcygeal ligament ossification (white arrow) and the steep angle needle trajectory (NT) used to perform the caudal epidural injection avoiding the calcification are noticeable

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We decided to perform CE injection with corticosteroid and local anaesthetic with sonographic guidance to access the sacral hiatus and fluoroscopy to confirm the contrast media spread in the required target as described in literature.[3,5]

When performing the US examination, we noticed a partial ossification of the sacrococcygeal ligament (SCL) in short and long axes (Figure 1).

We found that a portion of SCL was unaffected by ossification. Thus, we inserted the needle with a steep acute angle caudally to cephalad into the sacral epidural space with an in-plane technique (Figure 1). We confirmed the correct placement of the needle with an antero-posterior fluoroscopic image that also revealed the correct spread of the contrast media injected to the affected nerve root. The patient provided a written informed consent to the procedure and the publication.

Discussion

Without the use of US, adequate skills and sono-anatomic knowledge, most probably the SCL calcification would not be seen; there would have been the potential risk to break the calcification and drag unwanted material into the epidural space.

There are some studies about US use in the anatomical examination of sacral hiatus, mainly aimed to measure its diameter, width or agenesis. These findings can be compared with those of an X-ray of the sacral bone if needed. Furthermore, SCL ossification has been reported in 29% of patients, and it is a known risk factor for CE failure because it cannot be revealed by palpation.[4,6]

Our case supports the routine use of US guidance when performing CE injection. Thus, US should be considered useful not only in detecting the needle target but also as a diagnostic tool to detect anatomical abnormalities or diseases.

Main Points:

- Ultrasound sacral examination should be performed before caudal epidural injection to detect anatomical abnormalities.
- Sacroccoccygeal ligament calcification is a quite common cause of caudal epidural injection failure and cannot be revealed by palpation.
- Sonographic guidance is useful to perform caudal epidural injection as it show the best access point to the sacral jatus.
- The combination of ultrasound and fluoroscopic guidance is recommended in order to reduce failure and complication rates of caudal epidural injections.

Conclusion

We recommend the use of a combined ultrasound and fluoroscopy for imaging guidance to access the CE canal and to deliver the drugs injected in the appropriate location.

Informed Consent: Written informed consent was obtained from patient who participated in this case.

Peer-review: Externally peer-reviewed.

Conflict of Interest: The author have no conflicts of interest to declare.

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