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Removal of a trapped epidural catheter via CT-guided positioning and posture optimization: A case report

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Case Report

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Additional Declarations: No competing interests reported.

Abstract

Background

Continuous epidural analgesia is widely used for labor pain management. Trapped epidural catheter is a rare complication. Blind traction may stretch or break the catheter, complicating retrieval.

Case presentation:

A 25-year-old primigravida at 39^{+4} weeks requested epidural analgesia for severe labor pain. After uneventful vaginal delivery, the epidural catheter could not be removed despite multiple positioning attempts over 54 h. CT revealed the catheter forming a two-turn spiral around the right L2–3 facet joint without knotting. Under CT guidance, the patient was positioned seated with leftward trunk flexion to open the right facet joints, and the catheter was successfully removed intact. At 7-day follow-up, she had no residual neurological symptoms.

Conclusion

CT imaging is highly valuable for trapped epidural catheters, as it can identify the exact configuration and guide a patient-specific posture for safe, non-surgical removal. Early CT assessment after failed conventional measures may prevent catheter breakage and unnecessary invasive procedures.

Clinical trial registration

Clinical trial number: not applicable.

Background

Continuous epidural analgesia is the gold standard for labor pain, but catheter entrapment is a rare complication, with a reported incidence of 0.012% [1, 2]. Blind traction may stretch or break the catheter, complicating retrieval [3]. CT can delineate the catheter's course and its relation to adjacent structures, providing a rational basis for removal [4]. We present a case in which CT-guided posture optimization enabled safe, non-surgical removal of a trapped epidural catheter.

Case presentation

A 25-year-old primigravida at 39^{+4} weeks requested epidural analgesia for severe labor pain (visual analogue scale score of 8). She had no significant medical or surgical history; family history was unremarkable. Physical examination revealed stable vital signs (blood pressure 118/72 mmHg, heart

rate 78 bpm, temperature 36.7°C), normal spinal mobility, and intact lower-extremity motor and sensory function.

In the left lateral position, a midline L2–3 epidural puncture was performed with a combined spinal-epidural set; the catheter was threaded cephalad without difficulty and left at a skin depth of 12 cm. When withdrawing to 9 cm, it stuck. Aspiration was negative for blood or cerebrospinal fluid, and a lidocaine test dose was negative. A pump delivering 0.1% ropivacaine with sufentanil provided effective analgesia, and she delivered vaginally 9.5 h later.

Post-delivery, the catheter could not be removed in the left lateral position. Over 54 h, we attempted various flexion/extension positions, massage, and sitting — all failed. Sitting traction caused visible stretching and mild right lumbar soreness; the patient tolerated these maneuvers well. Because bedside maneuvers could not determine whether the catheter was knotted or simply coiled, CT was performed. CT revealed the catheter running obliquely upward along the right L2–3 facet, forming a two-turn spiral without knotting (Fig. 1A, B). We positioned the patient seated with the upper body flexed leftward to open the right facet joints. Under steady traction, the entire catheter was removed intact (Fig. 2). She was discharged that day. At 7-day follow-up, she had no residual pain, paresthesia, or motor deficits. The patient expressed relief at avoiding surgical exploration and was pleased with the non-surgical outcome.

Discussion and conclusions

Catheter-related complications include kinking, coiling, occlusion, knotting, and breakage [5]. Material properties affect breakage risk: nylon stretches 30% of its length, polyurethane up to 300% [5]. Management options include delayed removal, slow traction, positional changes, cold saline, or a convex frame; CT is recommended to identify the cause, with neurosurgical consultation if fragments remain [6–8]. CT was invaluable in our case — it ruled out knotting and precisely showed the spiral around the facet, allowing us to design a posture that widened the joint space and released the loop. Excessive depth (12 cm at skin, ~ 6–7 cm in the epidural space) likely contributed to coiling; 4–5 cm in the epidural space is recommended [9]. We advocate early CT when standard repositioning and gentle traction fail, as it can delineate the catheter's path and anatomy, potentially avoiding invasive exploration or guidewire assistance [10, 11].

Limitations

This is a single observational case, so findings cannot be generalized. CT entails radiation exposure, though clinically justified given the risk of breakage. This strategy also requires timely access to CT and radiology support, which may not be available in all obstetric units.

CT imaging is highly valuable for trapped epidural catheters, as it can identify the exact configuration and guide a patient-specific posture for safe, non-surgical removal. Early CT assessment after failed conventional measures may prevent catheter breakage and unnecessary invasive procedures.

Abbreviations

CT
Computed tomography

Declarations

Ethics approval and consent to participate

Not applicable.

Consent for publication

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Competing interests

The authors declare that they have no competing interests.

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Author Contribution

Q.L. and S.F. contributed equally to this work and share first authorship. Q.L. conceptualized and led the project, prepared Figures 1 and 2, finalized the manuscript, and reviewed and edited the draft. S.F. acquired images, curated data, performed formal analysis, wrote the original draft, and reviewed the manuscript. L.Z. participated in clinical management, and revised and critically reviewed the manuscript. Q.Z. performed the clinical removal of the trapped catheter, supervised overall clinical management, and reviewed and edited the manuscript. All authors read and approved the final manuscript.

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Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

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Figures

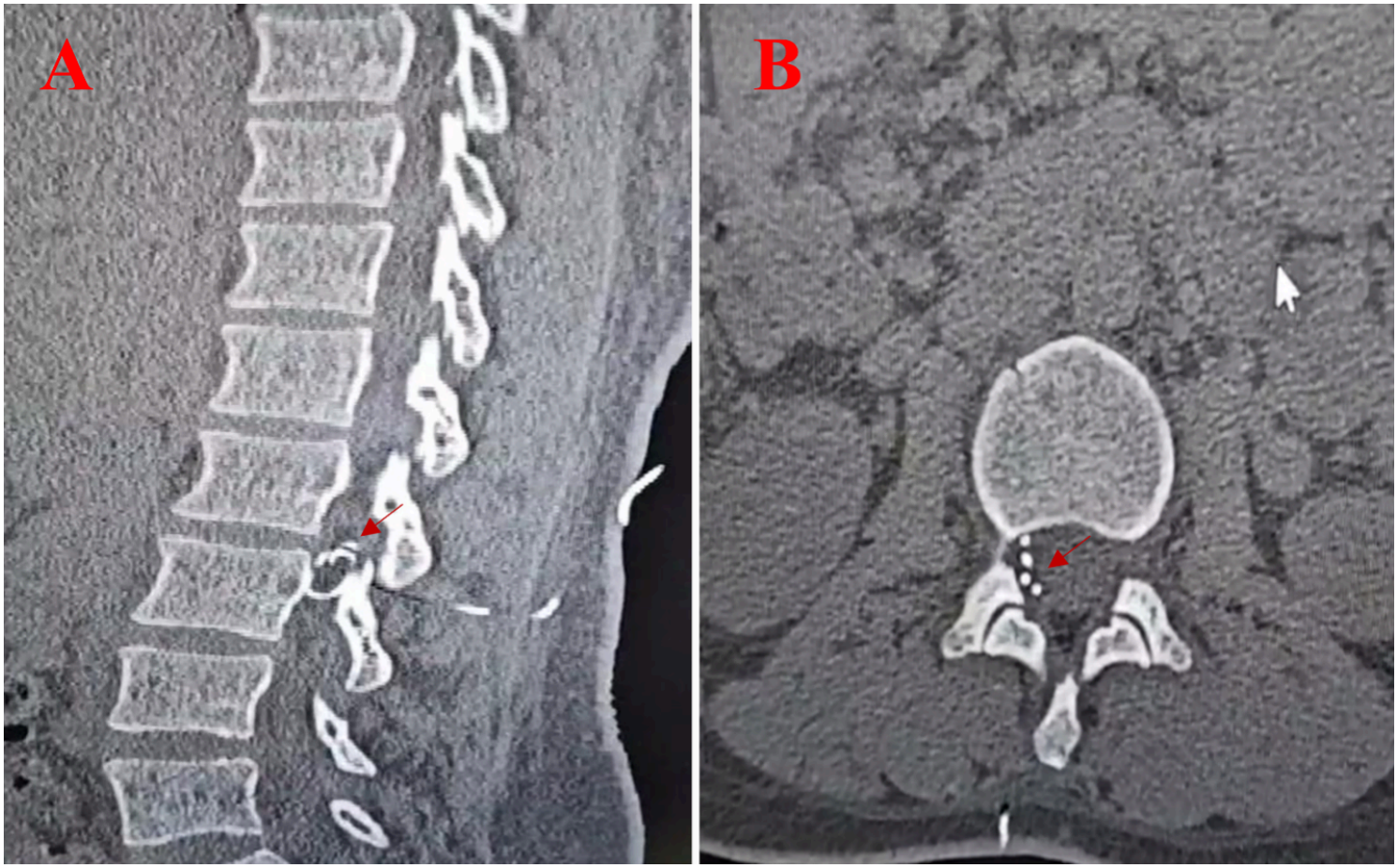


Figure 1

CT imaging of the trapped epidural catheter. (A) Axial CT image showing the catheter (red arrow) forming a spiral loop around the right L2–3 facet joint. (B) Sagittal reconstruction demonstrating the catheter's oblique upward course (red arrow) and its relation to the articular processes.

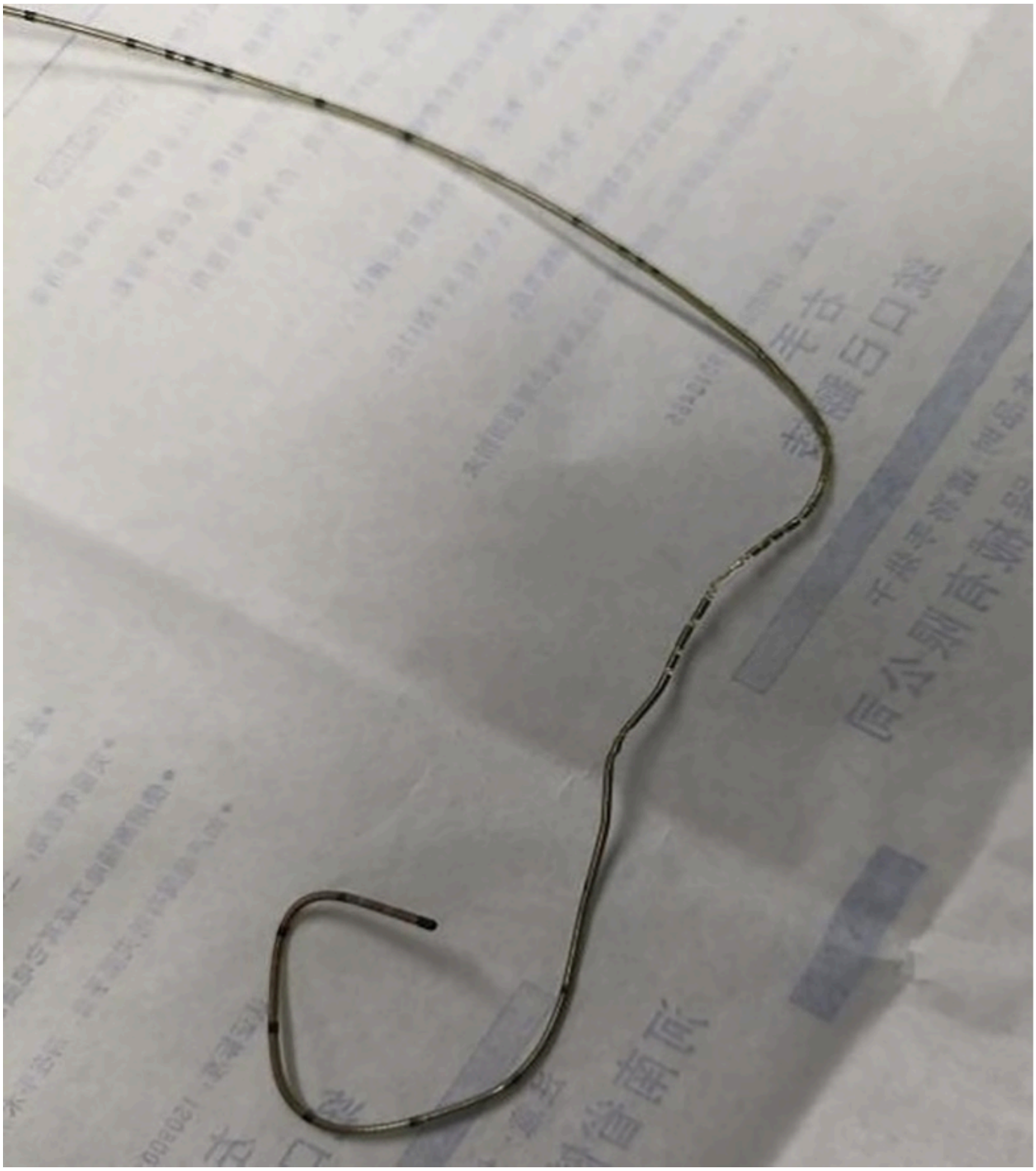


Figure 2

The intact catheter after successful removal. Photograph of the entire epidural catheter retrieved intact following posture-adjusted traction.