

# Under-recognized Cause of Intrathecal Catheter Malfunction

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## Introduction

Intrathecal baclofen (ITB) administration via a programmable implanted delivery system is a popular treatment for severe spasticity resulting from a wide range of the central nervous system diseases. The most common complications of ITB include drug adverse events, system-related malfunctions, human errors (refill, programming mistakes) and host events (infections, recurrent illness). **We present a case with unsuccessful response to ITB therapy despite following recommended guidelines for device troubleshooting.**

## Patient Description

- 57-year-old female, multiple sclerosis diagnosed 7 years previously
- Progressive severe pain and lower extremity spasticity
- Previous treatments: oral baclofen, tizanidine, cyproheptadine, and physical therapy
- Exam:
  - Large amplitude spasms in multiple muscle groups following any movement
  - Unable to ambulate and required assistance with transfers
  - Range of motion: bilateral knees between 70-90 degrees of flexion, hip abduction from 0-20 degrees, and hip flexion from 60-110 degrees
- Excellent response to trial of 50 mcg intrathecal baclofen
- Pump implanted with catheter tip to T6. Catheter access port (CAP) aspiration in the operating room confirmed cerebrospinal fluid.

## Catheter Troubleshooting

Profound hypertonicity and pain persisted 2 weeks following implantation.

- Not improved: removal of noxious stimuli, therapy, multiple pump dosing increases, and verification of reservoir content volume
- CAP access was successful, but the managing physician felt the flow was slow and sub-optimal
- *A contrasted catheter study on computed tomography showed no contrast within the intrathecal space (Figure 1)*

An intrathecal baclofen trial was repeated using a 100 mcg injection, again with significant improvement in Ashworth spasticity scores from 3/4 throughout lower extremities to 0/4 at four hours following injection.

- With continued urging from the managing physician, the patient was taken to the operating room where intra-operative fluoroscopy showed only cephalad flow of intrathecal contrast with no caudad distribution (Figure 2)
- The catheter tip was retracted about 1.5 inches in the operating room and a baclofen dose of 100 mcg per day was started (Figure 3)
- Patient immediately noted, and continues to have, significant improvement in spasticity and pain in addition to increased ability to participate in therapies at two-month follow-up.



Figure 1: Absence of contrast within intrathecal space

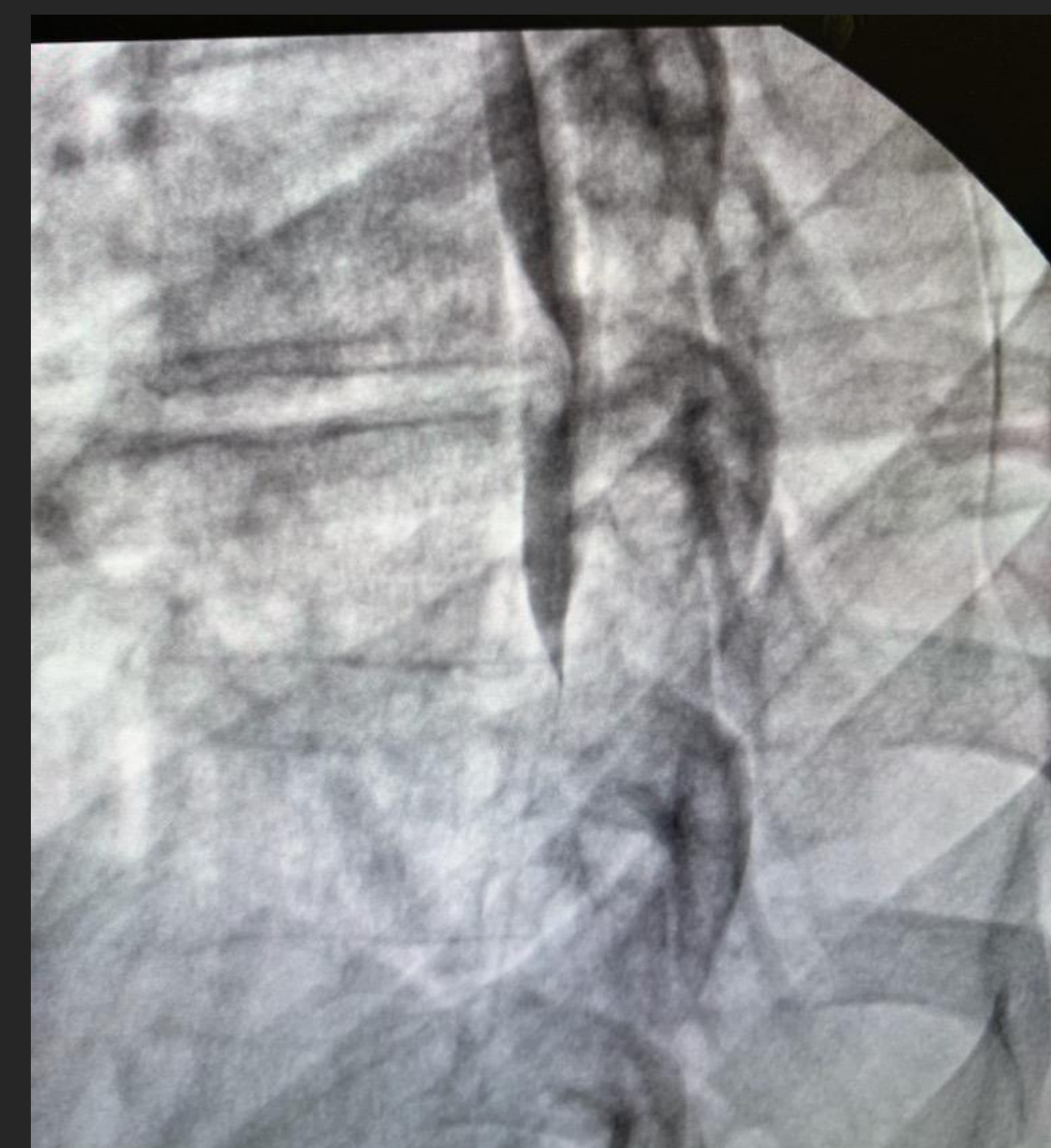


Figure 2: Intrathecal contrast flow with apparent blockage to caudad flow

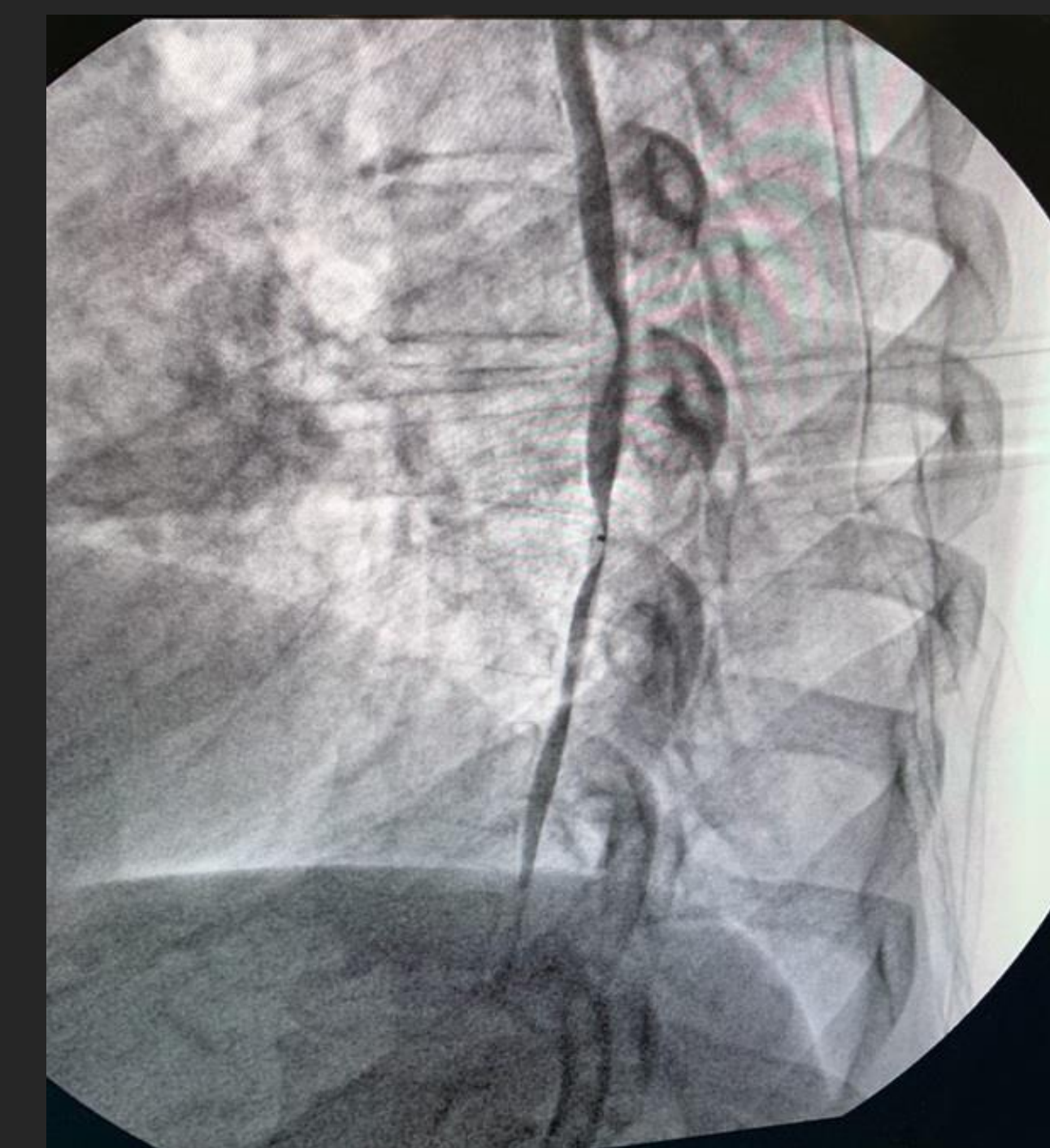


Figure 3: Intrathecal contrast pattern following repositioning

## Discussion

This case highlights the complexity of intrathecal anatomy and its relation to pump troubleshooting.

- ✓ This patient repeatedly experienced profound benefit with intrathecal baclofen trials but failed to have any appreciable improvement with dosage adjustments following catheter implantation.
- ✓ Troubleshooting guidelines were followed, and the intrathecal tip positioning was confirmed with aspiration of cerebrospinal fluid from the access port. In the presence of a clear response to trial doses but an absence of benefit from the implanted device, *consideration for impediments within the spinal canal became likely.*
- Possible etiologies include intra-canal leaflets, partial blockage of the six fenestrations within the catheter tip, catheter tip migration, poor CSF flow around the catheter tip, or unappreciated severe canal stenosis. These anatomical changes may not be seen on imaging.

## Conclusion

Further diagnostic evaluation prior to explantation, including fluoroscopic catheter studies and *trial of repositioning*, may be considered as an addition to traditional algorithmic troubleshooting to preserve successful ITB therapy

## References

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