



Intrathecal Pump: Low Rate Catheter Granuloma



Sheth S, DO, Endrizzi S, MD

Department of Anesthesiology

Medical College of Wisconsin, Milwaukee, WI

INTRODUCTION

Intrathecal targeted drug therapy is the administration of analgesic and/or anti-spasmodic medications directly into a patient’s spinal fluid for pain and spasticity control. With the use of intrathecal drug delivery system (“IDDS”), providers can use much lower doses of analgesics to improve pain control, while limiting the side effect burden associated with higher doses of systemic analgesics^[1].

However, there are several risks in using IDDS, such as complications associated with intrathecal catheter insertion, surgical pump implantation, device management, drug refills, and adverse effects of therapeutic drugs^[2].

MEDICAL AND PAIN HISTORY

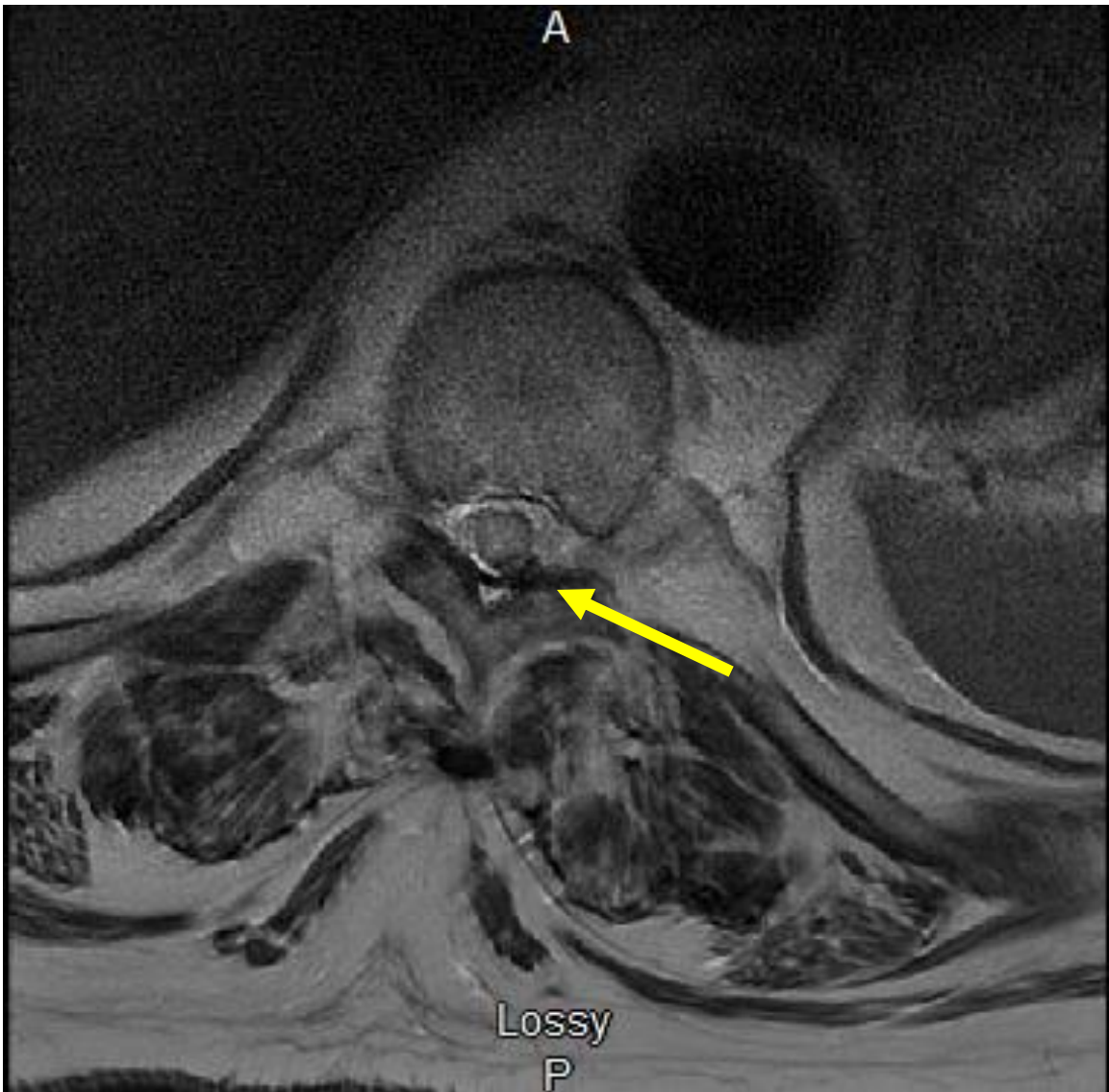
59 year-old male with past medical history:

- Degenerative disc disease
- Lumbosacral spondylosis status post multilevel lumbar laminectomy and fusion
- Chronic low back pain status post right intrathecal narcotic pump and spinal cord stimulator implant

The patient presented with low back, new acute left foot weakness and urinary incontinence developing three weeks after SCS implant. Patient complains of increased pain radiating from his hips down for the past one month, causing him to turn off his SCS.

MRI Thoracic Spine (03/28/2024)

A heterogeneous, intradural-extramedullary lesion found measuring ~ 4.5 cm craniocaudal and 1 cm axial along left dorsolateral aspect spinal cord at T9-T11



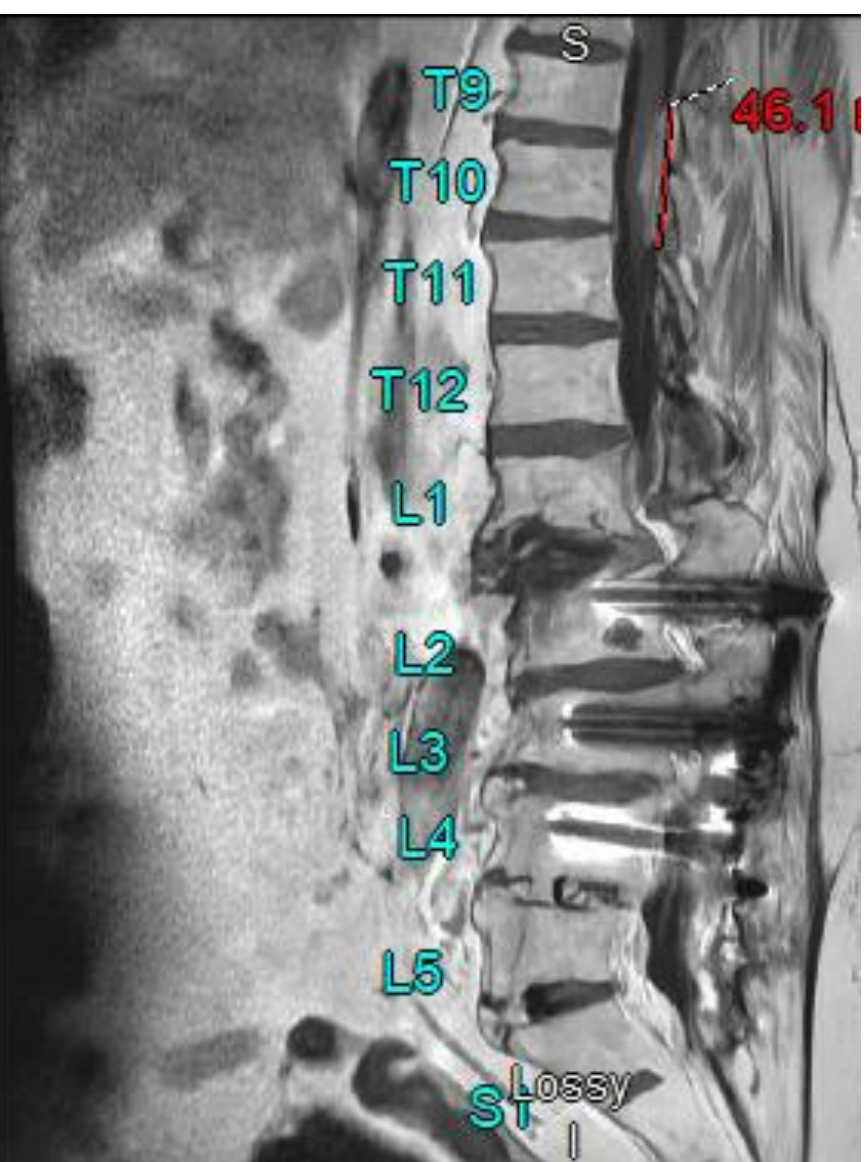
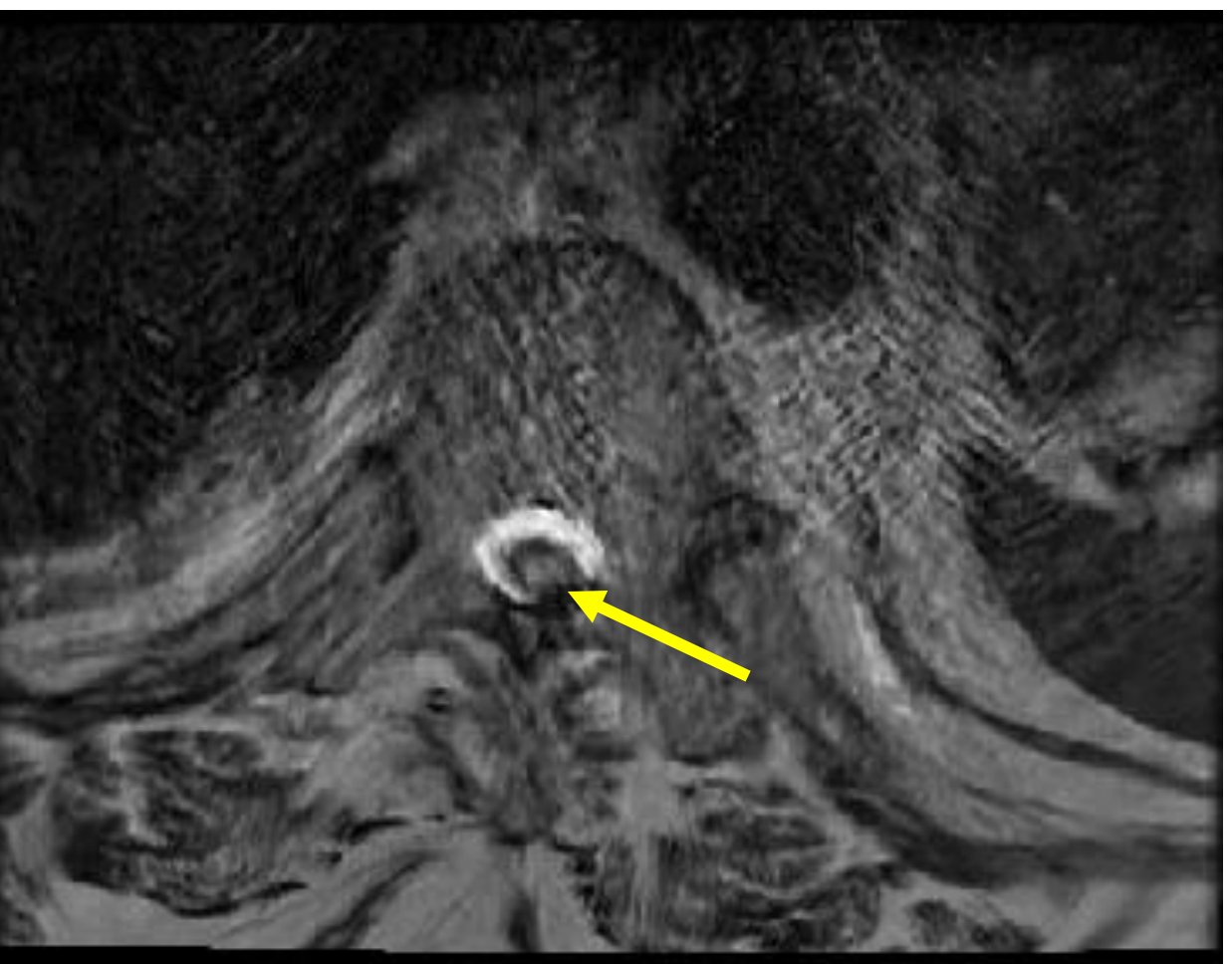
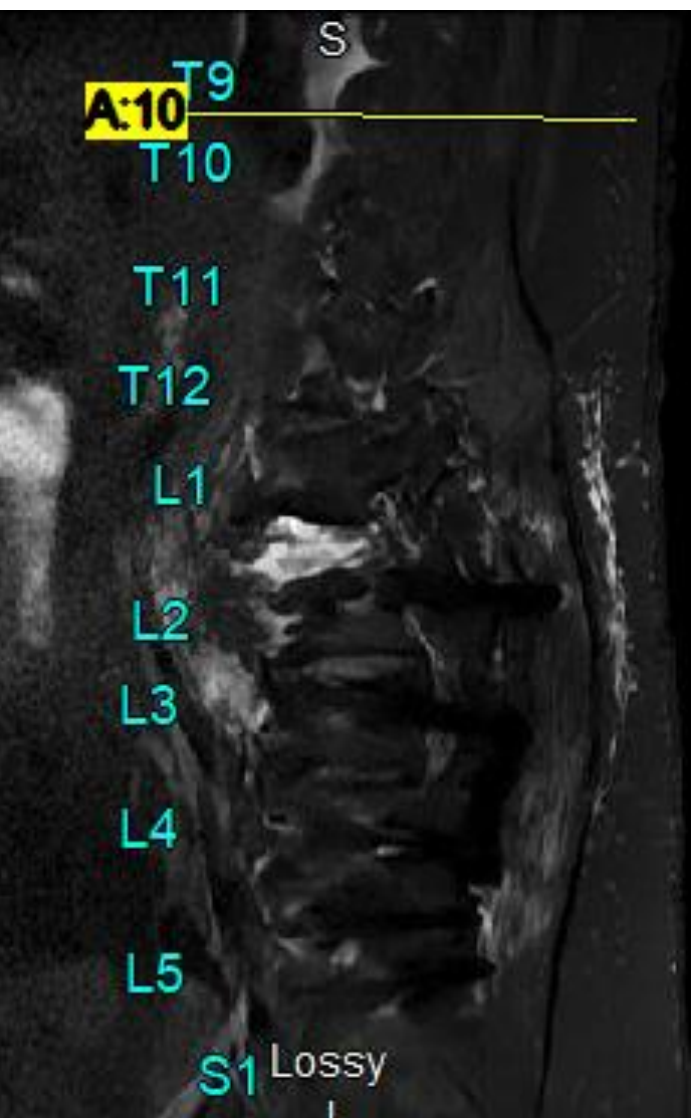
With concern for potential granuloma at catheter tip:

- Hydromorphone: 0.5568 mg/day decreased to 0.0183
- Bupivacaine: 2.227 mg/day decreased to 0.073 mg/day

Five days after, all meds removed from intrathecal pump & replace with saline.

MRI Thoracic Spine (04/18/2024)

Decreased thickness of intradural extramedullary lesion, measuring 5mm, previously 10mm. Cephalocaudal extent is roughly similar, measuring 41 mm.



IDDS Safety

- Drug mixtures and pump program prescriptions double-checked by clinicians
- Refill procedures done by expert clinicians
- 24/7 medical coverage for complications

IDDS Risks

- Catheter complications: migration, laceration, occlusion, disconnection
- Pump complications: rotor corrosion, electronic failure, low battery life
- MRI complications
- Human error: schedule mistakes, miscalculations of dead space, programming mistakes, incorrect refilling
- Procedure complications: bleeding, infection, CSF leak

DISCUSSION

The clinical impact of this case report highlights the cautions that must be taken when using an IDDS. Although granulation formation is a well-documented complication with high dose intrathecal pumps, it is not commonly seen with low medication rates^[3]. In addition to an in-depth conversation educating the patient on the risks and benefits of IDDS, it is paramount that the provider maintains continued vigilance on all aspects of this efficacious, yet potentially lethal, therapy.

REFERENCES

1. Wang, Josef K., Lee A. Nauss, and Juergen E. Thomas, *Pain Relief by Intrathecally Applied Morphine in Man*. Anesthesiology, 1979. 50(2): p. 149-151.
2. Staats, P.S., *Complications of Intrathecal Therapy*. Pain Medicine, 2008. 9(suppl 1): p. S102-S107.
3. Kratzsch T, Stienen MN, Reck T, Hildebrandt G, Hoederath P. Catheter-tip Granulomas Associated with Intrathecal Drug Delivery--A Two-Center Experience Identifying 13 Cases. Pain Physician. 2015;18(5):E831-E840.