

Introduction
Acute post-operative complications can occur after intrathecal drug delivery system (IDDS) implantation surgery. We present a patient with acute neurological status change after IDDS placement. We describe the workup that led to appropriate diagnosis and treatment.

Case
A 49-year-old male with stage 4 metastatic prostate cancer had intractable pain, poorly controlled with opioid therapy. He had an up-titration of systemic opioids due to increasing pain with limited response and opioid-related side effects. He presented to the emergency room complaining of loose stools 48 hours after an uneventful IDDS placement surgery for cancer pain management. He reported loose, foul-smelling, blood-tinged stools approximately every 3 hours, poor bladder control, frequent urge to urinate, worsening lower extremity weakness, and gait problems. Preprocedural CT imaging did not show any concerning findings or neuraxial metastasis. The IDDS was placed with a catheter tip at T8 for low lumbar pain, centered around the left buttock with radiation to the left leg. At the time of implantation, he also had pain in the right shoulder secondary to a metastatic process in the right scapular area. The patient was on 390 oral morphine equivalents (OME) at the time of implantation surgery, which was transitioned to intrathecal 0.8 mg/day morphine with 2.4 mg/day bupivacaine and 0.4 mcg/day ziconotide. The implantation surgery was completed under general anesthesia. At the time of presentation to the emergency room, he complained of bilateral mid-back pain radiating to the chest at the level of the nipple, burning leg pain bilaterally, and bilateral paresthesia of the dorsal/plantar aspects of the feet. This pain pattern was higher up the spine than the preoperative pain pattern; however, he reported adequate pain control.

Oncology, neurology, pain management, and neurosurgery teams promptly evaluated and admitted him to the hospital. Cauda equina from possible bleeding complications from implantation was high on the differential diagnoses, given the timing of symptoms to surgery. Infection and progression of metastatic prostate cancer were also considered. The intrathecal medications were reduced by 20% to prepare for the possible need for emergency surgery or extraction. Lumbar spine magnetic resonance imaging (MRI) with and without contrast was performed and did not reveal any acute findings that would explain the patient’s presentation. In addition, the standard laboratory workup was within normal limits.

More Than meets the eye: A Patient with Acute Neurological Status Change after Intrathecal Pump Implantation

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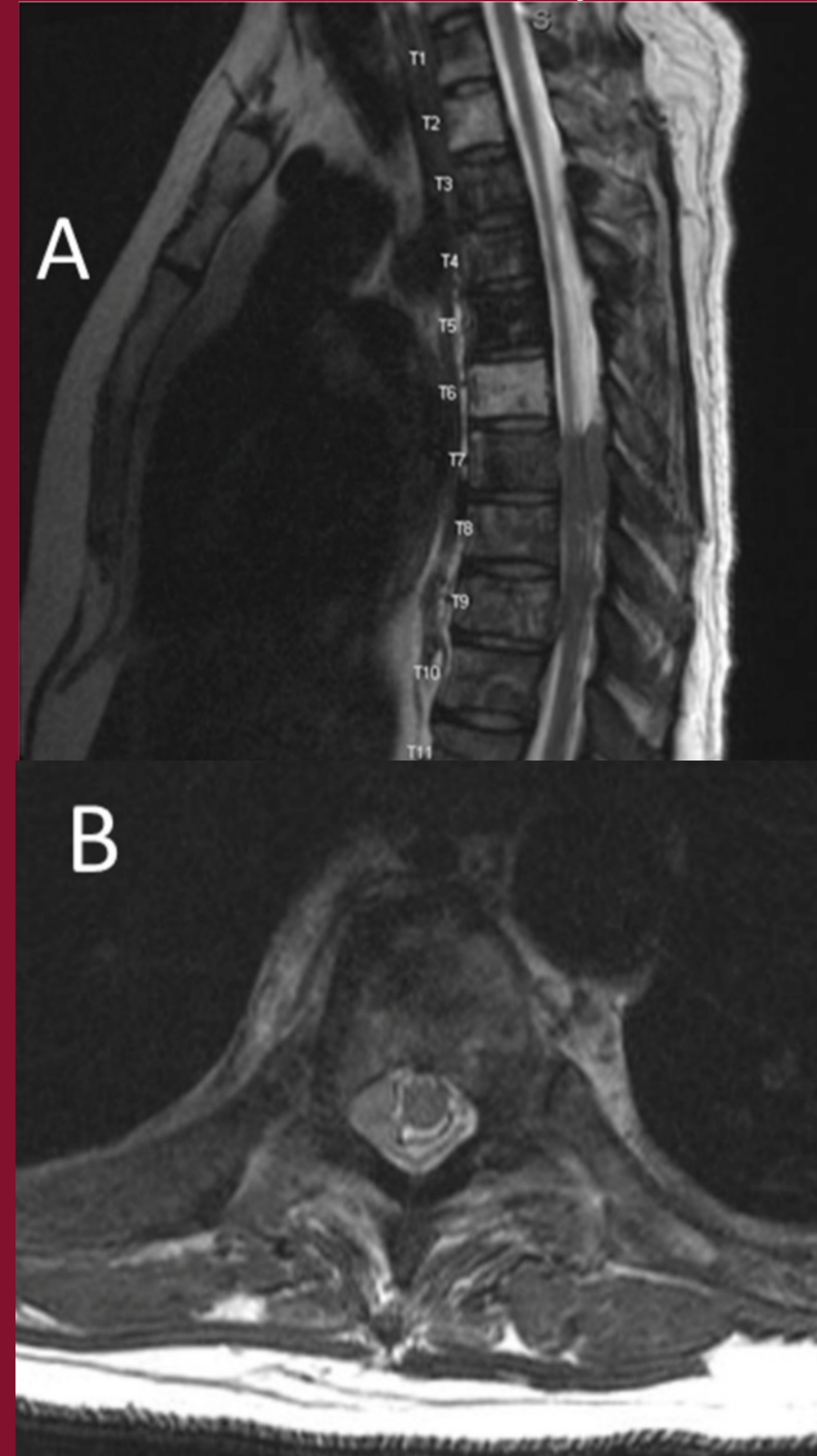


Figure 1: MR images of the thoracic spine (T2 weighted sagittal (panel A) and axial (panel B) views) showing a 3.9 x 0.8 cm mass in the posterior spinal canal at T6-T8 causing compression of the adjacent cord.

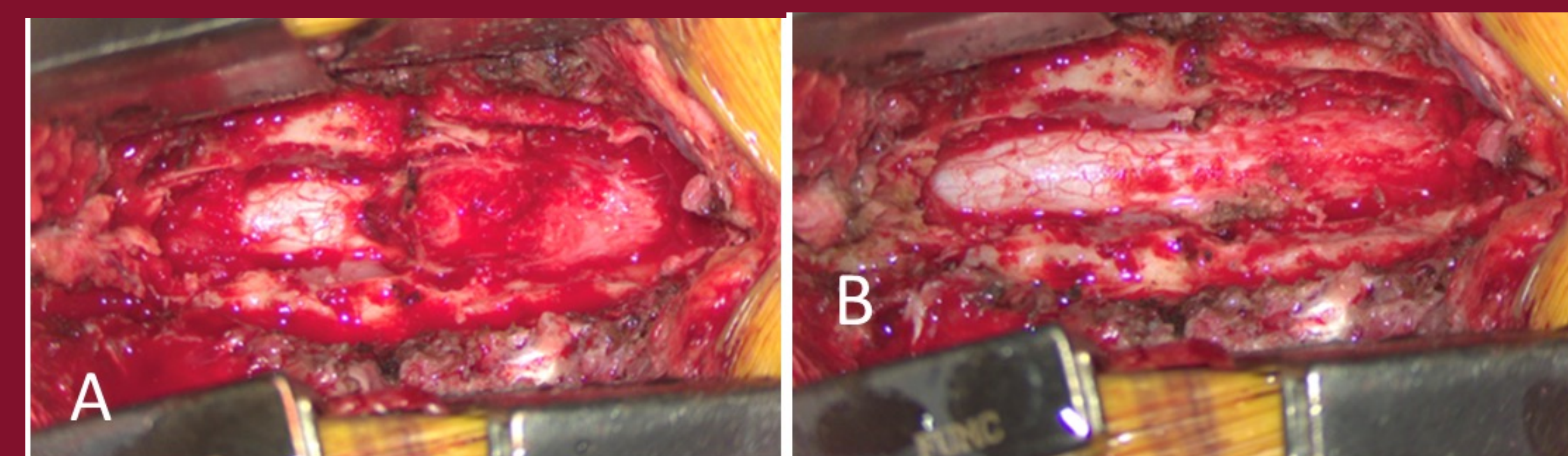


Figure 2: Intraoperative view of the thoracic mass during resection (panel A) and after resection (panel B)

Acute AE after IDDS implantation surgery	Time of presentation	Symptoms	Diagnosis
Catheter-related AE Migration and hemorrhage ²	Post-operative day 3	Headache, neck pain, photophobia, mild weakness/ numbness in each leg.	Head CT: subarachnoid hemorrhage Lumbar and cervical 3D CT: catheter fragment in the cervical spine
Migration ³	Post-operative day 14	Return of baseline preoperative pain 9/10 on the Numeric rating scale.	Fluoroscopy revealed catheter had migrated and formed loop around T10 nerve root.
Microfracture ⁴	Post-operative day 1	Insomnia, anxiety, severe tremors, bilateral lower extremity myalgias and arthralgia, nausea, non-bloody emesis, diarrhea, and sensation of being flushed. Opiate Withdrawal Scale score was 27 (moderately severe)	Symptoms improved with catheter replacement
Biologic causes Hemorrhage ²	Post-operative day 3	Headache, neck pain, photophobia, mild weakness/ numbness in each leg	Head CT: subarachnoid hemorrhage Lumbar and cervical 3D CT: catheter fragment in the cervical spine
Hemorrhage and spinal headache ⁵	Post-operative day 1	Positional headache with frontal nausea, Subdural hematoma attributed to severe CSF leak	None mentioned. Resolved with fluoroscopic guided epidural blood patch
Spinal headache ⁶	Post-operative day 2	Leakage of clear fluid from lumbar incision site, positional headache	Transient relief with fluoroscopy guided epidural blood patch. Resolution with epidural fibrin glue injection.

Subsequently, an MRI of the thoracic spine was performed. This was significant for a 3.9 cm x 0.8cm mass in the posterior spinal canal with T6-T8 cord compression (Figure 1), which would account for his clinical presentation. He subsequently underwent a T 6-8 laminectomy under general anesthesia with improved strength and control of his lower extremities (Figure 2). He recovered with radiation therapy and had good pain control with continued IDDS use. He was eventually discharged home with rehabilitation services.

Discussion: IDDS is a safe and effective modality for the treatment of cancer pain in carefully selected patients. It is prudent to rule out neuraxial metastasis before considering placement of IDDS for surgical planning of catheter placement, given the risk of tumor seeding. MR imaging may be more sensitive in detecting spinal cord metastasis. Acute change in clinical condition soon after implantation procedure is highly suggestive of a procedure or treatment-related complication. In the case outlined above, the patient presented with profound neurological status changes consistent with cauda equina syndrome within 48 hours after implantation.

IDDS therapy and procedure-related side effects are infrequent and have been described in the literature. A few of these can occur right after implantation surgery. These can be divided into catheter-related adverse events due to disruption or disconnection, pump-related adverse events, biological adverse events such as spinal headaches, hemorrhage, and medication-related adverse events. (Table 1) Acute adverse events after IDDS implantation are often related to catheter-related problems, the occurrence of spinal headaches, and due to bleeding complications. Most patients present with features consistent with cerebrospinal fluid leak and spinal headache. Only one published study reported lower extremity weakness in addition to spinal headache symptoms. Our patient presented with cauda equina syndrome and additional new pain in the lower thoracic dermatomes consistent with the tumor infiltration at T6-8 levels. Careful neurological exams and imaging studies are needed for accurate diagnosis and treatment.

Conclusion: Cord compression due to new metastasis can cause cauda equina syndrome after IDDS implant surgery. The role of CSF flow after IDDS therapy may play a role in presentation after surgery.

References: See electronic poster

