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A Case of Transverse Myelitis With an Intrathecal Pump: A Case Report

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Background: Intrathecal pumps (ITP) are an effective tool for patients with intractable pain. We report a rare case of transverse myelitis as a late complication of ITP placement.

Case Report: A 60-year-old female patient reported bilateral progressive lower extremity weakness and loss of sensation 1.5 years postimplant of an ITP. She became unable to ambulate and developed urinary incontinence. Magnetic resonance imaging found hyperintense signaling from T6 to mid-T9 level. Lumbar puncture showed an elevated white blood cell count with lymphocyte predominance. The patient was given high-dose corticosteroids and plasmapheresis without improvement in symptoms. Following this treatment, the ITP was removed without complications and was sent for culture. Culture was positive for Parvimonas micra and treated with intravenous ampicillin/sulbactam. The patient was transferred to a tertiary medical center for further treatment.

Conclusions: This case calls for early and prompt diagnosis and management of postimplant complications of an ITP.

Key words: Transverse myelitis, intrathecal pump, back pain, complication, case report

BACKGROUND

Traditionally, long-term chronic pain management has been treated with oral analgesics, usually with opioid medications (1). However, continuous use leads to greater tolerance and subsequently higher doses required to achieve adequate pain control. Higher doses are also associated with an increased risk of adverse events (AEs). Thus, the introduction of intrathecal delivery systems for opioids provides a benefit by requiring lower doses to achieve pain control without the limitations of increased AE associated with high-dose opioids (1).

An intrathecal pump (ITP) is a device surgically implanted directly under the skin to relieve intractable chronic pain. The programmed pump delivers targeted doses of medication directly into the intrathecal space. Administering medication directly to this area impedes the transmission of pain signals from the spinal cord to the brain and provides targeted relief with a smaller dose of medication. However, as with many invasive procedures, implanted drug delivery systems are not without risks. Risks include infection, local bleeding, dosing errors, cerebrospinal fluid (CSF) leaks, meningitis, pump failure, and the formation of hygromas and granulomas (2). Granulomas present in < 3% of patients with ITPs and the compression of the inflammatory mass against the spinal cord can result in various symptoms, including neurological deficits, radiculopathy, and myelopathy (3). Furthermore, infection related to pain pumps can also lead to neurological deficits by introducing inflammation and affecting the integrity of the spinal cord. Medication-related AEs must also be considered. The majority of these are dose-dependent and mediated by the opioid receptor (4).

Transverse myelitis (TM) is a rare complication that is not widely considered a late complication of ITP placement. However, prompt recognition is essential in pre-

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venting irreversible damage and further neurological deficits. We present a case of TM following a previously well-tolerated and efficacious ITP used for over a year and a half. The patient provided informed consent to be included in this case report. This case calls for early recognition and treatment of complications during the implant as well as postimplant management.

CASE PRESENTATION

A 60-year-old female patient with a known past medical history of diabetes, hypertension, L3-L5 posterior laminectomy, lumbar fusion, and ITP (March 2023) presented in November 2024 with complaints of progressive lower extremity weakness for the past 2-3 weeks. Aside from an infection around the implant site during the initial ITP implantation that resolved with antibiotics, her pain was well controlled with ketamine, procaine, ondansetron, and intrathecal hydromorphone. She experienced a fall while attempting to ambulate, prompting her hospital visit. She has been having chronic issues with back pain and lower extremity weakness for several years. However, she noticed a marked decline starting in October 2024, with decreased sensation and complete loss of strength in her left lower extremity, which later extended to her right, and a complete inability to walk. She also noted increased urinary incontinence episodes before making it to the bathroom. The patient mentioned that she had a urinary tract infection (UTI) before the start of the symptoms, and denied any diarrhea or eating uncooked meat. The patient recalled a vague history of an upper respiratory illness (URI) a few weeks ago as well. Family and social history were reviewed and deemed noncontributory.

An initial magnetic resonance imaging (MRI) performed showed long segments of the cord with mild edema, as well as abnormal T2-fluid-attenuated inversion recovery signaling from T6 to mid-T9 level (Fig. 1). The pain pump was also seen to be starting at T6 and going down the lumbar spine on prior computed tomography (Fig. 2).

The second MRI, a week later, confirmed these findings. This was initially concerning for spinal cord infarct vs TM. Spinal cord infarct was ruled out, given the findings of progressive weakness and MRI findings compared to sudden weakness that would manifest with spinal cord infarct. Lumbar puncture was performed by Interventional Radiology, which showed elevated white blood cell (WBC) count with lymphocyte predominance. After consulting with Infectious Disease, the patient was initially placed on acyclovir; however, subsequent viral panel and infectious workup for bacteria were negative. The patient had an IgG index of 2.03, with oligoclonal bands of 10. The patient then received a high dose of methylprednisolone 1,000 mg intravenous (IV) daily for 5 days and was given plasmapheresis. The patient did not receive any benefits from the 5-day course of steroids. Given high WBCs and lack of response to treatment, the pain pump was to be removed and sent for culture.

The operation to remove the pain pump was then conducted. The thoracic catheter was aspirated, and fluid was removed and sent for culture and cell analysis. After cultures were taken from the abdominal pump area, the subcutaneous tunneled catheter was identified. After anesthetic injection and skin incision, subcutaneous dissection was performed to reveal the entire catheter that went into the L4-L5 interspinous space. The anchor attached to the subcutaneous tissue and paraspinal muscle was removed, and the spinal portion of the catheter was removed after identifying the tip of the catheter with fluoroscopy. Fluoroscopy was done after removal to ensure that every component of the device was removed. The procedure was completed with no complications and was well tolerated. The patient was monitored after the procedure and set up for transfer to a tertiary medical center. After the transfer, the catheter-tip culture returned positive for Parvimonas micra, and the patient was treated with IV ampicillin/sulbactam for 2 weeks.

At the most recent follow-up of 12 weeks, the patient has continued her home exercises but still reports lower extremity weakness. She is unable to ambulate long distances without her wheelchair, but she can transfer herself from bed to wheelchair with assistance.

DISCUSSION

This case report details a rare case of TM following a previously well-tolerated ITP. The etiology of TM was suspected to be from a late presentation of infectious myelitis caused by an infected ITP pocket following the original procedure. The recent URI or UTI may suggest a possible autoimmune or parainfectious immune response, leading to a trigger for postinfectious TM. The progressive lower extremity weakness is consistent with immune demyelination. Autoimmune etiologies, such as neuromyelitis optica or multiple sclerosis (MS), can be considered with the progressive nature of symptoms and history of chronic back pain and lower extremity

weakness, but the lack of relapsing history, optic neuritis, or brainstem symptoms makes it less likely. Furthermore, the longer-segment lesions point away from MS. The chronic back pain may indicate a catheter-tip granuloma or malposition, leading to compression or inflammatory damage. Although this treatment modality is a valuable and effective tool for pain physicians for patients with chronic pain, its invasive nature carries risks for complications that must be weighed against its potential benefits.

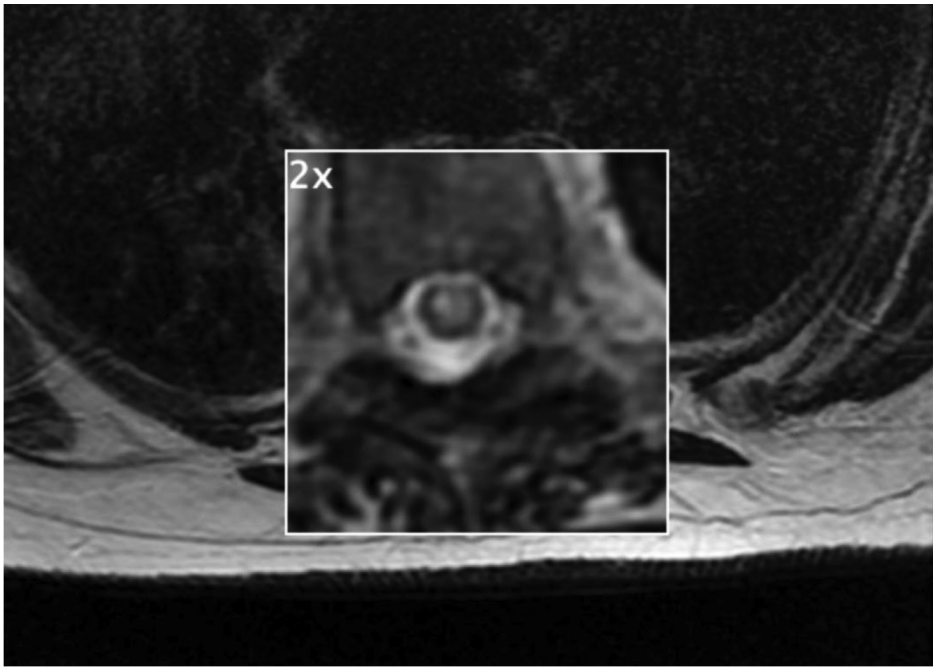

Fig 1. T2 FLAIR MRI of the thoracic spine showing an intradural, intramedullary hyperintensity consistent with transverse myelitis

Complications can occur not only with the routine complications associated with surgery but also with the pump, catheters, and drugs themselves (5). A 2021 real-world study (5) found that among 1,001 reports, the top 3 AEs were infection (15.7%), motor stall (12.4%), and adverse medication reactions (11.8%). Spinal epidural hematomas (n = 3) and programming errors were associated with the most serious AEs, such as death. Notably, medication-related AEs can be preventable with strict protocols for programming and device management. However, the authors note that their study groups contained a heterogeneous group of patients with varying underlying illnesses as well as clinicians with varying levels of expertise (5). Frizon et al (6) investigated the removal of ITPs in 59 patients and found that 8 patients had complications (retained catheter, persistent CSF leak). Some clinicians opt to leave the nonfunctional catheter in place to avoid fistula formation, CSF leak, infection, epidural hematomas, spinal cord injury, or difficult removals caused by scar tissue (6).

A 2003 case report (7) documented a case of TM 2 months after placement of an ITP with lower extremity weakness, overflow incontinence, and constipation. MRI and CSF confirmed the diagnosis, and following the removal of the pump, it was found that there was an Acinetobacter baumanii catheter-tip infection. IV corticosteroids and antibiotics were administered, and

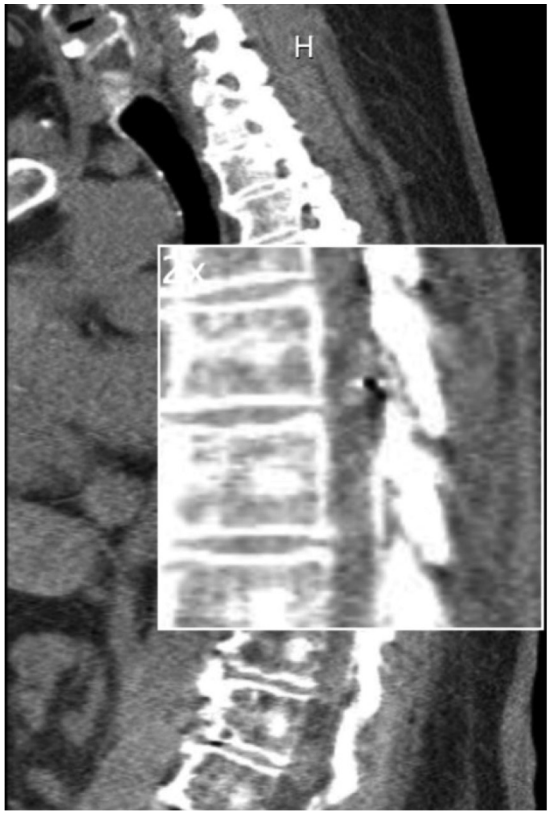

Fig. 2. CT showing the tip of the catheter in the thoracic area

significant clinical improvement was noted within 30 days (7). We support Ubogu et al's (7) recommendation that clinicians should be aware of and recognize signs of spinal cord disease as a possible late complication after ITP placements. Early recognition and prompt intervention are warranted to prevent irreversible sequelae and may support good clinical recovery outcomes.

TM is an acute or subacute rare focal inflammatory disorder that can affect the spinal cord at any level but is usually seen in the thoracic area (8). Although TM is not completely understood, its etiology can be idiopathic or secondary to various factors, such as infections, autoimmune disorders, drug or toxin exposure, and other systemic conditions (9). Acute TM encompasses the entire cross-section of the spinal cord and extends longitudinally and rostrocaudally. Thus, patients can present with complete motor and sensory loss below the affected spinal cord level, neurogenic bladder, neurogenic bowel, and sexual dysfunction (9). TM can last as short as 3-6 months or become permanently debilitating. Approximately 1/3 of patients recover with little to no deficits, 1/3 have moderate levels of permanent disability, and 1/3 are permanently disabled (8). Initial treatment involves high-dose IV corticosteroids, which can rapidly improve clinical symptoms. Aggressive rehabilitation and optimal activity can help improve functional status for activities of daily living and neural regeneration/restoration (9). Interestingly, Wu et al (9) reported successful pain control and improved muscle strength after using an ITP for intractable neuropathic pain following acute TM.

We emphasize that meticulous and proper technique, high clinical suspicion, workup, and timely management are essential to reduce ITP implementation complications. The clinician must thoroughly understand the diagnostic challenges of device malfunctions and postimplant management. Early recognition is crucial in preventing irreversible spinal cord damage and further neurological deficits. The main limitation of this study is inherent in the study design of only one patient. Further research should be conducted to better characterize the risks of TM at varying follow-up lengths. These risks must be carefully considered when counseling patients about this procedure.

CONCLUSIONS

This case report underscores the importance of recognizing rare but significant complications associated with ITPs. High clinical vigilance and diagnostic workups are important in the early identification of complications to avert serious sequelae. TM requires prompt evaluation and treatment to avoid permanent sequelae and neurological deficits.

REFERENCES

1. Ericson T, Singla P, Kohan L. Intrathecal pumps. *Phys Med Rehabil Clin N Am* 2022; 33:409-424.
2. Gerges T, Mavropoulos A, Levin D, Dao T, Acquadro M. A rare intrathecal pump complication caused by prolonged seroma leading to a potential pump pocket fill: A near miss. *Cureus* 2023; 15:e48651.
3. Levins KJ, Khan M, Drago T, et al. Blame it on the pump. *Clin Case Rep* 2021; 9:e04195.
4. Ruan X. Drug-Related side effects of long-term intrathecal morphine therapy. *Pain Physician* 2007; 10:357-366.
5. Goel V, Yang Y, Kanwar S, et al. Adverse events and complications associated with intrathecal drug delivery systems: Insights from the manufacturer and user facility device experience (MAUDE) database. *Neuromodulation* 2021; 24:1181-1189.
6. Frizon LA, Sabharwal NC, Maiti T, et al. Removal of intrathecal catheters used in drug delivery systems: Removal of intrathecal catheters used in drug delivery systems. *Neuromodulation* 2018; 21:665-668.
7. Ubogu EE, Lindenberg JR, Werz MA. Transverse myelitis associated with Acinetobacter baumanii intrathecal pump catheter-related infection. *Reg Anesth Pain Med* 2003; 28:470-474.
8. Simone CG, Emmady PD. Transverse myelitis. In: *StatPearls [Internet].* StatPearls Publishing, Treasure Island, FL 2025.
9. Wu WT, Huang YH, Chen DC, Huang YH, Chou LW. Effective management of intractable neuropathic pain using an intrathecal morphine pump in a patient with acute transverse myelitis. *Neuropsychiatr Dis Treat* 2013; 9:1023-1028.