



DVT after ITP revision

Kyle Mele MD¹, Arti Ori MD¹

¹Brigham and Women's Hospital Department of Anesthesiology, Perioperative and Pain Medicine

Introduction

The origin of intrathecal medication delivery dates back to the work of Corning and Bier on spinal anesthetics in the late 1800s (1). Advances in our understanding of the central nervous system have led to the expansion of medications used for intrathecal therapy as well as the advent of implanted drug delivery systems. Intrathecal pump implantation is a reliable therapy for treatment-resistant chronic pain, spasticity, and dystonia. By administering a low volume and concentration of medication to the neuraxis a similar or superior efficacy to systemic therapy is achieved without the side effect profile. Like all interventions there are potential complications: those related to the surgical procedure and those secondary to the device-catheter system. The procedure itself can be complicated by bleeding, infection, seroma or CSF leakage. Catheter related complications include blockage, kinking, fracture, migration or tearing. While pump malfunction is possible it is less commonly observed than catheter dysfunction.

Outpatient pain providers are often tasked with troubleshooting these devices when a patient presents with suboptimal response. It is important to stratify these patients based on acuity. Those with a subacute course can be treated in the outpatient setting while acute withdrawal or device failure necessitate admission for monitoring and likely surgical intervention.

Methods

Informed consent was obtained from the patient prior to the writing of this case report. This document contains no identifiable information and is exempt from IRB review requirements as per institutional policy.

Case Report

A 49 yo 80 kg M with a PMH of HTN and SCI after a gunshot wound to the abdomen ~10 years ago presents to the pain clinic to establish care. His initial injury resulted in bilateral lower extremity paraplegia and necessitated end ileostomy, right sided nephrectomy and IVC filter for DVT/PE. An additional sequelae of his injury was the development of bilateral lower extremity spasms and pain. He describes the sensation of burning pain as well as spasms that start in the bilateral knees with radiation into the ankles. In regard to oral medication the patient takes gabapentin 300 mg QID, ibuprofen 800 mg BID and baclofen 10 mg PRN TID. He had previously been in the care of another pain clinic and underwent intrathecal pump placement in 2019 (triple mix of baclofen, hydromorphone and bupivacaine) to treat his pain and spasms. Despite his current therapy he endorses intractable LE spasms as well as chronic LE pain (8-10/10 VAS) that render him disabled. Interestingly he endorses that the intrathecal pump never provided any relief and when titrated he had a paradoxical increase in his pain and spasms.

Physical exam is notable for diffuse LE atrophy, flaccid paralysis except for LLE 4/5 hip flexion and knee extension, some sensation to light touch in the proximal LLE and well healed surgical incisions over the LLQ and the lumbar spine. ITP interrogation reveals no alerts and details a continuous infusion of baclofen 535 mcg/day, hydromorphone .8036 mg/day, and bupivacaine 1.6072 mg/day. Due to the radiating nature of his pain an MRI lumbar spine is ordered which reveals posterolateral tethering of the cauda equina (Figure 1). Neurosurgical evaluation did not deem this to be an actionable finding due to the patient's stable neurologic symptoms. A thoracic/lumbar spine CT was also performed which did not reveal any catheter discontinuity (Figure 2)

Figure 1.



Figure 2.

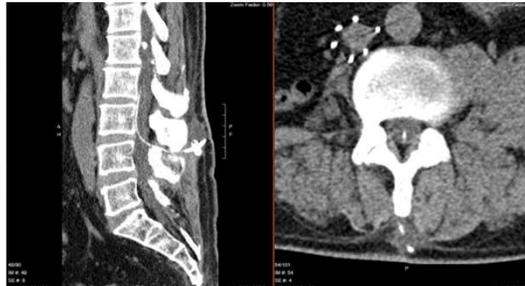
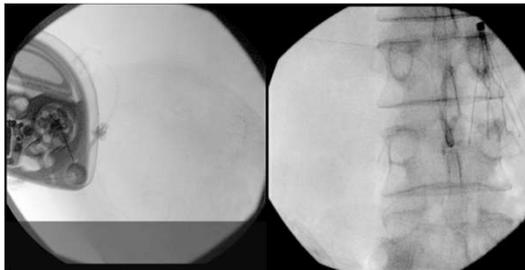


Figure 3.



Case Report Continued

The patient later returned for side port aspiration and contrast study which revealed extravasation concerning for a catheter leak (Figure 3). In this setting the patient was brought to the OR for an ITP revision. After opening the pump pocket side port aspiration was noted to be sluggish. The catheter was dissected free and further exploration revealed leaking of fluid from the connector between the pump segment and the catheter. After replacing this connector aspiration of CSF from the side port was noted to be brisk. Due to the catheter leak and the patient's report of lack of efficacy we reduced the continuous ITP rate by 80% as the dose reaching the intrathecal space was unclear. While closing a bridge bolus was programmed.

The patient's immediate postoperative course was complicated by hypertension, tachycardia, lower extremity pain and spasms. A hydromorphone PCA was started for pain management, IV diazepam was administered for ongoing spasms and labetalol was given to treat his hemodynamic derangements. Following a lack of response to the above therapy a 50 mcg intrathecal baclofen bolus was given and his ITP continuous rate was increased by 50%. This led to a reduction in the patient's symptoms and the patient was subsequently transferred to the inpatient medicine service.

The patient was started on routine post-operative antibiotics and a full workup for potential nosocomial/infectious causes of spasticity was undertaken. Urinalysis was non-infectious, blood cultures were negative and CXR revealed atelectasis but no focal consolidations. On POD #5 lower extremity doppler revealed an acute left common femoral DVT which was treated with apixaban. The patient's ITP was titrated back to his pre-procedure continuous dose over the course of 7 days. On discharge the patient reported a VAS score of 2/10 with significant reduction in his spasms.

Conclusion

This case highlights the importance of prompt DVT prophylaxis as well as early mobilization with physical therapy. Our patient was started on heparin prophylaxis greater than 24 hours post-procedure and did not work with physical therapy for several days as they deemed him not medically optimized for treatment. DVT is a well known complication of acute spinal cord injury however the prevalence in the chronic SCI population is not as well studied (2). An estimate of the incidence of DVT ranges from 5.4-64% in patients on prophylactic therapy and 47% to 100% in those not treated with prophylaxis.

This case also calls attention to the lack of consensus on calculating ITP dosing after malfunction of the implant (3). Saulino Et al. 2016 noted that some providers recommend reinstating ITP therapy at 30-50% of the previous concentration following malfunction while other providers would treat the patient as if they are pump naïve. Regardless of the dosing strategy utilized patient's require close monitoring post-operatively and a strong case can be made for post-operative admission.

References

1. Hurlley RW, Cohen SP, Liu SS, Fishman SM, Benzon H, Raja SN. Implanted Drug Delivery Systems for Control of Chronic Pain. In: Essentials of pain medicine e-book. Elsevier; 2017.
2. Mackiewicz-Milewska M, Jung S, Kroszczyński AC, Mackiewicz-Nartowicz H, Serafin Z, Cisowska-Adamiak M, Pyskir J, Szymkuć-Bukowska I, Hagner W, Roś D. Deep venous thrombosis in patients with chronic spinal cord injury. *J Spinal Cord Med.* 2016 Jul;39(4):400-4. doi: 10.1179/2045772315Y.0000000032. Epub 2015 Jul 1. PMID: 26132450; PMCID: PMC5102284.
3. Saulino M, Anderson DJ, Doble J, Farid R, Gul F, Konrad P, Boster AL. Best Practices for Intrathecal Baclofen Therapy: Troubleshooting. *Neuromodulation.* 2016 Aug;19(6):632-41. doi: 10.1111/ner.12467. Epub 2016 Jul 19. PMID: 27434299.

