

Substance Misuse with Intrathecal Pain Pumps: Two Case Reports

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Background

- 10-40% of the US adult population has chronic pain ¹
- There is a bidirectional link between chronic pain and mental health conditions ²

Targeted Drug Delivery (TDD)

- Administration of medication via an intrathecal pump directly to the cerebrospinal fluid
- Administers opioids and baclofen for pain and spasticity, respectively ³
 - Known as a “pain pump” when used for pain
 - Indicated for severe, intractable pain not controlled with systemic agents, or for patients with severe side effects from systemic drugs
 - Some indications for TDD: cancer related pain, back pain, chronic pancreatitis, complex regional pain syndrome ³
- Benefits of TDD: more effective analgesia, fewer side effects ³
- While rates of misuse appear to be lower than with oral opioids, misuse and diversion remain a possibility
- Between 1981-2013, approximately 300,000 pumps implanted ⁴

We present two cases of TDD misuse seen by our C-L psychiatry team

Case #1

- 48-year-old female with a history of chronic pancreatitis managed with hydromorphone pump, MDD, and non-epileptic seizures was admitted for removal of her pump after her pain management MD suspected misuse
- Psychiatry consulted due to concern for OUD and depression
- Prior to admission:**
 - Reported a rash and withdrawal symptoms (nausea, increasing pain, “skin crawling”, sneezing, lethargy, and mood lability) to pain MD
 - Pump examined – catheter was patent, no evidence of motor malfunction, reservoir was empty
 - MD suspected pump programming error and refilled pump with 40mL of 15 mg/mL hydromorphone
 - Three days later, patient endorsed over-sedation
 - Reservoir accessed – only 5mL hydromorphone remained
 - Surreptitious reservoir access suspected; otherwise, patient would have received 525mg hydromorphone / 72 hours – most likely fatal

Case #2

- 36-year-old healthcare worker with chronic pancreatitis on hydromorphone TDD was admitted for removal of TDD after pain management MD suspected misuse
- Psychiatry consulted due to concern for OUD and anxiety
- Prior to admission:**
 - Pump had been refilled recently
 - Patient had signs of skin infection (redness, drainage) near pump access site; antibiotics prescribed by MD
 - A few weeks later, patient had nausea and vomiting. Infection was healing, but puncture site was not
 - Physician interrogated device – pump was working properly
 - Anticipated reservoir volume calculated to be 35.2mL; however, no medication remained
 - Physician injected saline into reservoir and was able to withdraw; therefore, the needle and syringe were working appropriately
 - MD suspected misuse due to infection, non-healing wound, and discrepancy in reservoir volume



Figure 1: Example of an intrathecal pump. From: Medtronic. Drug infusion systems. Accessed September 12, 2022. <https://www.medtronic.com/us-en/healthcare-professionals/products/neurological/drug-infusion-systems.html>

Table 1. Potential signs of misuse of intrathecal pumps.

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Signs of TDD Misuse ⁵	Unusually high or escalating dose requirements Signs of intoxication or withdrawal Needle marks around reservoir Lower-than-expected reservoir volumes
Signs of exogenous substance misuse via TDD ⁶	Unusually high or escalating dose requirements Higher-than-expected reservoir volumes Unexpected substances in reservoir contents

Discussion

- Pump manipulation and misuse does occur
- Signs of manipulation include symptoms of intoxication or withdrawal, escalating medication dosing, puncture marks around the reservoir, and lower-than-expected reservoir volumes ⁵
- Additionally, higher than expected reservoir volumes can be seen when exogenous substances are injected into the pump ⁶
- Withdrawal from intrathecal opioids can present somewhat differently than does withdrawal from oral opioids (Table 2):
 - Diuresis, agitation, hyperalgesia, diarrhea, and yawning are more frequently reported ⁷
 - Psychosis has been reported, albeit rarely, with intrathecal morphine withdrawal ⁸
- If pump manipulation is suspected, a psychiatrist should seek consultation from pain management for further assessment

Table 2. Differences between TDD and systemic opioid withdrawal symptoms.

More common in TDD than with systemic therapy ⁷	Diuresis Agitation Hyperalgesia Diarrhea Yawning
Less common in TDD than with systemic therapy ⁷	Piloerection Diaphoresis Mydriasis
Rare withdrawal symptom of TDD ⁸	Psychosis

Conclusions

- Psychiatrists frequently treat patients with chronic pain
- Psychiatrists should be familiar with common pain management strategies, including TDD
- While rates of misuse are likely lower with TDD than systemic opioids, misuse does occur
- Psychiatrists, particularly consultation-liaison and addiction psychiatrists, should be familiar with potential signs of misuse
- TDD withdrawal can present slightly different than does withdrawal from systemic opioids

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