

A Medically Challenging Case of Altered Mental Status in a Patient with Intrathecal Morphine Pump Misplacement

Sounak Roy MD, David McEnerney DO

Department of Anesthesiology University of Florida Health Jacksonville



Introduction

- **Role of IDDS in Chronic Pain:** Intrathecal drug delivery systems (IDDS) provide effective analgesia for chronic pain by delivering medication directly into the cerebrospinal fluid, minimizing systemic side effects [1].
- **Necessity of Precise Catheter Placement:** Accurate catheter placement is critical for optimal drug delivery and pain control in IDDS [2].
- **Implications of Catheter Misplacement:** Misplacement can lead to inadequate analgesia, resulting in escalated dosing and increased risk of toxicity [3].
- **Risks Associated with Surgical Procedures:** Elderly patients undergoing surgeries involving general anesthesia and prone positioning are at an increased risk of cerebrovascular events due to altered cerebral hemodynamics [4].
- **Purpose of the Case Report:** This case illustrates the impact of catheter misplacement on dosing requirements and the subsequent clinical complications.

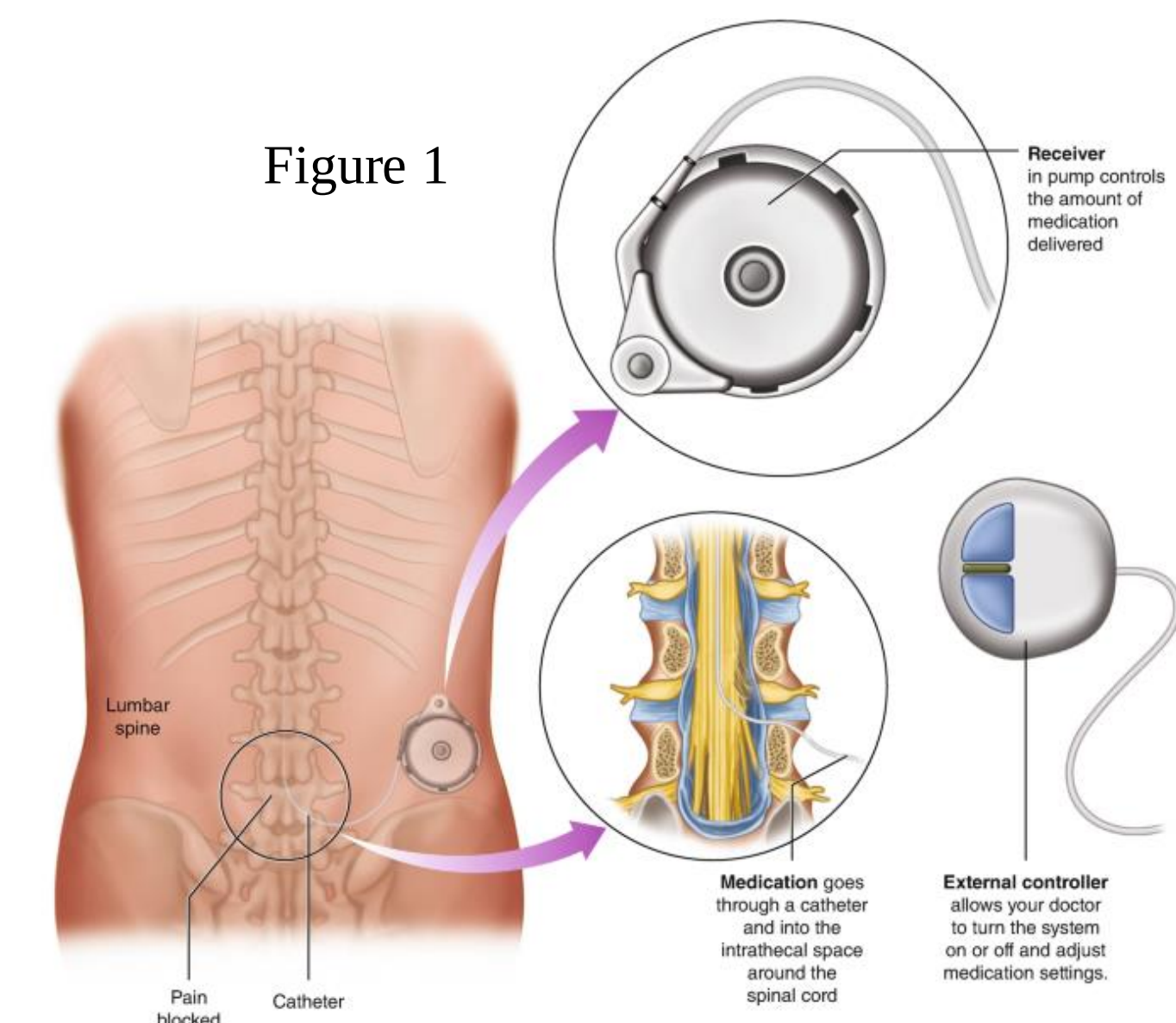


Figure 1. Intrathecal Catheter Placement for Morphine Delivery Illustration showing the correct placement of an intrathecal catheter for optimal morphine distribution within the spinal canal, emphasizing the risks of misplacement and its impact on drug efficacy.

"Intrathecal Drug Delivery Systems," SpringerLink, 2024.

Figure 2

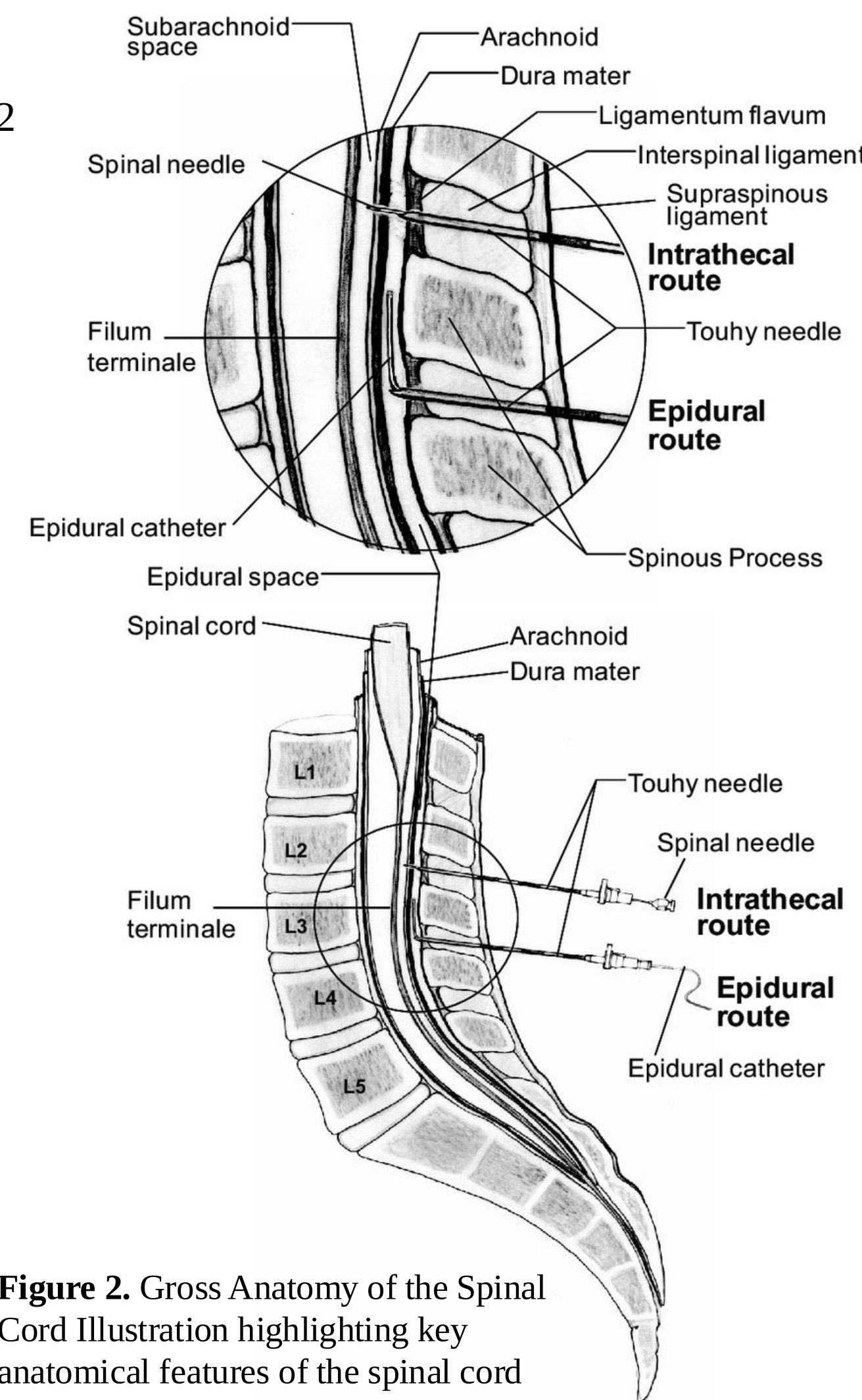
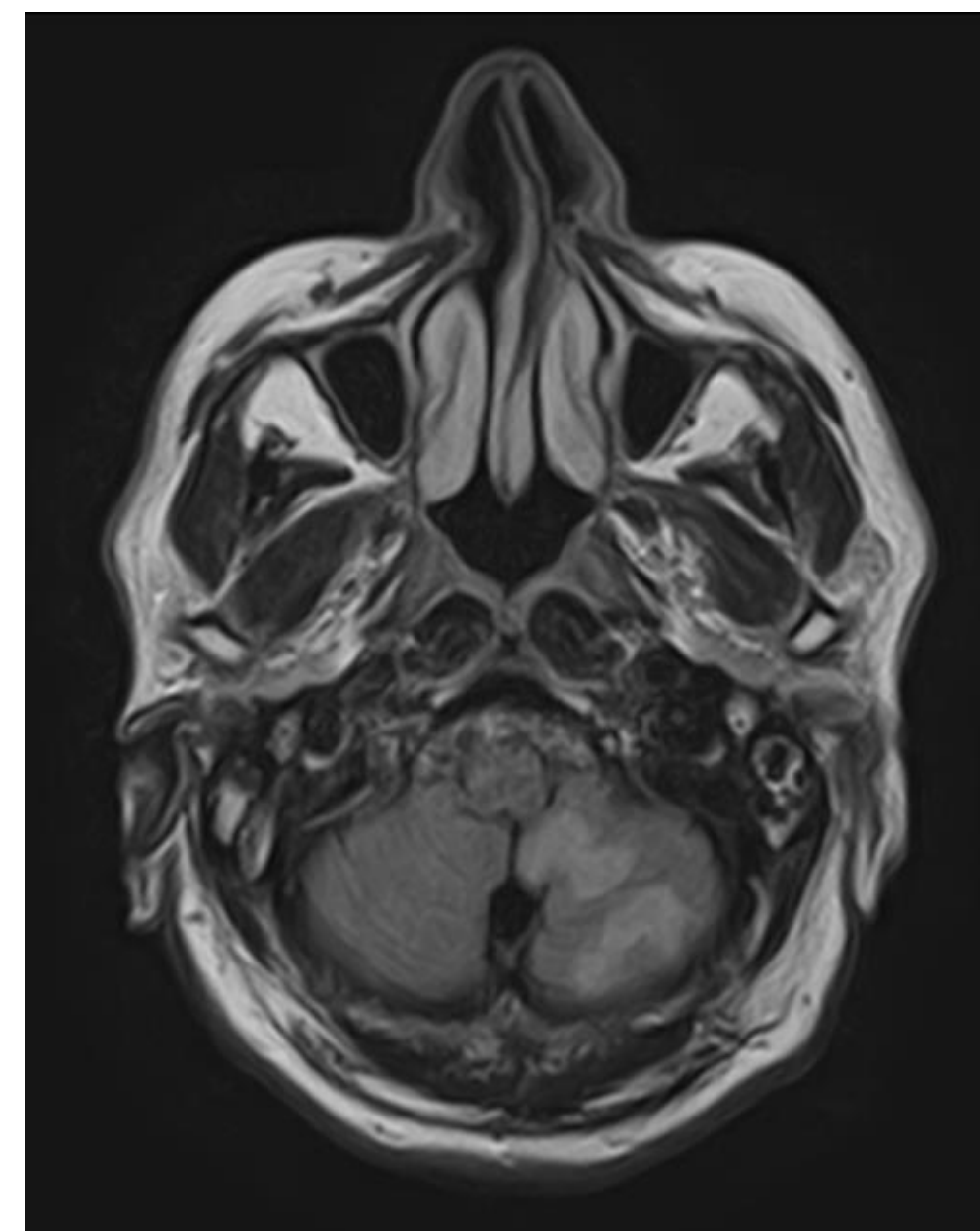


Figure 2. Gross Anatomy of the Spinal Cord Illustration highlighting key anatomical features of the spinal cord relevant to perioperative pain management. Cox F., 2009. Perioperative Pain Management, ResearchGate.

Case Description

- **Patient Profile:** 76-year-old male with a 10-year history of chronic low back pain radiating to both legs.
- **Initial Pain Management:** Managed with an intrathecal morphine pump delivering 0.208 mg/hour (~5 mg/day), which is exceedingly high compared to average dosing.
- **Dose Escalation History:** Morphine dose was steadily increased over time due to persistent pain, suggesting potential delivery issues.
- **Pump Replacement Procedure:** Underwent scheduled pump replacement; intraoperatively, the catheter was found misplaced in the paraspinal muscles.
- **Catheter Repositioning:** Repositioned into the intrathecal space, confirmed by cerebrospinal fluid (CSF) aspiration.
- **Postoperative Dose Adjustment:** Morphine dose was drastically reduced to 0.05 mg/hr (~1.2 mg/day) appropriate for correct intrathecal delivery.
- **Discontinuation of Oral Opioids:** One week later, oxycodone PRN was discontinued during a clinic visit.
- **Presentation of Altered Mental Status:** The following day, presented to the emergency department with acute altered mental status. Despite Narcan, there was no improvement.
- **Imaging Findings:** CT scan revealed an acute or subacute left posterior inferior cerebellar artery (PICA) infarct.
- **Diagnostic Workup:** Included infection screening, naloxone administration without improvement, imaging studies, lumbar puncture, and EEG monitoring.



- **EEG monitoring:** Showed moderate, diffuse, encephalopathy of unknown cause.
- **Disposition:** Patient was discharged to a skilled nursing facility with most likely diagnosis of new cerebellar and posterior intracranial artery strokes.

Figure 3. Axial FLAIR MRI of the Left Cerebellar Hemisphere
FLAIR MRI showing high signal intensity in the posteroinferior aspect of the left cerebellar hemisphere, consistent with a PICA territory infarct.

Representative imagine courtesy of Ammar Haoumi, Radiopaedia.org, from the case rID:98803.

Discussion

- **Complex Interplay Between Catheter Misplacement and Dosing Strategies:** The initial misplacement of the catheter into the paraspinal muscles resulted in inadequate intrathecal morphine delivery, prompting an escalation of the dose to 0.208 mg/hr-significantly higher than standard dosing recommendations [2].
- **Enhanced Systemic Risk with Elevated Intrathecal Morphine Doses:** High doses of intrathecal morphine increase the potential for systemic absorption and adverse effects, especially upon correction of catheter placement, which can lead to sudden and excessive drug delivery to the central nervous system [3].
- **Critical Dose Reduction Following Corrected Placement:** After repositioning the catheter intrathecally, the morphine dose was appropriately reduced to 0.05 mg/hr. This adjustment aligns with typical dosing protocols and minimizes the risk of opioid toxicity due to increased bioavailability.
- **Nuanced Differential Diagnosis of Altered Mental Status:** The patient's altered mental status was unlikely due to opioid withdrawal or overdose, given the dosing adjustments and timeline. Clinical presentation and diagnostic findings were more indicative of an acute cerebrovascular event.
- **Perioperative Factors Contributing to Cerebrovascular Events:** The PICA infarct may be associated with perioperative factors such as general anesthesia and prone positioning, which can predispose elderly patients to ischemic strokes due to hemodynamic fluctuations [4].
- **Clinical Implications and Multidisciplinary Considerations:** This case underscores the imperative of accurate catheter placement, meticulous dosing adjustments, and a comprehensive, multidisciplinary approach to evaluating neurological symptoms in patients with intrathecal drug delivery systems.

References

1. Deer TR, et al. (2012). Polyanalgesic Consensus Conference 2012: Recommendations for the management of pain by intrathecal (intraspinal) drug delivery: Report of an interdisciplinary expert panel. Neuromodulation, 15(5), 436-464.
2. Hayek SM, et al. (2011). Age-dependent intrathecal opioid escalation in chronic noncancer pain patients. Pain Medicine, 12(8), 1179-1189.
3. Bernards CM. (2004). Recent insights into the pharmacokinetics of spinal opioids and the relevance to opioid selection. Current Opinion in Anesthesiology, 17(5), 441-447.
4. Schultz DM, Stayner S. (2014). Intrathecal Drug Delivery for Chronic Pain. In: Essentials of Pain Medicine. Elsevier.