

A CASE OF PRIAPISM AFTER INTRATHECAL MORPHINE INJECTION

Marco Cunicelli, DO¹, Elizabeth Piwowarski, DO¹, and Tejal Raju, MD²

Background: Data on the frequency of priapism after spinal injections is lacking. Priapism may occur as a rare complication following intrathecal narcotic administration. This report describes an uncommon adverse reaction to intrathecal morphine injection uniquely without concurrent local anesthetic.

Case Report: A 74-year-old male presented to the pain management office for a scheduled intrathecal bolus trial to monitor for response prior to permanent placement of an intrathecal pump. Following an intrathecal injection of a bolus dose of 100 mcg of morphine, the patient noted the development of an erection lasting 8 hours. A diagnosis of intrathecal morphine-induced priapism was made.

Conclusion: This report presents the first case in the literature of priapism induced by noncontinuous intrathecal morphine injection in the context of an intrathecal pump trial. A specific mechanism has not yet been defined; however, we believe multiple factors play a role in the body's response to morphine.

Key words: Case report, chronic pain, intrathecal drug delivery, morphine, priapism

BACKGROUND

Intrathecal (IT) medication delivery is an option in interventional pain management that is becoming more popular of late (1). It is typically used in the management of chronic pain after conservative, noninvasive approaches such as physical therapy and oral analgesic medications have failed (1). The benefit of intrathecally-administered opioids over oral medications is thought to be 2-fold due to its directed deliverance: enhanced pain control at lower doses and fewer side effects due to less systemic absorption (1). An intrathecal trial of an opioid is conducted prior to the permanent placement of an IT drug pump to ensure adequate analgesia and to monitor for adverse effects of the drug (1). This trial can be administered in 2 ways: injection/bolus (single or multiple) or continuous infusion (2). Common side effects observed from IT morphine include pruritus, rash, and urinary retention (3).

A rare side effect of an IT morphine injection is priapism. Priapism describes a disorder in which the penis sustains a protracted erection in the absence of appropriate stimulation (4). In the literature, there are case reports of priapism following IT analgesia administration (1). Priapism has been associated with IT bupivacaine administration in only a few case reports, and with IT morphine in even fewer (1). Of the cases describing morphine use, concurrent use of another drug, namely intravenous fentanyl and IT bupivacaine, was common (1). This raises the question of which drug is the cause. In addition, these cases describe the use of continuous epidural infusions of morphine over hours, rather than a single bolus injection of morphine. In this report, we present a case of a 74-year-old male with priapism induced by an IT morphine bolus injection.

From: ¹Edward Via College of Osteopathic Medicine - Virginia Campus, Blacksburg, VA; ²Virginia Interventional Pain and Spine Center, Roanoke, VA

Corresponding Author: Marco Cunicelli, DO, E-mail: macunicelli@gmail.com

Disclaimer: There was no external funding in the preparation of this manuscript.

Conflict of interest: Each author certifies that he or she, or a member of his or her immediate family, has no commercial association (i.e., consultancies, stock ownership, equity interest, patent/licensing arrangements, etc.) that might pose a conflict of interest in connection with the submitted manuscript.

Accepted: 2021-05-20, Published: 2021-07-31

CASE

A 74-year-old male presented to the pain management office for a scheduled IT bolus trial for chronic pain secondary to lumbar radiculopathy with postlaminectomy pain syndrome. It was expected that this would help control the low back pain and improve his symptoms. His medical history was remarkable for chronic low back pain and arthritis. During the procedure, he was positioned prone on the table and his vital signs remained stable. Using fluoroscopic guidance, the area of the L3/L4 interspace was identified and the entry position for the needle was then identified and marked. The skin was prepped and draped sterilely using betadine swabs x3. The needle tract was anesthetized using 1% lidocaine. Subsequently, a 23-gauge 3.5-inch spinal needle was advanced into the subarachnoid space at this level. A flow of clear cerebrospinal fluid from the needle indicated correct needle placement. The needle's position was verified in both anteroposterior and lateral x-ray views. Subsequently, 0.5 mL of Iohexol 180 mg/mL was injected, confirming IT location. Lastly, 2 mL of preservative-free morphine 50 mcg/mL was injected for a total of 100 mcg. The needle was removed, and the patient tolerated the procedure well. The patient was scheduled for a telemedicine follow-up visit to take place 24 hours post procedure to discuss the results from the trial. It was expected that the patient would receive some level of pain control from the IT morphine bolus. However, the patient called the office 4 hours post trial and reported that he had developed an erection and urinary retention as well as some mild itching. By this time, he had driven back to his house, and when he arrived home, was unable to void due to the development of an erection. His last void had been 4 hours earlier prior to coming to the office. He attempted a cold shower and soaking in cold water with no relief of these symptoms. He then contacted the office where he was advised to take diphenhydramine for the itching and seek urgent medical attention in the emergency department for the erection as it could cause permanent damage. The patient was adamant that he wanted to stay at home and try conservative measures such as a bath, which he states did eventually relieve his symptoms hours later. The following morning, he was able to urinate, and the itching had subsided. The patient had never developed priapism before and remained highly motivated to repeat the IT pump trial. After a second failed IT narcotic trial, he is currently undergoing a spinal cord stimulation (SCS) trial to control his back pain.

DISCUSSION

Data on the frequency of priapism after spinal injections is lacking. A literature review of PubMed was conducted with the keywords "priapism" and "intrathecal morphine" which returned one result. The search was then expanded with the keywords "priapism" and "morphine" and "spinal." This search resulted in only 2 results. The search was further expanded using keywords "priapism" and "epidural" and "spinal." This result generated 10 articles. Of these 10 articles, only 7 specifically mentioned priapism as the result of opioids and anesthesia. It was noted in these articles that priapism was found to be a complication of epidural anesthesia with opioid narcotics and local anesthetics (1).

Our case differs from the prior cases in that (a) opioids were delivered directly to the spinal canal rather than the epidural space, and (b) the patient received an injection of morphine without local anesthetic (bupivacaine) (1). The temporal correlation between anesthesia and onset of an erection was clearly demonstrated, as the erection developed an hour after intrathecal morphine injection and detumescence occurred after the effects of morphine dissipated over a period of 8 hours. Since it is such a rare complication, the true incidence is unknown and the pathophysiology of how opioids and anesthetics induce erections is not well understood (1). What is known is that erections occur due to increased blood flow and relaxation of smooth muscle in the corpora cavernosa (1). This process is mediated by nitric oxide (NO) release from vascular endothelium (5). It is believed that morphine causes an increase in the endothelial production of NO, which has vasodilatory properties throughout the body (5). Furthermore, we know that parasympathetic stimulation plays an important role in the physiology of erections. Parasympathetic neurons are located at sacral levels S1-3 (1). Increased output from the parasympathetic neurons results in erection while stimulation of sympathetic neurons causes smooth muscle contraction by alpha-adrenergic stimulation, resulting in detumescence (1). We postulate that spinal anesthesia at level L3/4 could have affected the spinal levels mediating erection and downregulated sympathetic output in the lumbar region, resulting in a parasympathetic predominance mediating erection. Furthermore, since morphine is a narcotic, it predominantly downregulates the sympathetic nervous system and allows the parasympathetic nervous system to predominate (5). More research is needed on morphine-induced

priapism in order to better elucidate the underlying pathophysiology. Only by publishing this data can we hope to increase awareness of this side effect and create a standard prevention and management strategy.

CONCLUSION

Priapism may occur as a rare complication following IT narcotic administration. This report presents the first case thus far in the literature describing priapism induced by noncontinuous IT morphine injection in the context of an IT pump trial without co-administration of a local anesthetic drug. This novel information could implicate morphine as the cause of priapism both in this case and

the previous cases that delivered a drug combination. In addition, this case demonstrates a unique presentation in that this patient was only briefly exposed to morphine as a single injection rather than a continuous infusion as in all other known cases. A specific mechanism has not yet been defined; however, we believe multiple factors play a role in the body's response to morphine, including increased parasympathetic nerve stimulation and increased NO-mediated vasodilation. More research is needed on morphine-induced priapism in order to better elucidate the underlying pathophysiology and provide recommendations to practicing pain physicians on its continued use.

REFERENCES

1. Ruan X, Couch JP, Shah RV, Liu H, Wang F, Chiravuri S. Priapism – a rare complication following continuous epidural morphine and bupivacaine infusion. *Pain Physician* 2007; 10:707-711.
2. Medtronic. About the trial: Chronic pain. Medtronic Web site. www.medtronic.com/uk-en/patients/treatments-therapies/drug-pump-chronic-pain/getting-a-device/drug-pumps-about-trial.html. Date Published 02/2019. Date Accessed 09/12/2020.
3. Cummings A, Fitzgerald BM, Orgill BD. Intrathecal morphine. In: *StatPearls [Internet]*. Treasure Island, FL: StatPearls Publishing; 2020. www.ncbi.nlm.nih.gov/books/NBK499880/. Date Published 07/28/2020. Date Accessed 09/12/2020.
4. Silberman M, Stormont G, Eugene WH. Priapism. In: *StatPearls [Internet]*. Treasure Island, FL: StatPearls Publishing; 2020. www.ncbi.nlm.nih.gov/books/NBK459178/. Date Published 06/30/2020. Date Accessed 09/13/2020.
5. Pourshanzari A, Allahtavakoli M, Hassanshahi G. Effects of low-dose morphine on nitric oxide concentration and angiogenesis in two-kidney one clip hypertensive rats. *Iran J Basic Med Sci* 2011; 14:560-567.

