

## Vertigo and Nystagmus Post Intrathecal Morphine Administration

Case Report

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### Abstract

Intrathecal morphine was shown to provide profound and prolonged analgesia and is now used extensively for management of postoperative pain. The described side effects of the opioid used via this route are similar to those observed after systemic administration. Vertigo with horizontal nystagmus is an adverse side effect rarely described after intrathecal, epidural or intravenous morphine administration. We report the case of a patient who presented this complication following administration of intrathecal morphine after a right lower lobe segmentectomy.

### Introduction

Intrathecal morphine without local anesthetic is often added to a general anesthetic to prevent pain after major surgery. It is an attractive analgesic technique since the opioid is injected directly into the cerebrospinal fluid, close to the structures of the central nervous system where the opioid acts. The procedure is simple, quick, and with a relatively low risk of complications or failure. It is expected to decrease postoperative pain intensity and opioid requirements, and to accelerate recovery [1]. Morphine, which is relatively less hydrophobic than other opioids, has a longer residence time in the cerebrospinal fluid and may therefore reach rostral sites over a longer period compared to other opioids. Consequently, there is a potential of achieving adequate and long-lasting analgesia with a single intrathecal injection of morphine. However, the downside of this less hydrophobic character is an increased risk of adverse effects, especially postoperative respiratory depression, which remains a particular concern. Other side effects have been described such as pruritus, urinary retention, nausea and vomiting [1]. Vertigo occurring after spinal anesthesia has been rarely reported [2-6].

We report the case of a patient who experienced vertigo with nystagmus after receiving spinal anesthesia with intrathecal morphine.

### Case Presentation

An 81 year-old male, 87 Kilos, was admitted for lung segmentectomy. Past medical history showed hypertension and mitral valve replacement in 2002. In 2014, he underwent laparoscopic colectomy for colon adenocarcinoma. In September 2015 CT scan of the chest, revealed a metastatic tumor in the right lower lobe so the patient was programmed to undergo a right lower lobe segmentectomy. The surgery has been performed under general anesthesia. Propofol (1mg/Kg), fentanyl (1µg/Kg) and cisatracurium (0.2 mg/Kg) were used for induction. Anesthesia was maintained by sevoflurane (MAC=1), reinjections of fentanyl and cisatracurium. In order to control postoperative pain, the patient underwent, before induction, spinal anesthesia using a 27G Whitacre, at the L4-5 interspace, receiving 0.8 mg of intrathecal morphine and 5 µg of Sufentanil. It is important to note that the puncture wasn't traumatic. No bleeding or paresthesia were noted during the performance of spinal anesthesia. There were no complications during the surgery. The patient was extubated in the OR and transferred to the cardiovascular surgery unit for surveillance. He was hemodynamically stable during his entire stay. A continuous infusion of 0.1% bupivacaine, at a rate of 8 mL/h, through an indwelling intercostal catheter inserted intraoperatively, was also used to manage postoperative pain. Numeric rating scale (NRS) was used for assessment of the patient's pain intensity and was performed every 2 hours. NRS

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scores of 2 or 3 were noted during the first 24 hours.

Five hours after spinal analgesia, the patient presented an acute rotatory vertigo associated with nausea. He remained hemodynamically stable, awake and very alert. A complete neurological exam was performed. Only a horizontal nystagmus was noted bilaterally. The Dix-Hallpike maneuver was negative. No cerebrospinal fluid leak was noted. The brain CT-scan was normal. No other side effects of intrathecal morphine were reported. A single dose of one mg of Midazolam IVD was administered to alleviate the patient's symptoms. Naloxone was not used and vertigo resolved spontaneously, during the next 24 hours. The patient was transferred to the floor on the first postoperative day and discharged home on the fourth postoperative day.

## Discussion

Intrathecal morphine analgesia is widely used to alleviate postoperative pain after thoracic surgery. It is as effective as thoracic epidural analgesia with the advantage of being easier to perform [7-10]. Vertigo and nystagmus following intrathecal morphine administration are rarely encountered. Few cases have been previously reported [2-6]. As in our patient vertigo and nystagmus appeared few hours after morphine administration in all cases. Naloxone was effectively used to treat the neurological symptoms in four cases. However, in our patient, because the symptoms were well tolerated, naloxone was not given in order not to lose the analgesic effect of morphine. Korff and colleagues also described a case where the patient's complaints rapidly improved and completely disappeared within 24 hours without using naloxone [6].

Other causes of vertigo and nystagmus in this setting include: transient attack of viral labyrinthitis, benign paroxysmal positioning vertigo (BPPV) elicited by the lateral decubitus position, cerebrospinal fluid leak, and postdural puncture headache.

Goundrey [3] claimed that there can be no proven relationship between the patient's acute symptoms and the intrathecal morphine he received. It may have been a transient attack of viral labyrinthitis that coincided with the surgery. However, acute labyrinthitis classically lasts for two to three days, not hours.

As to the fact that vertigo and nausea noted by the patient could be secondary to benign paroxysmal positioning vertigo (BPPV) elicited by the lateral decubitus position during the surgery. BPPV is characterized by brief episodes provoked by head movements [11]. Our patient described a continuous rotatory vertigo that wasn't provoked or aggravated by head movements or sudden movements. Moreover, the Dix-Hallpike maneuver was performed and turned out to be negative.

Another differential diagnosis for vertigo is cerebrospinal fluid leak which was not observed in our patient. Finally, vertigo and nausea could be associated with postdural puncture headache [12, 13]. However, our patient didn't suffer from headache at any time; his symptoms weren't relieved by recumbent position, nor worsened by upright position.

On the other hand, the timing of both the onset of symptoms

and their resolution is in favor of vertigo being a side effect of intrathecal morphine administration. In fact, the onset of symptoms, approximately five hours after injection, is similar to the known timing of rostral spread of morphine from the lumbar spinal space to the intra-cerebral cerebrospinal fluid [14]. In analogy to the respiratory depression observed after neuraxial morphine, onset is biphasic: it can occur early (30 to 90 min) after epidural administration of hydrophilic morphine due to systemic vascular absorption, or it can occur late (6 to 18 h) after epidural or intrathecal morphine due to rostral spread in cerebrospinal fluid and slow penetration into the brainstem. Moreover, the spontaneous resolution of symptoms in our patient within 19 hours after injection is also consistent with the expected duration of the central effect of epidurally or intrathecally injected morphine in regard to analgesia and other complications, such as respiratory depression, both of which can last up to 24 hours. This is also consistent with the hypothesis that has been proposed by Rottach and colleagues, about the physiopathological mechanisms for opioid effects on eye movements. Their hypothesis is based on opiate-mediated inhibition of binding sites in the cerebellum and the vestibular nuclei [15].

Furthermore, the dose of morphine used could have been relatively high. In fact, the patient received 0.8 mg of morphine intrathecally which is equivalent to 10µg/Kg [7, 16], whereas some authors reported side effects of intrathecal morphine injection with a dose ranging from 0.1 to 0.5 mg of morphine [14, 17, 18].

Finally, there are no published data available to demonstrate if the association of morphine and sufentanil intrathecally would increase the risk of having more serious side effects. However, a similar case of rotational vertigo and nystagmus has been reported by Gellerfors and colleagues, rapidly after an intrathecal block with bupivacaine and fentanyl [19].

## Conclusion

The onset of vertigo and nystagmus after intrathecal morphine injection is a very rare side effect. It is benign and self-limited.

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