Refractory hypothermia following neuraxial opiate administration in the peripartum population

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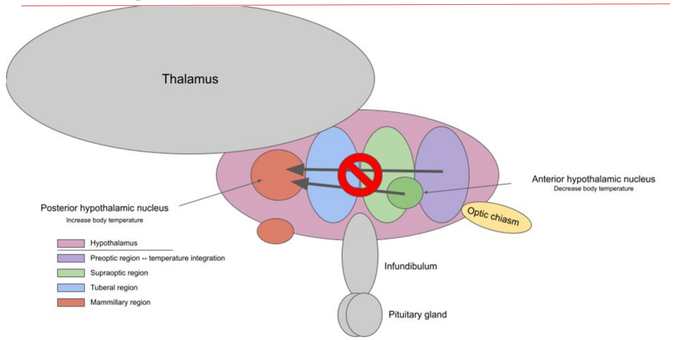
Introduction

Thermoregulation is a multivariate and complex system in human physiology. It encompasses multiple organ systems and is one of the pillars of homeostasis. Disruption of this balance can have negative side effects on patient physiology and thereby worsen patient outcomes. As such, body temperature monitoring is recommended as standard monitoring by the ASA. Neuraxial anesthesia regularly disrupts this delicate homeostasis via several distinct mechanisms.

Such mechanisms include the associated sympathectomy with neuraxial local anesthetic administration, exposed body surface area for procedures, and direct alterations of the thermoregulatory set point with neuraxial opiate administration. These mechanisms can often be overcome with techniques familiar to anesthesiologists such as forced air warming, fluid warming, warm saline lavage, and brevity of procedure length. However, hypothermia induced by neuraxial opiates are sometimes not responsive to such techniques and thus require further intervention.

The peripartum population is somewhat unique in that many systemic anesthetic drugs are avoided, when possible, to prevent action of these medications on the fetus. Thus, neuraxial analgesia is frequently chosen as a primary or sole anesthetic for these patients. It is also common to administer neuraxial opiates in this population as well, both for their synergistic effects with local anesthetics as well as for acute postoperative pain control. The administration of these opiates is not without potential complications. Here we discuss refractory hypothermia following neuraxial opiate administration for cesarean delivery.

Description



A 40 y.o. female G5P2022 at 34w0d with a past medical history of preeclampsia with severe features, gestational diabetes, chronic hepatitis B, obesity, and advanced maternal age presents for cesarean section. After appropriateness was assessed via pre-operative evaluation, a spinal anesthetic of 1.6 mL 0.75% hyperbaric bupivacaine with 0.1 mg morphine and 10 mcg fentanyl was chosen as the primary anesthetic for the case. The spinal was administered in the sitting position in the OR without difficulty. During the case, the patient's temperature was measured by skin temperature probe and was found to be 35.5 degrees C. However intraoperatively the patient did not endorse any signs of hypothermia and declined warming measures when offered.

Post-operatively, the patient was taken to the post anesthesia care unit to recover. Her temperature was found to be 34.6 degrees C sublingually upon arrival. Conservative warming measures including forced air warmer and warmed blankets were attempted for approximately 30 minutes without any significant change in body temperature. At this time 1 mg IV midazolam was administered, and conservative warming measures were continued. 15 minutes after administration of IV midazolam another sublingual temperature was checked and found to be 36.8 degrees C.

Discussion

While the exact mechanism of neuraxial opiate-induced hypothermia and its treatment have proven difficult to elucidate, it is postulated to involve the opiate receptors in the hypothalamus and its thermoregulatory pathways (1). Of interest, several pharmacologically distinct treatment options have been identified in the literature with varying mechanisms of action. First, IV naloxone represents a documented treatment for this type of hypothermia, likely antagonizing the opiate receptors in the hypothalamus and restoring homeostasis however at the cost of effective analgesia (2). IV nalbuphine has also been documented as effective, likely by a similar mechanism (3). And finally, PO lorazepam has been documented as being an effective treatment as well, although the mechanism remains not well understood (4). Here IV midazolam represents a pharmacologically similar treatment alternative to PO lorazepam.

Treatment options for neuraxial opiate induced hypothermia

1. IV naloxone
2. IV nalbuphine
3. PO lorazepam
4. IV midazolam

References

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