

Neostigmine and Atropine for Management of a Post-Dural Puncture Headache



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Introduction

- Research on the off-label use of **neostigmine and atropine in management of post-dural puncture headache** is scarce in the United States.
- Treatment is typically **supportive** care with bed rest, oral pain medications, caffeine, with an **epidural blood patch** reserved for severe cases. Several studies^{1, 2} described the use of neostigmine with atropine or normal saline as a potential treatment.
- In this study, we report the use of **neostigmine and atropine** to successfully treat a patient presenting several days after a post-dural puncture headache.

Case Description

- 24 year old female with a PMH of **morbid obesity** (BMI 50), presenting for her first **c-section**.
- A decision was made for her to receive **spinal anesthesia**.
- There was marked difficulty in the spinal placement, **requiring over 90 minutes with attempts by multiple experienced personnel**.

Case Description Cont’d

- Eventually, there was successful placement with a 27G spinal needle through a 17G tuohy needle.
- The **c-section was performed uneventfully**.
- Our patient **was discharged from the hospital 3 days after delivery** without any signs of headache.
- Two days later, she woke up with a **headache** that was positional, worse with standing, and resolves while supine.
- She returned to the hospital and anesthesiology was consulted. The headache was almost entirely frontal, behind the eyes in a T shape.
- Treatment options were discussed with the patient. Due to the **difficult neuraxial placement** and because there was **difficulty with IV placement**, a blood patch would have been challenging, posing a **risk for exacerbation of the headache**.
- Around the clock acetaminophen and ibuprofen did not provide relief. **Rest, IV hydration, caffeine, and oral analgesics were initially attempted** without much success.
- Ultimately, a decision was made to administer **neostigmine 20 µg/kg and atropine 10 µg/kg** at bedside.
- After administration of these medications, her **headache significantly improved** within an hour, and she was seen standing comfortably in patient room. Patient's only experienced **side effect was transient blurred vision**.

Discussion

Author	Dosage	n	p-value	Significant
Mahmoud 2018	Neostigmine (20 µg/kg) + Atropine (10 µg/kg)	85	< .001	Yes
Daoud 2019	Neostigmine (20 µg/kg) + Atropine (10 µg/kg)	3	N/A	N/A
Shrestha 2023	Neostigmine (20 µg/kg) + Atropine (10 µg/kg)	1	N/A	N/A
Soliman 2023	Neostigmine (20 µg/kg) + Atropine (10 µg/kg)	90	0.001	Yes
Ahmadzade 2023	Neostigmine (40 µg/kg) + Atropine (20 µg/kg)	99	0.035	Yes
Mohamed 2023	Neostigmine (20 µg/kg) + Atropine (10 µg/kg)	90	<0.05	Yes

Table 1: Articles on neostigmine and atropine for the treatment of post-dural puncture headache

Discussion

- Several **mechanisms** have been proposed, including cerebral vasoconstriction mitigating CSF drainage, and sympatholysis increasing CSF secretion by the choroid plexus by up to 30%¹. Atropine has also been shown to increase CSF secretion through antagonizing the effect of acetylcholine on the choroid plexus³.
- Side effects** with the neostigmine and atropine combination include abdominal cramping, muscle twitching, and urinary bladder hyperactivity. Blurry vision may occur due to the anticholinergic effects of neostigmine disrupting the accommodation reflex⁴. These side effects are typically **transient and well tolerated**¹, but they are important to discuss with patients prior to administration.
- We hope that our report sheds light on **neostigmine and atropine** as a potential treatment for a post-dural puncture headache, especially in situations where there is expected difficulty in reaching the epidural space.

References

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