

TREATMENT OF POST-DURAL PUNCTURE HEADACHE WITH ATROPINE/NEOSTIGMINE COMBINATION

Austin Foote, BS; Patrick Penland, DO; Mary Roberts, MD; John Crowe, MD
Department of Anesthesiology, University of Cincinnati

Introduction:

- Post-Dural Puncture Headache (PDPH) is the most common complication of neuraxial anesthesia in obstetric patients.¹
- Current treatment options include:
 - Hydration
 - Caffeine
 - Acetaminophen
 - Sphenopalatine Ganglion Block
 - Epidural Blood Patch (gold standard)
- Mahmoud et al published a **double-blind randomized control trial** comparing **neostigmine + atropine** combination therapy vs. saline placebo and found **pain scores were significantly better** with neostigmine + atropine than placebo and significantly decreased the need for epidural blood patch.²
- It is hypothesized that the central effects of both atropine and neostigmine influence both cerebrospinal fluid secretion and cerebral vascular tone. (see Figure 1)

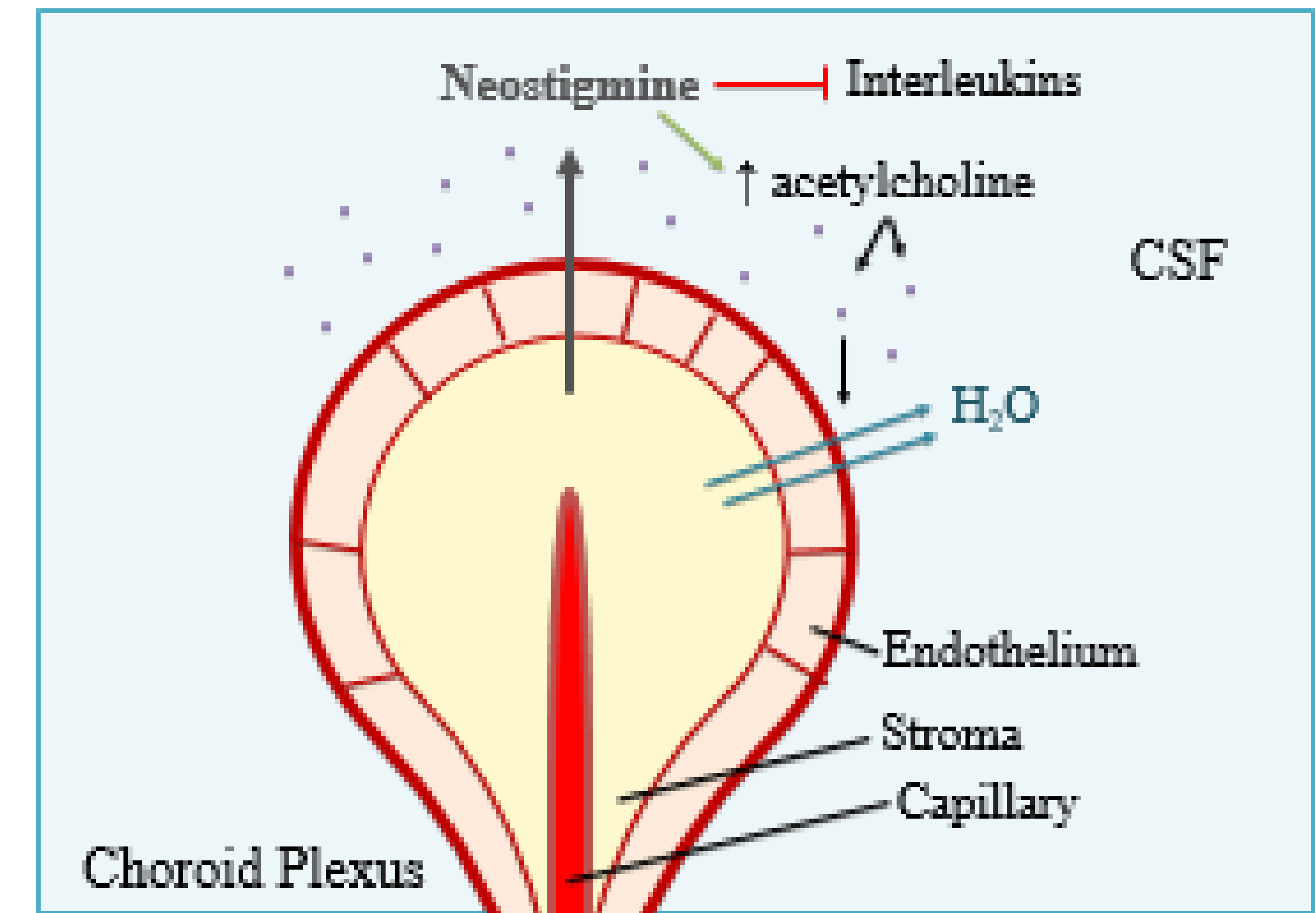


Figure 1. Hypothesizing the mechanism of action of neostigmine in CSF production. Neostigmine can pass through the blood-brain barrier and may block the production of inflammatory markers such as interleukins as well as possibly having a direct effect on receptors at the endothelium of the choroid plexus promoting increased CSF.³

Case Report:

29-year-old female G1P1 with a past medical history of hypertension, chronic kidney disease (CKD) stage III and bladder exstrophy s/p gastrocystoplasty and Mitrofanoff. (see Figure 2)

Her pregnancy was complicated by recurrent pyelonephritis and severe uterovaginal prolapse, as well as fetal growth restriction. Given her pregnancy course and surgical history, she was scheduled for a primary cesarean delivery at 34 weeks and 4 days gestation.

She underwent classical cesarean section and extensive lysis of colonic adhesions. Our anesthesia team attempted placement of a combined spinal epidural prior to the cesarean section, which was complicated by **accidental dural puncture twice** and placement of an intrathecal catheter, which failed to provide adequate anesthesia for the procedure, and she underwent general anesthesia.

Post-operatively, she developed an ileus and a headache which was worsened with standing and was associated with photophobia and mild neck stiffness.

- Conservative treatment with acetaminophen, caffeine, and hydration failed to alleviate her headache
- Sphenopalatine ganglion block was performed with little to no improvement in symptoms
- Epidural blood patch was considered but given a high suspicion for anatomic abnormalities in this patient from her bladder exstrophy and her two wet taps by experienced providers, patient considered high risk for repeat accidental dural puncture

Our team looked for alternative treatment options.

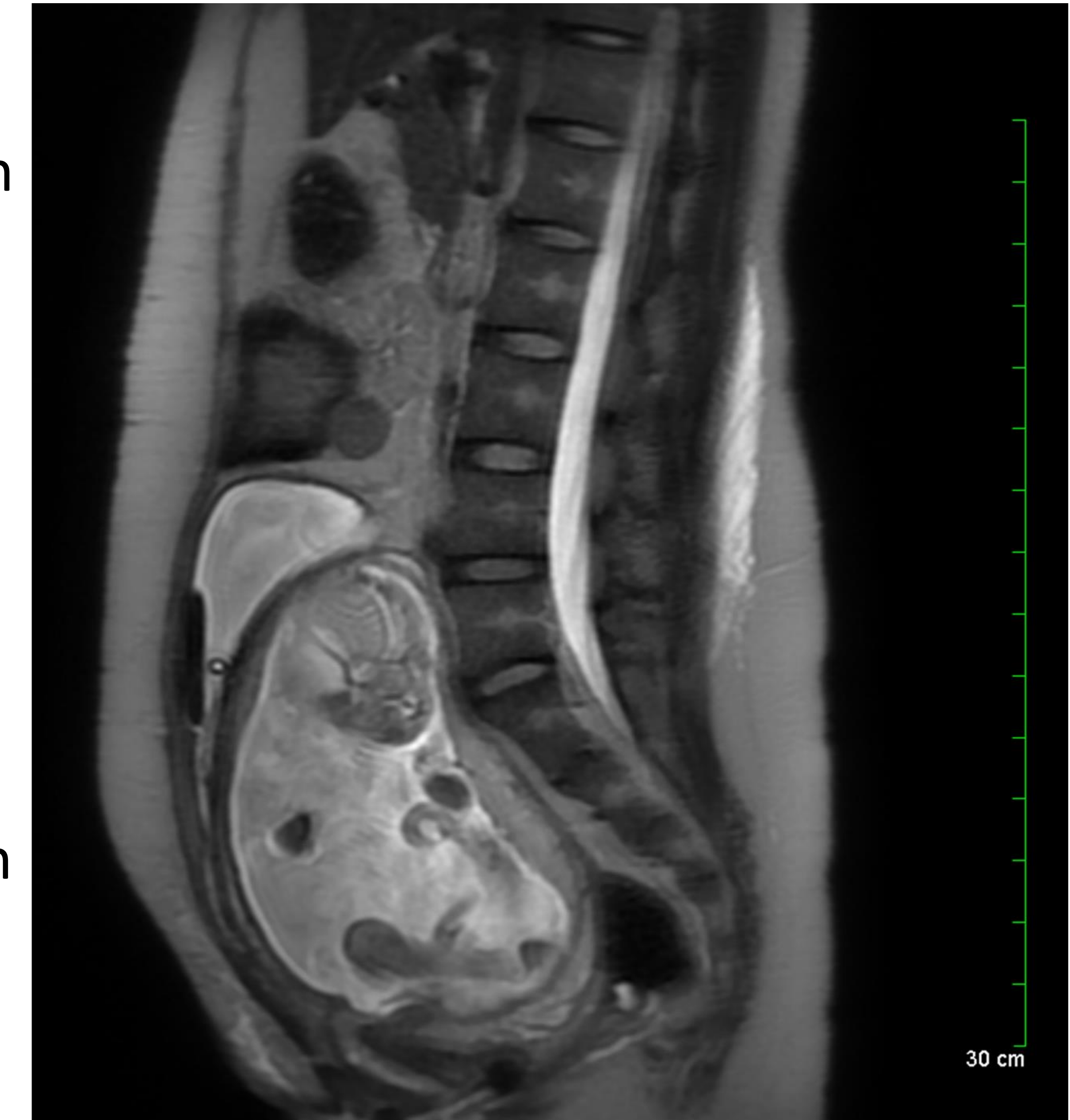


Figure 2. MRI Abdomen without contrast at 22 weeks 4 days gestation. This MRI demonstrates the Mitrofanoff bladder, a gravid uterus, and a radiographically normal lumbosacral spine.

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Treatment Process:

Patient transferred to Labor and Delivery PACU for monitoring

Pain score prior to administration was 7/10

Standard ASA monitors, including a 5-lead EKG, were applied

Administered neostigmine 20 µg/kg + atropine 10 µg/kg mixture

Monitoring occurred for 1 hour following administration
Patient reported subjective fever 15 minutes after administration

- Temperature was 98.1 °F
- Resolved with cool cloth applied to patient's forehead

No vital sign changes or other adverse reactions noted

Pain score 24 hours following administration was 0/10

Bowel obstruction resolved, with multiple stools within 24 hours of administration

References:

1. Flood P. Postdural puncture headache in obstetrics. *Seminars in Perinatology*. 2002;26(2):146-153.
2. Abdelaal Ahmed Mahmoud A et al. Addition of Neostigmine and Atropine to Conventional Management of Postdural Puncture Headache: A Randomized Controlled Trial. *Anesthesia and Analgesia*. 2018;127(6):1434-1439.
3. MacAulay, N. Molecular mechanisms of brain water transport. *Nature Reviews Neuroscience*. 2021; 22: 326–344.