Epidural Blood Patch for Postdural Puncture Headache in a Patient With Coronavirus Disease 2019: A Case Report

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The safety of epidural blood patch in patients with coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is unknown. Here, we report a single case of epidural blood patch to treat a postdural puncture headache in a woman after spinal anesthesia for cesarean delivery. The patient's headache was relieved, and she did not develop any other neurological symptoms. (A&A Practice. 2020;14:e01303.)

GLOSSARY

CNS = central nervous system; **COVID-19** = coronavirus disease 2019; **CSF** = cerebral spinal fluid; **EBP** = epidural blood patch; **HIV** = human immunodeficiency virus; **RT-PCR** = reverse transcriptase polymerase chain reaction; **SARS-CoV-2** = severe acute respiratory syndrome coronavirus 2

The coronavirus disease 2019 (COVID-19) pandemic has overwhelmed global health care systems. Medical providers must manage the disease, its potential comorbidities, and their personal safety. Pregnancy, labor, and delivery complicate matters even more. In this scenario, anesthesia providers are operating with limited, rapidly evolving information. Although experience is limited, neuraxial procedures seem safe and are recommended for parturients with COVID-19 disease.[1] Headache is a recognized complication of neuraxial block. Epidural blood patch (EBP) is an effective treatment for postdural puncture headache. The safety of EBP in patients with active COVID-19 disease is unknown. These patients may have viremia. Intentionally injecting virus-containing blood into the epidural, and possibly subarachnoid, space may risk inoculating the central nervous system (CNS). Given this uncertainty, professional societies urge caution when contemplating EBP.[2,3] To help fill this knowledge gap, we report our experience providing an EBP to a woman who developed a severe postdural puncture headache in the setting of recently diagnosed COVID-19 disease. Our patient has provided Health Insurance Portability and Accountability Act–compliant written consent for the publication of this report.

CASE DESCRIPTION

An otherwise healthy, 26-year-old Haitian Creole-speaking primigravida at 35 weeks and 6 days gestation was admitted to the hospital for preterm contractions. She was 1.65 m tall and weighed 70.6 kg (body mass index, 25.9 kg/m^2). On arrival, the patient complained of a new-onset dry cough, and a nasopharyngeal swab sent for reverse transcriptase polymerase chain reaction (RT-PCR) testing was negative for SARS-CoV-2 infection. On admission, her white blood cell count was 11.4 k/μL, her hemoglobin was 14.7 g/dL, and her platelet count was 312 k/μL. Later that day, she developed a category 2 fetal heart rate tracing with minimal variability and repetitive late decelerations. The obstetrician decided to perform an urgent cesarean delivery. The patient consented to a spinal anesthetic. In the operating room, the anesthesia resident attempted to induce spinal anesthesia using an 18-gauge introducer and a 25-gauge pencil point spinal needle at the L3–4 interspace. He was unsuccessful after 1 attempt. Because of the urgency of the situation, the attending anesthesiologist performed a second attempt at the L2–3 interspace. He was successful on his first try. Subarachnoid injection of 13.5 mg of 0.75% bupivacaine with 8.25% dextrose and 10 μg fentanyl produced an adequate level of surgical anesthesia. The patient underwent an uncomplicated cesarean delivery and delivered a 2936-g infant with Apgar scores of 8 and 8 at 1 and 5 minutes. Intraoperative hemodynamic changes were unremarkable. Hypotension was managed with intermittent boluses of phenylephrine and ephedrine. Oxygen saturation ranged from 95% to 100%. Tachycardia to 130 beats per minute developed after delivery of the baby but resolved with intravenous fluids. After surgery, she was started on subcutaneous enoxaparin 40 mg daily.

On postoperative day 1, she was afebrile but continued to complain of a dry cough. A second nasopharyngeal swab was sent for SARS-CoV-2 RT-PCR testing and returned a positive result. Laboratory testing at that time was consistent with COVID-19 (D-dimer 1581 ng/mL, C-reactive protein 101 mg/L, and lactate dehydrogenase 424 U/L). Her platelet count remained stable at 260 k/μL. She remained afebrile throughout her hospital stay and did not have any worsening of her respiratory symptoms.

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On the morning of postoperative day 1, the patient also reported a positional 7 of 10 circumferential headache with neck stiffness. She denied nausea, vomiting, or photophobia. Acetaminophen and ketorolac provided partial relief of her headache. On postoperative day 2, the headache had worsened to 10 of 10. She declined an EBP, and acetaminophen, butalbital, and caffeine were added to her analgesic regimen. On postoperative day 3, she requested an EBP. Her platelet count that morning was 303 k/μL.

On the morning of postoperative day 3, approximately 23 hours after the patient's last dose of enoxaparin, 2 anesthesia providers donned enhanced personal protective equipment (N95 mask, face shield, double gloves, and gown) and entered the patient's room. The patient wore a surgical facemask and assumed the left lateral decubitus position. The skin over the L3–4 interspace was cleansed with chlorhexidine, and an 18-gauge Tuohy needle was inserted into the epidural space using a loss of resistance to saline technique. The epidural space was entered 4.5 cm beneath the skin, and 20 mL of freshly drawn autologous blood was injected through the Tuohy needle without difficulty. Two hours later, the patient reported significant relief of her headache and neck stiffness but still had a mild residual headache that did not interfere with ambulation or activities of daily living.

The patient was discharged to home on postoperative day 4 with a mild, nonpositional headache. She received multiple follow-up phone calls over the next 2 weeks. She denied any COVID-19–related symptoms. She also reported no headache or other neurological symptoms.

DISCUSSION

We believe this is the first report of an EBP in a parturient diagnosed with SARS-CoV-2 infection. The differential diagnosis of postpartum headache is extensive and includes tension or caffeine withdrawal headaches, preeclampsia, and postdural puncture headache. Headache can also be a symptom of SARS-CoV-2 infection. In 1 review, 8%–13% of patients with COVID-19 disease reported a headache.[4] Headache occurs in approximately 1% of parturients having spinal anesthesia with a 25-gauge pencil point needle.[5] Given the positional nature of the headache, and its proximity to her dural puncture(s), we believe this patient most likely had a postdural puncture headache.

Our understanding of the neurobiology of SARS-CoV-2 infection remains incomplete but is rapidly evolving. Most coronaviruses share similar structures and methods of infection. Other human coronaviruses invade the CNS.[6] Involvement of the CNS, including headache, dizziness, and impaired consciousness, has been reported to occur in up to 25% of patients with COVID-19 disease.[7] Loss of sense of taste or smell, which likely represents cranial nerve involvement, is reported in up to 70% of patients.[8] Some patients develop severe CNS pathology including stroke,[9] Guillain-Barre syndrome,[10] and encephalopathy.[11] Several reports of cerebral spinal fluid (CSF) analysis in patients with severe neurological manifestations associated with COVID-19 disease have been published. Most have failed to detect viral RNA in CSF samples,[9–12] but other inflammatory markers are increased.[11] These results may reflect the limitations of the SARS-CoV-2 RT-PCR test rather than absence of the virus from the CNS.[12]

A similar uncertainty about the safety of EBP in patients with a viral infection arose at the beginning of the human immunodeficiency virus (HIV) epidemic. Some voiced concerns about seeding the CNS with virus.[13] However, HIV routinely invades the CNS, and subsequent experience showed that EBP was safe in these patients.[14] Hopefully, the same will prove true with COVID-19 disease.

In summary, we have presented a single case report of an EPB in a patient with mild COVID-19 disease. Because of the continued uncertainty surrounding the pathophysiology of this disease, we agree with the notes of caution expressed by the Society of Obstetric Anesthesia and Perinatology[3] and the American Society of Regional Anesthesia and Pain Medicine.[2] We cannot comment on the wisdom of performing an EBP in women with more severe symptoms or significant thrombocytopenia. However, our patient appears to have benefited from the EBP without any discernable harm.

DISCLOSURES

Name: Mark C. Norris, MD.
Contribution: This author helped draft the manuscript and approve the final version.
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Contribution: This author helped care for the patient and draft the manuscript and approve the final version.
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