



In reply: Spinal anesthesia for Cesarean delivery in women with COVID-19 infection: questions regarding the cause of hypotension

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To the Editor,

The recent letter by Benhamou *et al.*,¹ has affirmed our experience² in anesthesia for Cesarean delivery in coronavirus disease (COVID-19) patients, and has also raised some questions. Now that the COVID-19 outbreak is in full swing in the world, we are willing to share our experience and are hoping to help every anesthesiologist in the frontline of the pandemic.

In our study, we described in the method section as to whether “Continuous epidural anesthesia or combined spinal-epidural anesthesia was the first choice to avoid endotracheal intubation”.² Nevertheless, because COVID-19 was not fully understood in the early stage of the outbreak, we could not rule out the presence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in the cerebrospinal fluid (CSF). To reduce the risk of viral spread, all 14 patients in our study received epidural anesthesia. Moriguchi *et al.*³ verified our concern when they reported a case of viral encephalitis caused by SARS-CoV-2 and confirmed the presence of SARS-CoV-2 in the CSF using genome sequencing.

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In our own study,² 12 of the women had perioperative hypotension—indeed, a high incidence of hypotension. Recently, Bhatraju *et al.*⁴ reported a large proportion of critically ill COVID-19 patients presenting with shock that required vasopressor support and was directly related to COVID-19. One reason might be that SARS-CoV-2 binds to the angiotensin converting enzyme-II (ACE2) receptor. The ACE2 receptor is a cardio-cerebrovascular protective factor, which plays an important role in regulating blood pressure, in addition to have an anti-atherosclerosis mechanism.⁵ Because the duration of perioperative hypotension we reported was short (and not more than a 30% reduction from baseline), there was no apparent increase in end-organ damage. Perioperative hypotension was effectively treated using a combination of left lateral lying position, intravenous fluids, and vasopressor support (phenylephrine).

In addition, the three emergency Cesarean deliveries in our study had fetal distress when they entered the hospital and all received general anesthesia. As outlined by Benhamou *et al.*,¹ there was insufficient time for the anesthesiologist to inject an additional dose into the epidural catheter previously placed for labour analgesia early enough to obtain adequate surgical anesthesia. A multidisciplinary diagnosis and treatment model is the key for the anesthesiologist to don personal protective equipment and to prepare the needed equipment and medications before the patient entered the operating room, so that once the obstetrician completes the evaluation of the patient and communicates with the anesthesiologist, pediatrician and nurse, a rapid Cesarean delivery can be undertaken.

We hope that our experience can help ensure the safety of parturients and newborns during the COVID-19

pandemic, and hope that it will help to protect frontline medical staff from SARS-CoV-2 infection.

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