Yet some studies demonstrate a synergy between sedatives and analgesics that causes a significant interaction for the response to tetanic stimulation. In a study published in 2018 by Sabourdin *et al.*,[4] pupillary reflex dilation was more sensitive in detecting a noxious stimulation at BIS levels around 55 than at 25. Sabourdin *et al.* conclude that BIS is displaying the level of cortical inhibition and not nociceptive status. But to a certain extent, BIS monitoring can be able to detect somatic responsiveness.[5] In these situations, BIS reveals secondary information from the noxious stimulus when reaching the cerebral cortex *via* ascending pathways. Thus, it is rather a marker of arousability than measuring the balance between nociception and antinociception. In that regard, the literature that Liu *et al.* reference is not contradictory to our results.

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Competing Interests

The authors declare no competing interests.

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Left Uterine Tilt for Cesarean Delivery Significantly Improves Maternal Hemodynamics and Should Not Be Considered Outdated Dogma

To the Editor:

We would like to congratulate Lee *et al.*[1] on their excellent study, which challenged medical dogma and demonstrated that with appropriate management of the blood pressure during a spinal anesthetic for a cesarean delivery, left uterine displacement does not affect the acid-base status of the neonate. The study was well-designed and executed; however, we strongly disagree with the authors' interpretation of the data such that "…findings do not support the historical practice and current recommendations for LUD [left uterine displacement] as being essential during elective cesarean delivery to support maternal hemodynamics, prevent spinal-induced maternal hypotension, and maintain neonatal acid–base status in healthy nonlaboring women with uncomplicated pregnancies."[1]

Lee *et al.*[1] found that the lack of left uterine displacement did not impact neonatal acid-base status; however, maternal hemodynamics were negatively affected in the group not receiving left uterine displacement. Maternal blood pressure and cardiac output were both significantly lower in the supine compared to left uterine displacement group, despite the supine group receiving 29% more phenylephrine.[1] Therefore, rather than concluding that left uterine displacement is not necessary, the study actually demonstrates that left uterine displacement is beneficial and does improve maternal hemodynamics significantly.

In addition to the mean outcome differences between groups in the study cohort, it is critically important to consider the relatively rare, but serious adverse events that occur in some individuals after the induction of spinal anesthesia. The study was not adequately powered to detect the influence of the supine position on the incidence of events such as reflex bradycardia and cardiovascular collapse. Even in this small cohort, however, there were some women in whom the lack of left uterine displacement appeared to have a profound impact. One subject in the supine group had a clinically significant drop in blood pressure to 44/22 mmHg, and the lowest base excess was in the supine group. There was also the one patient in the left uterine displacement group who became symptomatic with a systolic blood pressure decrease from 122 to 75 mmHg while lying supine before her anesthetic. Supine hypotensive syndrome occurs in approximately 8% of women at term; and even if left uterine displacement does not benefit the entire study cohort, these individuals may benefit from left uterine displacement.[2] Consistent with this concern, Lee *et al.* previously showed that although cardiac output only decreased 5% on average in the patients tilted less than 15° compared to when tilted at 15° or greater, cardiac output decreased by 20% in a subset of patients in the less tilted group.[3]

On the surface, the data from Lee *et al.*[1] suggests that left uterine displacement may not be essential; however, a deeper

look at their data demonstrates that left uterine displacement does have a positive effect on maternal hemodynamics, that a significant subset of patients are adversely affected when not tilted, and that we cannot predict which patients can safely be positioned supine. We, therefore, would strongly advocate for the continued use of left uterine displacement during cesarean delivery. The use of left uterine displacement should be considered for any pregnant woman in whom the uterus is palpable above the umbilicus.[4] Left uterine displacement is a simple, cost-free intervention with proven efficacy, and the data from Lee *et al.*[1] demonstrates the utility of this practice. If left uterine displacement distorts the anatomy enough to make surgery difficult, it can be reduced immediately prior to surgery, as most of the hemodynamic benefit of left uterine displacement is realized in the early post-spinal anesthesia period while surgical preparations are being made.

Competing Interests

The authors declare no competing interests.

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Neonatal Outcome after Maternal Supine Position for Elective Cesarean Delivery under Spinal Anesthesia: Was the Umbilical Cord Blood Sampling Procedure Reliable?

To the Editor:

I read with interest the article by Lee *et al.*[1] and the accompanying editorial by Farber and Bateman[2] regarding the effects of maternal supine position during planned cesarean delivery with spinal anesthesia on neonatal acid-base status as well as on maternal blood pressure and cardiac output. I congratulate Lee *et al.*[1] for their hard work in producing this demanding study to test the noninferiority of supine position during contemporary clinical use of a crystalloid coload and phenylephrine infusion. I have several points, however, that I wish to address regarding this study by Lee *et al.*

First, although the primary outcome of the study was mean umbilical artery base excess and the secondary outcomes were mean umbilical artery pH and umbilical vein base excess and pH, the authors did not describe their umbilical cord blood sampling procedure. It was not mentioned whether a segment of the umbilical cord was double-clamped. If only a single clamp was applied, the umbilical cord blood would remain in continuity with the placenta. The ongoing placental metabolism and gas exchange could result in changes in umbilical base excess and pH. Base excess significantly decreases (becomes more negative) after 20 min onward if the umbilical cord was not double-clamped and after 40 min onward if the umbilical cord was double-clamped. The pH steadily decreases after 60 s of delivery onward if the umbilical cord was not double-clamped; a difference of approximately 0.20 pH units may be reached by 60 min after delivery.[3] In their protocol registered on www.ClinicalTrials.gov (NCT02243423), Lee *et al.* state that the time frame for their sample is within 2 h. Absence of data regarding the umbilical cord blood sampling procedure may make the results unreliable.

Second, it was mentioned in the Results section[1] that the baseline cardiac output was 8.4 l/min in the tilted position *versus* 8.1 l/min in the supine position, resulting in a difference of 0.3 l/min and giving a P value of 0.002 using the paired t test. From figure 4,[1] it seems that 8.4 l/min and 8.1 l/min are the mean cardiac output over the first 15 min after spinal anesthesia in the tilted and in the supine position respectively and not the baseline cardiac outputs as stated. From the same figure, it seems that baseline cardiac outputs are around 9.25 l/min. In addition, the correct test to be done is the unpaired t test. The explanation is that the paired t tests consider the differences between each paired observation when computing the P values while the unpaired t tests consider the differences in group means.[4]

Third, some variables that may influence the neonatal or maternal outcomes were not included in the study. Such confounding variables include induction-to-delivery interval and uterine incision-to-delivery interval for neonatal outcomes and include block height for maternal outcomes.

Fourth, a strange pharmacologic response occurred during treatment of the patient who had an acute drop in blood pressure to 44/22 mmHg with a heart rate of 130/min at 6 min after spinal anesthesia. The minute after receiving a single dose of ephedrine 10 mg intravenously, the patient's blood pressure rebounded to 198/104 mmHg with a heart rate of 61/min. Ephedrine causes increase in the heart rate