

# Society for Maternal-Fetal Medicine Consult Series #59: the use of analgesia and anesthesia for maternal-fetal procedures: a letter to the editor



**TO THE EDITORS:** In August 2021, the Society of Maternal-Fetal Medicine (SMFM) published an article on the use of fetal analgesia and anesthesia.<sup>1</sup> According to SMFM, fetal pain perception requires a developed cortex and is not possible until at least 24–25 weeks gestation and not likely until after 28 weeks gestation, when somatosensory cortical connections develop. According to this hypothesis of cortical necessity, all fetal responses to noxious stimuli before 24–28 weeks gestation are viewed as unconscious, reflexive, and subcortical reactions and not indicative of a pain experience.

Such assertions conflict with validated neonatal pain assessment tools, which are strongly recommended by the American Academy of Pediatrics at similar and earlier gestational ages, based on behavioral responses.<sup>2</sup> The hypothesis of cortical necessity thus raises concerns about overreliance on neuroanatomical hypotheses, as was done in the era of untreated neonatal pain, rather than correlation with clinical behavior, context, and other markers of pain perception.

There is no identified difference in behavioral pain responses in the fetus or neonate after 24 weeks gestation that demonstrates impact from cortical connections. Instead, the same indicators of pain that are present after 24–28 weeks gestation are already present, developing, and maturing before 24 weeks gestation. These fetal responses to painful procedures include facial expressions of pain, withdrawal, and flailing, as well as stress hormone and hemodynamic changes. These responses are mitigated by analgesics.

Numerous researchers have also challenged the hypothesis of cortical necessity, noting that pain perception occurs before 24 weeks gestation without a developed cortex.<sup>3</sup> This growing debate highlights the lack of medical, scientific, and international consensus regarding the recognition and treatment of pain at earlier gestational ages. Fetal anesthesia recommendations published in 2021 by the American Society of Anesthesiologists and the North American Fetal Therapy Network state, “Because it remains uncertain exactly when a fetus has the capacity to feel pain, it is best to administer

adequate fetal anesthesia in all invasive maternal–fetal procedures to inhibit the humoral stress response, decrease fetal movement, and blunt any perception of pain.”<sup>4</sup>

Current neuroscientific evidence indicates that the onset of fetal pain perception is possible during the first trimester of pregnancy, during which time the minimum necessary neuroanatomy for fetal pain perception has developed, via the cortical subplate, via the thalamus, or both. Similarly, fetal awareness, mediated by the brainstem, has been demonstrated by 14 weeks gestation.<sup>3</sup>

If the fetus is capable of experiencing pain, which research convincingly indicates is possible beginning in the first trimester, then an ethical obligation exists to prevent, mitigate, and treat fetal pain whenever it can be anticipated. ■

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## REFERENCES

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