


## CORRESPONDENCE

# Diaphragm electrical activity target during NAVA: One size may not fit all

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To the Editor,

We appreciate the clarification and added refinement of targets for electrical activity of the diaphragm (EAdi) in some rare and specific conditions such as neuromuscular diseases and severe lung diseases, as proposed by Martin et al.<sup>1</sup> in their comments on our review on NAVA application in preterm newborn infants.<sup>2</sup> We agree that the levels of NAVA should be adjusted according to the specific lung conditions and status of the diaphragm. Long-term ventilated infants seem to be at higher risk of evolving ventilator-induced diaphragmatic dysfunction with atrophy or failed growth of myofibers,<sup>3,4</sup> and therefore are potentially in need of a training period with a longer time to wean.<sup>5</sup> We focused our review on the applications of NAVA in a specific patient population, that is, preterm infants with the most common lung conditions encountered in these patients such as early RDS and/or evolving BPD.<sup>2</sup> Our suggested settings for NAVA level gain are a summary of the few proposed applications in the literature in combination with our own experience, where too high support might induce apnea due to the well-known increased strength of the Hering-Breuer inspiratory inhibitory reflex in preterms with RDS,<sup>6-8</sup> and too low support might increase the work of breathing and ultimately induce respiratory acidosis due to inadequate ventilation in infants with evolving severe BPD who have been on mechanical support for a substantial time.<sup>5</sup> Even though the literature suggests that the optimal EAdi would be 5–10  $\mu$ V in stabilized newborn infants,<sup>2</sup> this is not completely verified, and especially not in view of different gestational and postnatal ages and underlying diseases, as also indicated by Martin et al.<sup>1</sup> From our experience from long-term ventilated extremely preterm infants

with evolving severe BPD, where we apply NAVA and NIV-NAVA as a standard weaning procedure similar to other centers with high survival in the most extremely preterm infants,<sup>9</sup> a reduction in NAVA level gain is usually indicated when EAdi <10  $\mu$ V. It is also important to note that higher EAdi levels can be momentarily reached in active and nonsedated infants, and therefore it is important to observe the breathing pattern where increased work of breathing mixed with periods of shallow tachypnoeic breathing or apnoeic spells indicates inadequate support and need of higher NAVA gain. All in all, we agree that there is more knowledge to be gained in the field of optimal EAdi and NAVA level gains. The suggested EAdi values are appropriate starting points in the population we addressed, but ventilator settings should always be adjusted based on the patient's clinical response. We fully agree that individualized patient care is needed and that one size does not fit all.<sup>10</sup>

## CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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None.

## AUTHOR CONTRIBUTIONS

**Richard Sindelar:** Conceptualization (equal); formal analysis (equal); writing – original draft (lead). **Robin McKinney:** Conceptualization (equal); formal analysis (equal); writing – review and editing (equal). **Linda Wallström:** Conceptualization (equal); formal analysis

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(equal); writing – review and editing (equal). **Martin Keszler:** Conceptualization (equal), formal analysis (equal); writing – review and editing (equal).

#### DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

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