Effect of various Neurally Adjusted Ventilatory Assist (NAVA) gains on the relationship between diaphragmatic activity (Eadi max) and tidal volume (Vt)


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Neurally adjusted ventilatory assist (NAVA) is an assisted ventilatory mode in which the electrical activity of the diaphragm (Eadi) is used to pilot the ventilator.

Paw = NAVA gain x Eadi
Introduction (2)

- NAVA improves patient-ventilator synchrony\(^{(1)}\)

\(^{(1)}\) Piquilloud et al. Intensive Care Med;2011;37:263-71

- Little is known about how to set the NAVA gain i.e., how to choose the ratio between Eadi and delivered pressure.
Study objectives

- To assess the relationship between Eadi max and tidal volume (Vt) at various NAVA gain settings.

- To evaluate whether modifying the gain influenced the Vt/Eadi max relationship in non-invasively ventilated (NIV) patients.
Methods (1)

- Prospective interventional study

- Comparison of 3 NAVA gain values during NIV (20 minutes each).
  - NAVA100: gain set by the clinician according to the manufacturer’s recommendations (same $P_{max}$ as in pressure support)
  - NAVA50: gain set as -50% of NAVA100 gain
  - NAVA150: gain set as +50% of NAVA100 gain

- Recording of Eadi max and tidal volume (Vt) for each respiratory cycle
Methods (2)

- Assessment of Vt/Eadi max ratio for each breath and each NAVA gain

- Determination of Range 90 (Range 5-95) for each patient and each NAVA gain setting

A smaller Range90 indicates a better matching of Vt to Eadi max.
Results (1)

- 12 patients included
  - 5 COPD
  - 2 mixed pulmonary disease

- Median [IQR] Range 90 for each gain setting:

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<th>NAVA 50</th>
<th>NAVA 100</th>
<th>NAVA 150</th>
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⇒ Globally NAVA100 allowed the best matching between Eadi max and Vt
If Range 90 was considered for each NAVA gain setting patient by patient:

Lowest Range90 value was:

- under NAVA 100 in 4 / 12 patients (33%)
- under NAVA 150 in 2 /12 patients (17%)
- under NAVA 50 in 6/12 patients (50%)

NAVAt was not the best NAVA gain for minimizing Range 90 in every patients.
Results (3)

- If the lowest Range90 value was compared to the next lowest for each patient:
  - 3 patients had differences of less than 10%
  - 9 patients had differences from 17-24%

→ Most patients (9/12 or 75%) had a clear better match between Eadi max and Vt for one specific NAVA gain.
Conclusions

- Range 90 assesses the matching between Eadi max and Vt.

- Different NAVA gains yield a different ability to match Vt to Eadi max.

- Range 90 approach could be a new way to determine the optimal NAVA gain for a given patient at a given time but requires further investigations.