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Does neurally adjusted ventilatory assist improve outcomes for critically ill adults during weaning from mechanical ventilation? A systematic review
Background

Patients in critical care are commonly ventilated with pressure support, particularly during weaning

- Diaphragm activity driven by respiratory centres via phrenic nerves and regulated by several afferent reflexes = complexity of breathing variability
- Weaning difficulty associated with patient / ventilator asynchrony
- Confound clinical decision making during weaning from IMV and necessitate sedation → poorer outcomes (Epstein, 2011)
- Ineffective triggering most common cause in assist control = increased duration of IMV and ICU stay (De Wit et al, 2009)
Neurally adjusted ventilatory assist (NAVA) is a novel ventilation mode

- Partial respiratory support drive be the electrical activity of the diaphragm
- EMG data monitored and fed back to the ventilator in real time via transoesophageal sensors
- Initiation of patient’s diaphragm drives the breath assist rather than airway pressure or flow, also determines amount of pressure support provided during a breath = synchrony regardless of iPEEP or DH
- Reduces trigger delay and chances of insufficient breath effort triggering assistance
Purpose

Diaphragm weakness and atrophy occurs during IMV and is a factor in weaning success – neural drive progressively lost during PSV (Petrof, Jaber & Matecki, 2010; Jaber et al, 2011)

NAVA support works to unload respiratory muscles without losing EAdi or ventilator drive (Sinderby et al, 2007), so **should** reduce dysfunction and improve weaning outcomes

Clear physiological benefits, thus far no consensus on clinical recommendations or outcomes for patients
Methods

Search Dec 2017 repeated Feb 2018

Clinical review of NAVA published 2012 (Terzi et al, 2012)

Qualitative synthesis due to wide range of outcomes, reported in line with PRISMA statement and appraised with Cochrane risk of bias tool
Results

36 articles identified and four randomised trials comparing NAVA and PSV met the inclusions criteria

- Outcomes varied considerably and there was a general high risk of bias across all studies with trial design and protocol concerns
- 194 participants in acute respiratory failure in total, due to varied causes such as COPD, sepsis, trauma and pneumonia
- No difference between groups for primary weaning outcomes
- Asynchrony and ineffective trigger effort significantly less in NAVA groups – nothing new
Results

Respiratory variables?

- Higher levels of support in PSV = higher tidal volumes
- Lower levels of PSV = higher RR
- Less tidal volume and consistent across levels of support in NAVA
- Significantly reduced triggering delay in NAVA, a risk factor for reintubation

Interesting trends?
Conclusions

Despite clear physiological and theoretical benefits, there is insufficient evidence to draw any firm conclusion…

However! NAVA shown to be safe and feasible, while similar effect on weaning outcomes to PSV

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Interesting trends suggest there could be a positive carryover in specific populations with severe asynchrony and problematic weaning

Current evidence sparse and lacking methodological rigour
Implications

- No conclusive evidence of link between physiological benefits and clinical outcomes – further, well designed research warranted

- If the trends can be extrapolated to general use across ICUs and not solely in highly experienced centres selected for research, then could NAVA outperform conventional PSV?

- A tool to consider for use with specific populations with severe asynchrony or problematic weaning

- Continue to be directed by clinician experience and robust clinical reasoning
References


Epstein SK. How often does patient-ventilator asynchrony occur and what are the consequences?. Respiratory Care. 2011 Jan 1;56(1):25-38.

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