Nurse-led weaning from mechanical ventilation: where's the evidence?

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Authors' objectives
To systematically review the published literature to answer the question: 'Does nurse-led weaning from mechanical ventilation reduce the duration of ventilation compared with doctor-led care?'

Searching
The following sources were searched (search dates unclear): the Cochrane Library, MEDLINE, EMBASE, Best Evidence, and the Current Controlled Trials Register. In addition, 'Intensive and Critical Care Nursing' was handsearched over the previous 2 years, expert opinions were sought, and the reference lists of the identified studies were reviewed. MeSH terms were used with the 'explode' option and keyword searching using methodological filters; further details of the search strategy were reported in the paper. The search included studies reported in any language, but only papers with an English abstract were included in the review.

Study selection
Study designs of evaluations included in the review
The grading of studies was based on the NHS Centre for Reviews and Dissemination guidelines (see Other Publications of Related Interest no.1). Studies relating to the following levels of evidence were eligible for inclusion: I, II-1a, II-1b, II-2a, II-2b and II-2c.

Specific interventions included in the review
Weaning strategies led by a nurse or respiratory therapist, which allowed them to reduce ventilator support without a doctor's order, compared with physician care.

Participants included in the review
The type of participants included in the review was not reported a priori, but appeared to include any patient group receiving mechanical ventilation.

Outcomes assessed in the review
The time the patient spent on a ventilator was assessed; this had to be reported for both the nurse-led and the control groups.

How were decisions on the relevance of primary studies made?
The author alone assessed the relevance of individual studies.

Assessment of study quality
Validity was assessed using guidelines proposed by the Critical Appraisal and Skills Programme (see Other Publications of Related Interest no.2), which included eleven questions addressing different aspects of study design. The author alone carried out the assessment of study validity.

Data extraction
The data were extracted by one author. Data were extracted under the following headings: study design (level of evidence); findings, including duration of ventilation, reintubation rates and mortality differences; confidence interval (CI); and the significant difference (p-value).

Methods of synthesis
How were the studies combined?
A narrative synthesis was undertaken.

How were differences between studies investigated?
Heterogeneity was discussed within the text of the review.

Results of the review
Three studies were included in the review: one randomised controlled trial (RCT) and two cohort studies. The RCT had level of evidence of I, whilst the two cohort studies had level of evidence II-2b and II-2c. The total number of participants was not stated.

The single RCT found that weaning commenced earlier in the protocol group: the difference between the control versus protocol group was -18.7 hours (95% CI: -40.2, +2.8, p=0.016), but this difference was not significant. There was a significant difference in the duration of the mechanical ventilation in the respiratory therapists (RT) group, compared with physician care: the difference between the control versus respiratory therapist protocol was -32.6 hours (95% CI: -63.4, -1.8, p=0.079). There were no significant differences in reintubation rates, mortality or hospital stay, although the hospital costs were reduced in the respiratory therapist group.

The first of the cohort studies (n=284) reported that the total ventilation time and weaning duration were reduced in the protocol group, compared with a retrospective control. However, neither result was statistically significant (p=0.09 and p=0.77, respectively).

The second of the cohort studies compared patients before and after the introduction of the weaning protocol. The study found no significant difference between the two groups in terms of the duration of ventilation (p=0.39).

In summary, two studies showed a reduction in ventilation time without additional complications; the third study had the weakest evidence and showed no difference between the control and treatment groups.

Authors’ conclusions
There was limited evidence suggesting that nurse-led weaning may reduce ventilation time. However, it was unclear whether it was the nurse-led aspect of the clinical protocol that produced the effect.

CRD commentary
Overall, the methodological quality of this review was fair. The author structured the report on established systematic review guidelines (see Other Publications of Related Interest no.1). A major limitation of the review was that only one author assessed the studies for inclusion and quality, and extracted the data. Independent assessment and data extraction by two or more reviewers can reduce bias and errors. The author herself commented that the database search was limited by time and resources, so it is possible that important studies were missed. In addition, she made no specific attempts to locate unpublished studies, so publication bias may have arisen. The same checklist was used to assess the validity of all of the studies.

While suitable for RCTs, the chosen checklist may not have addressed some issues specific to observational studies. Data from the included studies were presented in tabular format, but the details were inadequate: it was unclear how many participants were enrolled in the included studies and no patient characteristics were reported. The author synthesised the data in the narrative, which was appropriate.

The author’s conclusions follow from the results of the included studies.

Implications of the review for practice and research
Practice: The author states that the implications of nurses leading weaning need to be considered; in particular, with respect to ensuring adequate training and further expanding the role of nurses when stress may already be high.

Research: The author states that this review has highlighted an urgent need for UK-based research in the area of nurse-
led weaning from mechanical ventilation. The author goes on to state that the issue of whether the protocol- or nurse-led aspect of the studies causes the effect of reduced ventilation time needs to be investigated. The author suggests that this could be performed using an identical protocol, with nurses weaning some patients and doctors weaning others, and a randomised method of allocating patients to the groups.

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Other publications of related interest

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Record Status
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.