Semi-recumbent position or not?

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Study population: mechanically ventilated ICU patients
Comparison: semi-recumbent position versus standard care
Outcome: ventilator-associated pneumonia

Methods

Data sources

Publications were retrieved by a search of Medline and the Cochrane Library up to march 2006. Terms included were 'pneumonia' and 'ventilator*' and 'semi-recumbent'. To identify randomised controlled trials in Medline the following search strategy was used: (((ventilator associated pneumonia) OR (VAP AND (pneumonia OR pneum*)) OR ("Respiration, Artificial"[MAJR] AND pneumonia) OR (ventilated AND pneumonia) OR (ventilation AND pneumonia)) AND (((randomized controlled trial[pt] OR controlled clinical trial[pt] OR randomized controlled trials[mh] OR random allocation[mh] OR double-blind method[mh] OR single-blind method[mh] OR clinical trial[pt] OR clinical trials[mh] OR ("clinical trial"[tw]) OR ((singl*[tw] OR doubl*[tw] OR trebl*[tw] OR tripl*[tw]) AND (mask*[tw] OR blind*[tw])) OR ("latin square"[tw]) OR placebos[mh] OR placebo*[tw] OR random*[tw] OR research design[mh:noexp] OR comparative study[mh] OR evaluation studies[mh] OR follow-up studies[mh] OR prospective studies[mh] OR cross-over studies[mh] OR control*[tw] OR prospective*[tw] OR volunteer*[tw]) NOT (animal[mh] NOT human[mh])))) AND (semi-recumbent OR semi recumbent). Additionally, all reference lists of identified trials were examined.

Selection criteria

All randomised and quasi-randomised trials comparing semi-recumbent position versus standard care and ventilator-associated pneumonia as the outcome measure.

Review methods

Data were extracted by two reviewers independently and compared. Disagreements were resolved by discussion. Data from the original publications were used to calculate the relative risk of ventilator-associated pneumonia. Data for similar outcomes were combined in the analysis where appropriate, using a random-effects model.

Results

Two parallel-group randomised controlled trials were included (1, 2).

Study population, interventions and outcome definitions
See Table I

Validity assessment
See Table II

Summary estimates of associations between treatment and control group
See Figure I

Table I: Study population, interventions and outcome definitions

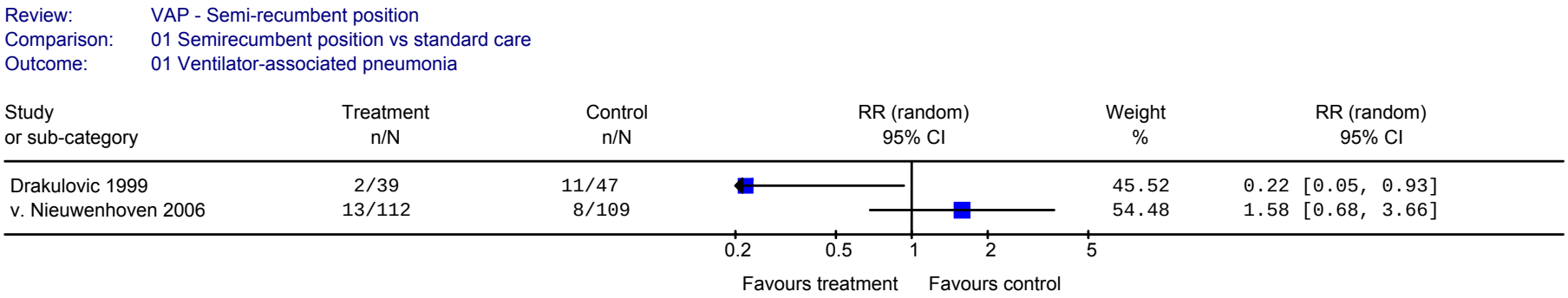
	Participants	**Interventions**	**Definition of ventilator associated pneumonia (VAP)**	**Notes**
van Nieuwen-hoven et al. 2006	Incl: 221 adult patients admitted to four ICUs in three university hospitals in the Netherlands, intubated within 24 hrs of ICU admission, predicted time on the ventilator > 48h Excl: selective decontamination of the digestive tract, patients treated in other positions: patients with trauma of the pelvic region, extensive abdominal surgery, cared for in beds	Treatment (112): semi-recumbent position (an aimed 45^{o} position of the head and back) Control (109): supine position (backrest elevation of 10^{o}) Notes: 1) the targeted backrest elevation of 45^{o} for semi-recumbent positioning was not achieved for 85% of the study time; reasons remained unclear	Clinical VAP was defined as new or persistent or progressive infiltrate with at least two of the following criteria: T > 38^{o} C or < 35^{o} C; WBC > 10 x 10^{9}/L or, < 3 x 10^{9}/L; positive cultures of tracheal aspirate. VAP was defined as clinical VAP and BAL ≥ 10^{4} cfu/ml or positive blood culture with the same microorganisms than in tracheal aspirate.	End of the study protocol: 1) Microbiologically confirmed VAP 2) Patients were placed in a bed without the possibility to alter backrest elevation 3) Extubation 4) Death Median days in study (range): T: 6 (2-7); C: 5 (0-64)

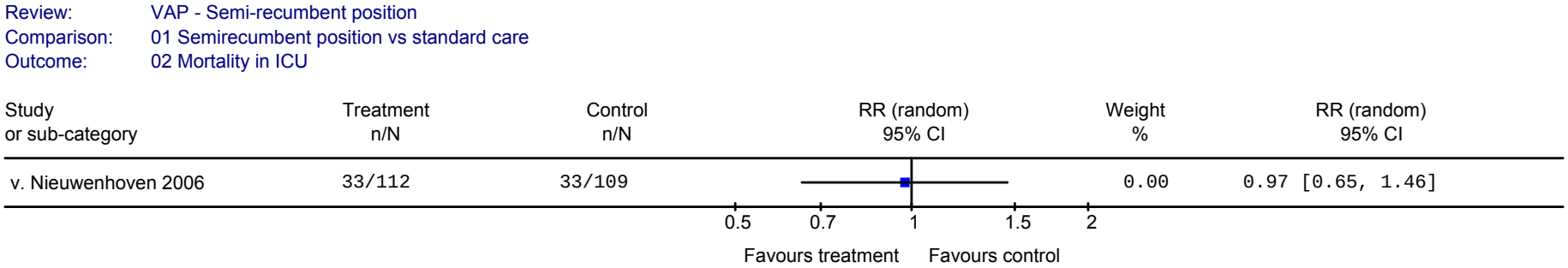
	without the possibility of altering backrest elevation, neurosurgery patients treated with 30^{o} head elevation			
Drakulovic et al. 1999	Incl: 90 intubated and mechanically ventilated patients admitted to one medical and one respiratory intensive-care unit Excl: recent abdominal surgery (< 7 days), recent neurosurgical intervention (< 7 days), shock refractory to vasoactive drugs, volume therapy, previous endotracheal intubation (< 30 days)	Treatment (43): semi-recumbent position (45^{o}) Control (47): supine position (0^{o})	Clinical VAP was defined as new or persistent infiltrate with at least two of the following criteria: T ≥ 38.3^{o} C; WBC ≥ 12 x 10^{9}/L or ≤ 4 x 10^{9}/L; purulent tracheal secretions. VAP was defined as clinical VAP and ETS ≥10^{5} cfu/ml or BAL ≥ 10^{4} cfu/ml or PSB ≥10^{3} cfu/ml or positive blood or pleural culture with the same microorganisms than in tracheal aspirate.	End of the study protocol: 1) Change in position for more than 45 min 2) Death 3) Weaning trial 4) Extubation Mean (SD) hours of ventilation in study: T: 145 (149); C: 171 (167)

Table II: Data on quality assessment

van Nieuwenhoven et al. 2006	*Generation of allocation sequence:* *Concealment of allocation:* *Blinding attending physician:* *Blinding outcome assessors:* *Description of dropouts:* *Analysis by intention-to-treat:*	Randomization occurred within ICUs; randomization by means of closed, nontransparent numbered envelopes; an independent person who mixed the envelopes before numbering generated the allocations Adequate No Three investigators, blinded for randomization code, independently evaluated all relevant data to the diagnosis of VAP Adequately described in figure 1 Yes
Drakulovic et al. 1999	*Generation of allocation sequence:* *Concealment of allocation:* *Blinding attending physician:* *Blinding outcome assessors:* *Description of dropouts:* *Analysis by intention-to-treat:*	Randomization by a computer-generated list; the allocation table was generated and disclosed by an independent person Adequate No No Adequate: T: 1 died, 3 withdrawn because of protocol violation (re-intubations) No

Figure I: Summary estimates of associations between treatment and control group expressed as relative risk (RR) and 95% confidence interval (CI) using a random effects model





Conclusion

Two methodological good trials showed conflicting results whether semi-recumbent position versus standard care should be used to prevent ventilator-associated pneumonia. In one trial, the targeted backrest elevation of 45^{o} for semi-recumbent positioning was not achieved for 85% of the study time. The other trial did not check whether the targeted semi-recumbent position was achieved during study. No conclusions for practice can be drawn.

References

1. Nieuwenhoven van CA, Vandenbroucke-Grauls C, Tiel van FH, Joore HCA, Strack van Schijndel RJM, Tweel van der I, et al. Feasibility and effects of the semirecumbent position to prevent ventilator-associated pneumonia: A randomized study. Crit Care Med 2006;34(2):396-402.
2. Drakulovic MB, Torres A, Bauer TT, Nicolas JM, Nogué S, Ferrer M. Supine body position as a risk factor for nosocomial pneumonia in mechanically ventilated patients: a randomised trial. Lancet 1999;354:1851-58.