A semirecumbent body position led to a lower rate of nosocomial pneumonia than a supine position in mechanically ventilated adults


QUESTION: In patients who are intubated and mechanically ventilated, is a semirecumbent body position more effective than a supine body position for reducing the incidence of nosocomial pneumonia?

Design
Randomised (allocation concealed), unblinded, controlled trial with follow up for 72 hours after extubation. An interim analysis was planned.

Setting
2 intensive care units (ICUs) of a 1000 bed, tertiary care, university hospital in Spain.

Patients
90 patients (mean age 65 y, 76% men) in the ICU who had been intubated and mechanically ventilated. Exclusion criteria were recent abdominal surgery or neurosurgery, shock refractory to vasoactive drugs or volume therapy, or previous endotracheal intubation. 96% of patients completed the trial.

Intervention
43 patients were allocated to a semirecumbent body position (45° from the horizontal) and 47 to a supine body position. Patients were fed parenterally or enterally (continuous feeding) at the discretion of the physician. Sucralfate and other medications could be used.

Main outcome measures
Clinically suspected nosocomial pneumonia. Secondary outcome was microbiological nosocomial pneumonia confirmed by bronchoalveolar lavage or protected specimen brush cultures.

Main results
The study was stopped early when analysis showed that the semirecumbent position was superior for reductions in clinically suspected pneumonia. Fewer patients in the semirecumbent group developed clinically suspected (p = 0.003) or microbiologically confirmed (p = 0.018) nosocomial pneumonia than in the supine group (table). Multivariate analysis showed that microbiologically confirmed pneumonia was associated with enteral nutrition (adjusted odds ratio [OR] 11.8, 95% CI 1.4 to 98) and supine body position (OR 6.1, CI 1.1 to 31). The groups did not differ for mortality (18% in the semirecumbent group v 28% in the supine group, p = 0.3).

Conclusion
For patients in the intensive care unit who were mechanically ventilated, a semirecumbent body position was associated with a lower rate of nosocomial pneumonia than a supine position.

<table>
<thead>
<tr>
<th>Pneumonia</th>
<th>Semirecumbent</th>
<th>Supine</th>
<th>RRR (95% CI)</th>
<th>NNT (CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinically suspected</td>
<td>8%</td>
<td>34%</td>
<td>77% (35 to 93)</td>
<td>4 (3 to 11)</td>
</tr>
<tr>
<td>Microbiological</td>
<td>5%</td>
<td>23%</td>
<td>78% (19 to 94)</td>
<td>6 (4 to 29)</td>
</tr>
</tbody>
</table>

*Abbreviations defined in glossary; RRR, NNT, and CI calculated from data in article.

COMMENTARY

Drakulovic et al have shown that in the absence of contraindications, the semirecumbent position is an affordable, feasible, and effective strategy to reduce the risk of nosocomial pneumonia in patients who are mechanically ventilated, especially when patients are receiving continuous enteral feeding through a nasogastric tube. Patients who were cared for in this position had a more than 75% reduction in the rate of nosocomial pneumonia when compared with patients in a supine position. This trial is unique because rather than examining surrogate outcomes for pneumonia, the authors examined clinically suspected and microbiologically confirmed cases of nosocomial pneumonia.

Multivariate analysis showed that nosocomial pneumonia was associated with enteral nutrition and supine body position. The frequency of clinically suspected pneumonia was 56% when patients were enterally fed in the supine position, 9% when enterally fed in the semirecumbent position, 10% when not enterally fed but in the supine position, and 6% when not enterally fed but in the semirecumbent position (p < 0.001). Gastro-oesophageal reflux is a consistent finding in mechanically ventilated patients and may favour pneumonia by promoting retrograde oropharyngeal colonisation and aspiration to lower airways.1 The semirecumbent position may decrease nosocomial pneumonia by decreasing gastro-oesophageal reflux, abnormal oropharyngeal colonisation, and aspiration of gastric contents to lower airways.

The US Centers for Disease Control and Prevention have recommended that ICU patients be nursed in a semirecumbent position to minimise the likelihood of nosocomial infections.2 Drakulovic et al found such consistent findings that the study was terminated at a scheduled interim analysis after 90 patients had been recruited. We now have strong evidence for nursing ventilated patients in the semirecumbent position.

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