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## Non-Pharmacological Interventions for Preventing Ventilator-Associated Pneumonia



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Ventilator-associated pneumonia (VAP) is a serious complication in critically ill, intubated ICU patients, contributing to high rates of mortality, morbidity, extended ICU stays, and increased healthcare costs. Preventing VAP is crucial for patient safety and healthcare sustainability.

A recent review explores non-pharmacological interventions for VAP prevention based on a systematic literature search updating the Clinical Treatment Guideline on Invasive Ventilation and Extracorporeal Gas Exchange, led by the German Society for Anaesthesiology and Intensive Care Medicine (DGAI).

Non-pharmacological measures to prevent VAP have been widely studied, with surveillance systems, infection control teams, and regular staff feedback proving effective in reducing nosocomial infections, including VAP. However, evidence is limited due to inconsistent definitions and a lack of proper surveillance.

Important strategies for VAP prevention include minimising the duration of invasive ventilation, using evidence-based prevention bundles, and ensuring strict hand hygiene compliance. Elevating the upper body of intubated patients (45° semi-recumbent position) reduces microaspirations and VAP risk. Prone positioning may reduce VAP rates, though the evidence is inconclusive. Endotracheal tubes with subglottic secretion drainage significantly lower VAP rates. Bundling these measures can reduce mortality by around 10%.

Several interventions are not recommended for preventing VAP based on current evidence. Tapered cuffs and polyurethane cuffs did not significantly reduce VAP rates compared to conventional or polyvinylchloride cuffs. Continuous cuff monitoring and physiotherapy also showed no clear impact on VAP rates or ICU mortality. While silver-coated endotracheal tubes and tracheal saline instillation reduced VAP rates, they were linked to higher mortality, possibly due to biased pathogen detection. The lateral Trendelenburg position showed a slight reduction in VAP rates in one trial but had a higher incidence of serious adverse effects, including oxygen desaturation and hemodynamic instability. Older studies on kinetic beds suggested a reduction in VAP rates, but recent high-quality studies are lacking. Closed endotracheal suctioning systems have shown a statistically significant association with reduced VAP rates but present conflicting evidence regarding their overall effectiveness.

Variability in VAP definitions across studies further complicates comparisons and generalisations, undermining the assessment of interventions' true effectiveness. The lack of blinding in certain interventions, such as body positioning and special endotracheal tubes, introduces a high risk of bias, potentially leading to overestimation of the benefits of interventions like closed suctioning systems.

For critically ill patients, avoiding harmful interventions is key, so the use of tracheal saline instillation and silver-coated endotracheal tubes should be avoided due to potential risks despite some evidence of VAP reduction. VAP prevention measures must be carefully considered for resource needs and implementation barriers, such as limited staff and time constraints. A tailored VAP prevention bundle can address these challenges, incorporating team training, electronic reminders, checklists, and regular feedback. Using a VAP surveillance system, ensuring consistent hand hygiene, and elevating the patient's body position, which is a low-resource measure with proven efficacy, are useful strategies. Subglottic secretion drainage is also effective in long-term ventilation.

Future studies should explore non-pharmacological interventions like early mobilisation, targeted nutrition, appropriate nurse-patient ratios, and interprofessional communication, which show promise but require further investigation on their direct impact on VAP outcomes.

Until more robust evidence emerges, the multidisciplinary team should carefully select VAP prevention measures. High-quality, randomised controlled trials, including cluster trials, are needed to establish the effectiveness of these interventions. Future studies should focus on

consistent VAP definitions, rigorous methodologies to minimise bias, and consideration of patient population diversity and clinical settings. These efforts will aim to improve patient safety, survival, and quality of life following critical care.

Source: [Intensive Care Medicine](#)

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