**Oral decontamination with chlorhexidine reduced ventilator-associated pneumonia in high-risk patients**


**Clinical impact ratings:** Infectious Disease ★★★★★☆☆☆☆ Critical Care ★★★★★☆☆☆☆ Pulmonology ★★★★★☆☆☆☆

**Question**
In high-risk mechanically ventilated patients, how effective is oral decontamination with chlorhexidine for reducing ventilator-associated pneumonia (VAP)?

**Methods**
Design: Randomized placebo-controlled trial.
Allocation: [Concealed]†.*
Blinding: Blinded (clinicians, patients, joutcome assessors, data collectors, data analysts, data safety and monitoring committee, manuscript writers, and pharmacists at participating centers]†.*
Follow-up period: Mean range 5.9 to 8.4 days (up to diagnosis of VAP, death, or extubation).
Setting: 2 mixed and 2 surgical intensive care units (ICUs) in 2 university hospitals, and mixed ICUs in 3 general hospitals in the Netherlands.
Patients: 385 patients > 18 years of age (mean age 62 y, 60% men) requiring mechanical ventilation for ≥ 48 hours. Exclusion criteria were inability to take oral medication, predmission immune compromise (defined as leukopenia < 3 × 10⁹/L, cumulative dose of corticosteroids > 750 mg/y, or HIV), or pregnancy.

**Intervention:** 2% chlorhexidine (n = 127), 2% chlorhexidine plus 2% colistin (n = 128), or placebo (n = 130). All medications were mixed with petroleum jelly FNA to form a paste, and 0.5 g was applied 4 times/d to each side of the mouth.

**Outcomes:** Incidence of VAP. Secondary outcomes were all-cause ICU mortality, and oral and endotracheal tube (ETT) colonization.

**Patient follow-up:** 100% (intention-to-treat analysis). Follow-up for oral and ETT colonization was < 80% for both.

**Main results**
The chlorhexidine and chlorhexidine plus colistin groups had lower incidences of VAP than did the placebo group (Table). Groups did not differ for all-cause ICU mortality (chlorhexidine vs placebo, hazard ratio [HR] 1.12, 95% CI 0.72 to 1.17; chlorhexidine + colistin vs placebo, HR 1.02, CI 0.66 to 1.59). Results for oral and ETT colonization are not reported because < 80% of patients were included in the analysis.

**Conclusion**
In high-risk mechanically ventilated patients, oral decontamination with chlorhexidine reduced ventilator-associated pneumonia.

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*See Glossary.
†Information provided by author.

**Commentary**
The study by Koeman and colleagues is the largest multicenter, blinded, placebo-controlled trial to date on the effectiveness of prophylactic oral chlorhexidine to prevent VAP in medicosurgical ICU patients (1), and it was the first to show a beneficial effect. In this trial, chlorhexidine with or without colistin was effective for decreasing the daily risk for VAP. The hypothesized advantage conferred by the addition of colistin for preventing late-onset VAP, usually caused by gram-negative microorganisms, could not be confirmed, possibly because of insufficient power.

This trial had several methodological strengths, including concealed allocation, intention-to-treat analysis for the primary outcome, blinded VAP adjudication by 3 independent experts, and correlation with a modified Clinical Pulmonary Infection Score to validate diagnosis of VAP.

Oral decontamination with chlorhexidine is an inexpensive pneumonia prevention strategy compared with some other prophylactic strategies. To date, randomized trial evidence favors chlorhexidine in patients at high risk for VAP, but inferences would be stronger from larger trials, increasing the total number of events and patients on which clinical policy can be based. Future studies evaluating whether routine long-term use of chlorhexidine with or without colistin influences ICU microbial flora will also inform us about its role in practice.

**Reference**