

Oral Care for Patients at Risk for Ventilator-Associated Pneumonia

Expected Practice:

- ☑ Develop and implement a comprehensive oral hygiene program for patients in critical care and acute care settings who are at high risk for ventilator-associated pneumonia (VAP).
 - Brush teeth, gums and tongue at least twice a day using a soft pediatric or adult toothbrush. [Level E]
 - Provide oral moisturizing to oral mucosa and lips every 2 to 4 hours
 - Use an oral chlorhexidine gluconate (0.12%) rinse twice a day during the perioperative period for adult patients who undergo cardiac surgery. [Level D]
 - Routine use of oral chlorhexidine gluconate (0.12%) in other populations is not recommended at this time.

Scope and Impact of the Problem:

The prevalence of hospital acquired infection is a significant concern in acutely and critically ill patients. VAP contributes to mortality in these patients. Oral hygiene is considered to be an important intervention, in combination with other strategies, for the prevention of ventilator-associated pneumonia.

Supporting Evidence:

- Colonization of the oropharynx is a critical factor in the development of nosocomial pneumonia.¹⁻³ Growth of potentially pathogenic bacteria in dental plaque provides a nidus of infection for microorganisms that have been shown to be responsible for the development of ventilator-associated pneumonia.²⁻⁴ Dental plaques provides a microhabitat for organisms and provides opportunity for adherence either to the tooth surface or to other microorganisms. These microorganisms in the mouth translocate and colonize the lung, which can result in VAP.^{3,5} Dental plaque can be removed by brushing.
 - There are no data associated with critically ill patients, however, the American Dental Association recommends that healthy people brush teeth twice daily to remove plaque from all tooth surfaces.⁶
 - The use of an oral care protocol (brushing with a pediatric toothbrush, mouthwash, and moisturizing gel) reduces oral inflammation and improves oral health.⁷
- Chlorhexidine oral rinse reduced respiratory infections in cardiac surgery patients who received chlorhexidine before intubation as well as postoperatively⁸ and reduced nosocomial pneumonia in patients who were intubated for more than 24 hours.⁹ However, when chlorhexidine was tested in a more varied ICU population, no difference was observed in VAP mortality, or length of stay. Although oropharyngeal colonization by VAP pathogens was reduced with chlorhexidine, its efficacy was insufficient to reduce the incidence of respiratory infections.^{10,11} A 2005 meta-analysis of chlorhexidine trials found that use of chlorhexidine did not result in significant reduction in the incidence of nosocomial pneumonia, nor in alteration of the mortality rate.¹² The CDC [Center for Disease Control and Prevention] guidelines recommend use of chlorhexidine only during the perioperative period for adult patients undergoing cardiac surgery; routine use in other critically ill populations is not recommended.¹³
- Several studies tested intervention bundles that included oral care as one of the interventions.¹⁴⁻¹⁹ The studies demonstrate that bundled interventions decreased nosocomial respiratory infections, however, the contribution of oral care to the results could not be determined.

- In addition to brushing, providing oral moisturizing to oral mucosa and lips every 2 to 4 hours is often a component of the oral care protocols.²⁰
- To date, data have not been published from large, well-controlled clinical trials of oral care interventions in at-risk patients other than chlorhexidine studies. There are clinical reports of infection rates before and after changes in oral care procedures but few have been published in refereed journals. Some reports show a positive effect, however, the role of oral care in reducing nosocomial pneumonia is not clearly established by such projects, and it is possible that other changes in care occurred in the units and affected the results.²¹⁻²²

AACN Evidence Leveling System

| | |
|----------------|--|
| Level A | Meta-analysis of quantitative studies or metanalysis of qualitative studies with results that consistently support a specific action, intervention or treatment. |
| Level B | Well-designed, controlled studies with results that consistently support a specific action, intervention or treatment. |
| Level C | Qualitative studies, descriptive or correlational studies, integrative review, systematic reviews, or randomized controlled trials with inconsistent results. |
| Level D | Peer-reviewed professional organizational standards with clinical studies to support recommendations. |
| Level E | Multiple case reports, theory-based evidence from expert opinions, or peer-reviewed professional organizational standards without clinical studies to support recommendations. |
| Level M | Manufacturer's recommendations only. |

Actions for Nursing Practice:

- Ensure that your unit has written practice documents such as a policy, procedure or standard of care that describes the oral care procedure.
- Document frequency of oral care differentiating between comprehensive oral care (including brushing) and oral cavity moisturizing.
- Include the oral care procedure as part of unit orientation to ensure consistency of care.

Need More Information or Help?

- Go to (www.aacn.org/prninfo).

References:

1. Munro CL, Grap MJ. Oral health and care in the intensive care unit: state of the science. *Am J Crit Care*. 2004;13:25-33.
2. Fourrier F, Duvivier B, Boutigny H, et al. Colonization of dental plaque: a source of nosocomial infections in intensive care unit patients. *Crit Care Med*. 1998;26:301-8.
3. Garrouste OM, Chevret S, Arlet G, et al. Oropharyngeal or gastric colonization and nosocomial pneumonia in adult intensive care unit patients: a prospective study based on genomic DNA analysis. *Am J Respir Crit Care Med*. 1997;156:1647-55.
4. Scannapieco FA, Stewart EM, Mylotte JM. Colonization of dental plaque by respiratory pathogens in medical intensive care patients. *Crit Care Med*. 1992;20:740-5.
5. El-Solh AA, Pietrantoni C, Bhat A, et al. Colonization of dental plaque: a reservoir of respiratory pathogens for hospital-acquired pneumonia in institutionalized elders. *Am J Respir Crit Care Med*. 2004;126:1575-82.
6. American Dental Association. Oral Health Topics: Cleaning your teeth and gums (oral hygiene). Available at: <http://www.ada.org/public/topics/cleaning.asp>. Accessed September 19, 2006.
7. Fitch JA, Munro CL, Glass CA, et al. Oral care in the adult intensive care unit. *Am J Crit Care*. 1999;8:314-8.
8. DeRiso AJ, Ladowski JS, Dillon TA, et al. Chlorhexidine gluconate 0.12% oral rinse reduces the incidence of total nosocomial respiratory infection and nonprophylactic systemic antibiotic use in patients undergoing heart surgery. *Chest*. 1996;109:1556-61.
9. Houston S, Hougland P, Anderson JJ, et al. Effectiveness of 0.12% chlorhexidine gluconate oral rinse in reducing prevalence of nosocomial pneumonia in patients undergoing heart surgery. *Am J Crit Care*. 2002;11:567-70.
10. Munro CL, Grap MJ, Jones DJ, et al. Chlorhexidine, toothbrushing, and preventing ventilator-associated pneumonia in critically ill adults. *Am J Crit Care*. Sep 2009; 18: 428 - 437
11. Fourrier F, Dubois D, Pronnier P, et al. Effect of gingival and dental plaque antiseptic decontamination on nosocomial infections acquired in the intensive care unit: a double-blind placebo-controlled multicenter study. *Crit Care Med*. 2005;33:1728-35.
12. Pineda LA, Saliba RG, El Solh AA. Effect of oral decontamination with chlorhexidine on the incidence of nosocomial pneumonia: a meta-analysis. *Crit Care*. 2006;10:R35.
13. Tablan OC, Anderson LJ, Besser R, Bridges C, Hajjeh R, and the CDC Healthcare Infection Control Practices Advisory Committee. Guidelines for preventing healthcare-associated pneumonia, 2003: recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee. *MMWR Recomm Rep*. 2004;53(RR-3):1-36.
14. Zack JE, Garrison T, Trovillion E, et al. Effect of an education program aimed at reducing the occurrence of ventilator-associated pneumonia. *Crit Care Med*. 2002;30:2407-12.
15. Simmons-Trau D, Cenek P, Counterman J, et al. Reducing VAP with 6 Sigma. *Nurs Manage*. 2004;35(6):41-5.
16. Powers J, Brower A, Tolliver S. Impact of oral hygiene on prevention of ventilator-associated pneumonia in neuroscience patients. *J Nurs Care Qual*. 2007;22(4):316-21.
17. Ross A, Crumpler J. Impact of an evidence-based practice education program on the role of oral care in the prevention of ventilator-associated pneumonia. *Intensive Crit Care Nurs*. 2007; 23(3):132-6.
18. Mori H, Hirasawa H, Oda S, et al. Oral care reduces ventilator-associated pneumonia in ICU populations. *Intensive Care Med*. 2006;32(2):330-6.
19. Youngquist P, Carroll M, Farber M et al. Implementing a ventilator bundle in a community hospital. *Jt Comm J Qual Patient Saf*. 2007;33(4):219-25.
20. Chan EY, Ruest A, et al. Oral decontamination for prevention of pneumonia in mechanically ventilated adults: systematic review and meta-analysis *BMJ* Apr 2007; 334:

21. Berry AM, Davidson PM, Masters J, Rolls K. Systematic literature review of oral hygiene practices for intensive care patients receiving mechanical ventilation. *Am J Crit Care*. 2007;16(6):552-62.
22. Garcia R. A review of the possible role of oral and dental colonization on the occurrence of health-care associated pneumonia: underappreciated risk and call for interventions. *Am J Infect Cont*. 2005;33:527-41.