## Oral care measures in patients with Ventilator Associated Pneumonia: Review article

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## Abstract

Most common nosocomial infection in Intensive Care Unit is Ventilator associated pneumonia (VAP). The risk associated is 1-3% per day of intubation, which signifies 6-20 fold increased probability of developing pneumonia than in non ventilated ICU cases. The major cause of VAP is the colonization of the oral cavity by microbes due to poor oral hygiene. Oral hygiene care like mouth rinse, gel, toothbrush, or combination along with use of suction for removing oral secretions, may reduce the risk of VAP in such patients.

**Keywords**: VAP, ICU, oral microbes, colonization, hygiene, risk

## Introduction

Pathogenic oral microflora has a significant role in many systemic diseases like bacterial endocarditis, bacteremia respiratory problems, and ventilator-associated pneumonia (VAP) [Di Benedetto, *et al*., 2013]. In this spectrum of diseases, nosocomial pneumonia is studied and the association between VAP and oral microbes is recognized. VAP is a nosocomial pneumonia occurring in patients who receive mechanical ventilation for more than 48 hours [Hutchins, *et al*., 2009].

Cases with VAP have a prolonged ICU stay with a longer total hospital stay typically an extra 7-9 days [Eke *et al*., 2012, Dennesen, *et al*., 2003]. Increased cost of health and higher mortality are also related to VAP. In this review we have focused on the oral care preventive protocol associated with VAP [Hutchins, *et al*., 2009].

**Signs and symptoms of VAP include following:** [American Thoracic Society, 1995]

1. Body temperature above $38^0$C or below $36^0$C
2. New infiltrate on chest X-ray
3. White blood count altered (above 12000 or below 4000)
4. Purulent sputum

Risk factors in the oral cavity associated with VAP include plaque formation, bacterial colonization in mouth, growth of pathogenic bacteria on teeth, certain secretions from oral cavity [Eke *et al*., 2012]. 24 hours of admittance to an intensive care unit (ICU) can lead to bacterial colonization with *Staphylococcus aureus* which includes Methicillin-resistant *Staphylococcus aureus* (MRSA), *Acinetobacter*, *Klebsiella*, *Escherichia coli* and *Pseudomonas* [Eke *et al*., 2012, Dennesen, *et al*., 2003].

VAP is related to a longer period of mechanical ventilation, excessive antimicrobial medicines and extensive hospitalization. Mortality rate linked to VAP is around 30-60%. Due to poor oral hygiene, aspiration of oral secretions is the main cause of VAP [Keyt, *et al*., 2014]. The normal defense mechanism against pneumonia is impaired due to endotracheal tube (ET) disrupting normal mucous clearance and collection in subglottic pool due to which these contaminated secretions are aspirated in lungs [Dennesen, *et al*., 2003, Keyt, *et al*., 2014].

Antibiotics should be used judiciously as the resistant microbes can infect critically ill cases and ICU's [Keyt, *et al*., 2014]. Appropriate and preventive nursing and respiratory intervention should be implemented.

Saliva plays an important role in oral clearance and has antimicrobial properties. In ICU, excessive stress leads to xerostomia which increases risk of plaque accumulation, caries and periodontal diseases [Bouadma, *et al*., 2010]. Intraoral examination, inspecting lips and any associated pathologies in oral cavity should be done by a dental expert.

Incorporation of oral hygiene habits like brushing the teeth, tongue using soft bristle brush twice a day reduces the risk of VAP by 60%. Use of chlorhexidine 0.12% twice daily and 1.5% hydrogen peroxide is recommended for maintaining proper oral hygiene [American Thoracic Society, 1995, Keyt, *et al*., 2014].

A proper oral care protocol should be followed in all institutions so that patient receives a comprehensive oral care. Appropriate treatment of plaque by hand scaling, aphthous ulcers, caries and oral candidiasis should be done [Bouadma, *et al*., 2010].

**Oral care recommended for VAP patients:** [Dennesen, *et al*., 2003, Keyt, *et al*., 2014]

1. Assessment of oral cavity: Assessing lips, oral mucosa, teeth, tongue, palate and gingival for any pathologic lesions or infections.
2. Maintain salivation: Prevent xerostomia and mucositis. Use of salivary substitutes or moistening gel.
3. Prevention of caries: Use of fluoridated tooth paste. Use of mouthwash and plaque removal should be done.
4. Head elevation: Head should be lifted to at least $30^0$ as this will prevent the accumulation of salivary secretions in oral cavity, prevent the aspiration of gastric contents and prevent the pooling of oral secretion in subglottic area.
5. Use of intraoral suction: To prevent aspiration of contents to lungs.

**Conclusion**

Acquired pneumonia in ventilated patients causes financial crisis due to increased hospitalization and use of ventilator. Due to severity of this disease healthcare professionals should consider the risk factors associated with VAP and adopt preventive strategies.

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