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Back to the Future—Focus on Oral Care for Preventing Pneumonia

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News *Video*

Pneumonia, a leading cause of death from health care-acquired infections, can be prevented through oral care, especially in nonventilator hospital-acquired pneumonia (NV-HAP) cases.



Intubated woman with ventilator-assisted breathing due to pneumonia.

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Although not widely known, pneumonia is the leading cause of death from healthcare-acquired infections (HAI).[1,2] In a point prevalence study, pneumonia was the number one HAI and accounted for 25.8% of all HAIs. Nonventilator hospital-acquired pneumonia (NV-HAP) accounted for 65% of these pneumonias, whereas 35% were attributed to ventilator-associated pneumonia (VAP).[3] Historically, healthcare has focused only on addressing VAP. However, NV-HAP can no longer be ignored.

"From the hygienic standpoint, the secretions of the mouth constitute the chief, if not the only, source of respiratory infection..." *Mouth Disinfection in the Prophylaxis and Treatment of Pneumonia, Augustus Wadsworth MD, 1906 president of the American Association*

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The History of VAP

Almost 120 years ago, Augustus Wadsworth, MD, identified the connection between the oral cavity and pneumonia. Unfortunately, health care did not learn from the past, as we struggle to prevent pneumonia in the hospital setting today. Extensive research has confirmed the connection between the oral microbiome, dental health, and the development of pneumonia, both in VAP and NV-HAP.[4] The microbiome of the oral cavity changes dramatically during hospitalization for several reasons and bacteria rapidly colonize in the oropharyngeal area within dental plaque.[5] These bacteria can be aspirated into the lungs, leading to the development of pneumonia. Oral care is a key intervention in managing the oral microbiome of the hospitalized patient to prevent pneumonia.[6]

VAP has long been recognized as a complication in the critical care space as mechanical ventilation (MV) became a commonly used intervention.[7] It was commonly reported in the 1980s when it occurred in up to 28% of patients on MV.[7-9] Today, VAP continues to be a complication that extends the duration of invasive MV, prolongs intensive care unit (ICU) and hospital length of stay, and is costly both in health care cost and human life. It impacts 5 to 40% of patients receiving MV for more than 48 hours (dependent on the population studied); this large variation depends upon the country, type of critical care unit, and the criteria used to identify VAP.10 In-hospital mortality also varies widely depending upon the study and type of outcome, crude vs. attributable mortality. In a meta-analysis including 6,284 patients from 24 VAP prevention trials, the estimated attributable mortality was 13%.[11]

The VAP Bundle

Hospitals have reported decreases in VAP rates over the past 20 years, but the extent to which these declines reflect better care versus stricter application of subjective surveillance criteria remains unclear. Over the years, guidelines have been

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individual components combined to make a set of quality indicators for a specific system, procedure, or treatment. These interventions must all be implemented together to achieve significantly better results.

There is no universally accepted bundle of interventions for VAP. In a systematic review of VAP care bundles published in 2023, Mastrogianni and colleagues identified the most common VAP interventions: sedation and weaning protocols, semi-recumbent positioning, oral and hand hygiene, peptic ulcer disease and deep venous thrombosis prophylaxis, subglottic suctioning, and cuff pressure control.[14] Head-of-bed elevation was implemented by almost all studies, followed by oral hygiene, which was the second extensively used intervention.[14] Oral care with toothbrushing has been recommended as an essential practice for prevention of VAP in the most recent practice recommendations published in 2022.[6]

Shedding Light on NV-HAP

Although not a new complication, NV-HAP has less visibility than VAP. Given that NV-HAP accounted for 65% of the pneumonias in the HAI prevalence study by Magill et al., there must be increased attention on the prevention of this deadly HAI.3 NV-HAP is a burden on the healthcare system. One out of every 100 acute care patients will develop NV-HAP; it has a high crude mortality (15 to 30%) and is a costly complication.[1, 15-19]

As noted in recent practice recommendations, oral care is the most widely studied intervention to prevent NV-HAP.[6] It may lower NV-HAP with little risk of harm.[6]

Although no specific bundles have been developed and widely tested for NV-HAP, observational studies have reported lower NV-HAP rates after the implementation of prevention bundles —interventions have included oral care, bed positioning, dysphagia diagnosis and management, mobilization, nasal hygiene, and sedation restrictions to list a few.[6,20-22]

Success Implementing an NV-HAP Bundle

Lacerna et al conducted a prospective, observational surveillance program to identify NV-HAP before and after 7 interventions in a large integrated healthcare system of 21 hospitals. Interventions for high-risk patients included oral care, mobilization, upright feeding, swallowing evaluation

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1000 admissions. An additional positive finding in this study was improved antimicrobial stewardship over this time period.[21]

As noted by Livesey et al. and others, additional research is needed regarding the prevention of NV-HAP.[6,22] A unified definition of NV-HAP and more rigorous, controlled studies are needed to truly evaluate interventions such as oral care on the outcome of NVHAP.

Oral health as a simple intervention

It is well-documented that implementing oral health care regimens is a simple intervention that may decrease the bacterial load and thereby decrease the risk of VAP and NVHAP. Although oral care is routinely provided in critical care units to prevent VAP, it is not a routine intervention for patients outside of the critical care setting.

Medical device companies, such as Stryker Sage, have been closely following HAP literature and creating oral care systems to address the risk factors of HAP since the early 2000s. Their focus on clinical outcomes and easy-to-use tools helps promote oral hygiene across the continuum of care in both the ventilator and non-ventilator space.

It is time for health care providers to step forward and provide *all patients* with this important, low-risk intervention to prevent pneumonia, both VAP and NV-HAP.

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