Introduction

Hospital-acquired pneumonia (HAP) is defined as pneumonia that develops in patients who are not ventilated but who develop a positive respiratory culture after 2 days of being hospitalized. Healthcare-associated pneumonia (HCAP) is defined as a positive respiratory culture within 2 days of hospital admission in patients who were transferred from another facility, were receiving long-term dialysis, or had been hospitalized within 30 days.

Morbidity and mortality are high with both HAP and HCAP. In a study from a large multicenter database, the mortality rate was 18.8% for HAP and 19.8% for HCAP. The mean hospital length of stay increased by 15.2±13.6 days with HAP and by 8.8±7.8 days with HCAP. The mean total hospital charges were $27,647 for patients with HCAP and $65,292 for patients with HAP.

For ventilator-associated pneumonia, the mortality rate was 29.3%, the mean length of stay was 23.0±20.3 days, and the mean total hospital charges were $130,841.

Aspiration of oropharyngeal secretions plays a central role in the development of pneumonia, particularly in patients with abnormalities in swallowing and upper-airway protective reflexes. Aspiration of bacteria from oral biofilms (dental plaque) may initiate or facilitate the progression of pneumonia and other systemic infections. Sumi et al. found that dental plaque from 64.5% of dependent elderly cases harbored potential pulmonary pathogens. Thus, dental plaque can serve as a reservoir for pathogens for aspiration pneumonia.

Aggressive oral care reduces colonization by potentially pathogenic bacteria and is likely to reduce the risk of pneumonia. In a placebo-controlled, randomized study of 417 nursing home patients, oral care reduced the rates of pneumonia, fever, and death from pneumonia.

Oral care is recommended by the Centers for Disease Control and Prevention as part of a comprehensive approach to prevent HAP. Specifically, they recommend developing and implementing a comprehensive oral hygiene program of oropharyngeal cleaning and decontamination for patients in acute care settings or for residents of long-term care facilities.

Abstract

Health Care Associated Pneumonia Prevention Using a Comprehensive Oral Hygiene Protocol

Issue: An intervention project using a comprehensive oral hygiene protocol that included mechanical cleansing, with an anterior to posterior trend in combination with the rate of health care associated pneumonia (HAP) in acute care settings.

Healthcare-associated pneumonia (HCAP) is defined as pneumonia that develops in patients who are not ventilated after 2 days of hospitalization. HAP is defined as pneumonia that develops in patients who are not ventilated but who develop a positive respiratory culture after 2 days of being hospitalized. Healthcare-associated pneumonia (HCAP) is defined as a positive respiratory culture within 2 days of hospital admission in patients who were transferred from another facility, were receiving long-term dialysis, or had been hospitalized within 30 days.

Morbidity and mortality are high with both HAP and HCAP. In a study from a large multicenter database, the mortality rate was 18.8% for HAP and 19.8% for HCAP. The mean hospital length of stay increased by 15.2±13.6 days with HAP and by 8.8±7.8 days with HCAP. The mean total hospital charges were $27,647 for patients with HCAP and $65,292 for patients with HAP.

For ventilator-associated pneumonia, the mortality rate was 29.3%, the mean length of stay was 23.0±20.3 days, and the mean total hospital charges were $130,841.

Aspiration of oropharyngeal secretions plays a central role in the development of pneumonia, particularly in patients with abnormalities in swallowing and upper-airway protective reflexes. Aspiration of bacteria from oral biofilms (dental plaque) may initiate or facilitate the progression of pneumonia and other systemic infections. Sumi et al. found that dental plaque from 64.5% of dependent elderly cases harbored potential pulmonary pathogens. Thus, dental plaque can serve as a reservoir for pathogens for aspiration pneumonia.

Aggressive oral care reduces colonization by potentially pathogenic bacteria and is likely to reduce the risk of pneumonia. In a placebo-controlled, randomized study of 417 nursing home patients, oral care reduced the rates of pneumonia, fever, and death from pneumonia.

Oral care is recommended by the Centers for Disease Control and Prevention as part of a comprehensive approach to prevent HAP. Specifically, they recommend developing and implementing a comprehensive oral hygiene program of oropharyngeal cleaning and decontamination for patients in acute care settings or for residents of long-term care facilities.

Project: A new protocol of comprehensive oral care was initiated in August 2005 to reduce the rates of HCAP in the Ortho/Neuro Unit, Nebraska Methodist Hospital, Omaha, Nebraska. A patient education sheet on HCAP and the oral care protocol were given to all Ortho/Neuro patients on admission. The comprehensive oral hygiene protocol included brushing every 12 hours using a baking soda-saturated toothbrush. This was followed by rinses with propylene glycol mouth rinses and oral care cleaning kit. The kit contained an antiplaque solution (0.05% cetylpyridinium chloride) and a mouthwash with 1.5% hydrogen peroxide.

Results: Following an increased focus on the implementation of this protocol at the Ortho/Neuro Unit, a significant reduction in the rate of HCAP was noted from 1.45 cases per 1000 patient days in 2004 to 1.05 in 2005. This represents a 27.9% reduction in the risk of HCAP from 2004 to 2005.

Lessons Learned: The results indicate use of the comprehensive oral hygiene protocol which included the oral cleansing kit was effective in reducing the rate of HCAP. There was a significant improvement in the reduction of the rate of HCAP when the protocol was used compared to other areas in the hospital.

Conclusion: The protocol that included mechanical cleansing with an anterior to posterior trend in combination with the rate of health care associated pneumonia (HAP) in acute care settings may significantly reduce the risk of HCAP in high risk patient populations and deserves further study.

Prevention of Hospital-Associated Pneumonia Using a Comprehensive Oral Hygiene Protocol

C.Jean Orr, RN; Marilyn Mitchell, RN, MSN, APRN, CRRN • Nebraska Methodist Hospital, Omaha, Nebraska

Presentation at the 2008 APIC Annual Conference: June 15-19, 2008

Reprints provided compliments of Sage Products, Inc. 800-323-2220 • www.sageproducts.com
In 2004, the orthopedic and neurology units of our facility had the highest rates of HAP (post-operative and medical pneumonias), i.e., 1.83 cases/1,000 patient days. We studied the efficacy of an oral hygiene protocol that implemented a new oral cleansing kit and an evidence-based oral-care protocol in reducing the incidence of HAP.

The new oral-care protocol was initiated in all non-critical care, non-ventilated neurologic and orthopedic patients on this 42 bed unit beginning in April 2006. A patient education sheet on HAP prevention and the oral-care protocol were given to all study patients at the time of admission. Representatives from Sage Products, Inc. (Cary, IL), the Service Leader, and the unit Performance Improvement representative collaborated to train the staff on how to implement the protocol. The protocol was reinforced and outcomes were reviewed quarterly, and a Cerner documentation screen was created.

Oral-care protocol:

- Brush teeth every 12 hours with the sodium bicarbonate impregnated suction toothbrush from the oral-care kit which contains Anti-Plaque Solution to help dissolve mucous and biofilm.
- Cleanse oral cavity every 4 hours with foam suction swab and the prepackaged cleanser which contains an anti-septic oral rinse (cetylpyridinium chloride 0.05%) to reduce bacterial load in the oral cavity.
- Apply a mouth moisturizer to the lips and oral mucosa every 2 to 4 hours.

Additional pneumonia prevention strategies:

- Elevate the bed to at least 30 to 40° or as much as possible.
- Perform incentive spirometry in patients together with coughing and deep breathing.
- Encourage and assist patients to early mobility when possible (e.g., sit in a chair for meals; walk 100 feet 3 times daily).

Shortly after implementation of the new oral-care protocol, HAP rates began to decrease: from 3 cases in April 2006 (the first month of the study) to 0 cases by July 2006.

The HAP rate per 1000 patient days decreased from 1.83 in 2004 to 1.0 in 2007 – a 45% reduction.

These results indicate that the use of a comprehensive oral hygiene program can lead to reduced rates of HAP. After implementation, the HAP rates decreased to a comparable level or less. Education of the patients about oral care provided them with the information necessary for them to better participate in their own care.

Although our study was not designed to determine cost savings, it is very likely that the small costs associated with prevention resulted in a reduction in the overall costs of care because of the reduction in the rate of HCAP.

Cost of the oral-care kits:
- Package of 6 cleansings (24-hour supply) = $16.80
- Average length of stay on this unit is 4 days, so the total cost of care for 4 days is $16.80 X 4 = $67.20

$67.20 for the patient length of stay for prevention compared with up to $65,000 per case of HAP!

References: