Ventilator-associated pneumonia (VAP) is a common problem in critically ill patients who receive mechanical ventilation. The condition is a leading cause of morbidity and mortality in intensive care units. VAP is defined as pneumonia that is neither present nor developing at the time of intubation, but which occurs 48 hours or more after intubation.1 Intubation increases the risk of pneumonia because the tube bypasses many of the lungs' normal defense mechanisms.

As graduate students in San Diego State University’s Program for Advanced Practice Nursing of Adults and the Elderly, we were required to learn evidence-based practice guidelines for many areas of acute and critical care nursing practice. Our instructor, Beverly Carlson, RN, MS, CNS, expected total recall of this vital information as training for our future roles as nurse practitioners and/or clinical nurse specialists.

In preparation for an examination, we developed a mnemonic, CHOOSE NO VAP, to help us remember the 11 steps that reduce the occurrence of VAP. Each letter details simple, evidence-based interventions that nurses should implement in their daily care of patients receiving mechanical ventilation.

C (Cuff): Clinicians should routinely assess and record endotracheal tube (ETT) cuff pressures to ensure that they are maintained at 20 cm H2O. An effective endotracheal seal reduces subglottic secretion movement into the lungs. A greater pneumonia risk is associated with cuff pressure below 20 cm H2O.2

H (HOB): All patients should have the head-of-bed (HOB) elevated at an angle of 30° to 45°, unless medically contradicted. Elevating the HOB reduces gastric reflux and the aspiration of gram-negative bacteria. Supine positioning increases pulmonary aspiration and is an independent risk factor for mortality in patients receiving mechanical ventilation.3

O (Oral care): Oral care should be performed 2 to 3 times daily using a soft toothbrush. Foam swabs, although easy to use, do not reduce dental plaque and should be used for comfort only. Maintaining oral hygiene helps to decrease colonization of the oropharynx with known respiratory pathogens, a problem that occurs within 48 hours of hospitalization in critically ill patients. Reducing respiratory pathogens helps prevent migration of harmful bacteria into the lungs.

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**O (Order enteral feedings):** Enteral feedings should be ordered and initiated within 48 hours of hospitalization.4 Enteral feedings help preserve the mucosal integrity of the gut and decrease translocation of bacteria from the gut. Patients who receive prolonged mechanical ventilation without nutritional support have an increased risk of infection compared with those fed enterally within 48 hours.4

**S (Suction):** Do not forget to suction subglottic secretions. As many as 5 to 15 mL of subglottic secretions can pool in the subglottic area found directly above the endotracheal balloon cuff.5 If not removed regularly, these secretions can harbor bacteria that may enter the trachea and cause pneumonia. Subglottic secretions should be removed before deflating the endotracheal cuff, in preparation for tube removal, and before making adjustments of the tube.

**E (ETT with dorsal lumen):** Removal of subglottic secretions can be facilitated with specially designed ETTs. These tubes contain a dorsal lumen that allows for continual drainage of tracheal secretions that accumulate in the subglottic area.

**N (No saline lavage):** Saline should not be inserted into the ETT when suctioning,6 because it may dislodge bacteria located in the catheter or ETT and may facilitate movement into the lungs.

**O (Orotracheal intubation):** Orotracheal intubation is the preferred route of intubation and should be used whenever possible.7 Nasal intubation is associated with an increased risk of sinusitis and leads to colonization of the upper airway with respiratory pathogens, increasing the risk of VAP.

**V (Ventilator circuits):** Change ventilator circuits only when needed. Changing the ventilator circuits routinely based on the duration of use has not been shown to decrease VAP rates.8 Study results suggest that no patient harm and considerable cost savings are associated with extended ventilator circuit change intervals.8 The maximum duration of time that circuits can be used safely is not known. Staff should routinely empty and discard any condensate that collects in the ventilator tubing. Condensate in the tubing may serve as a reservoir for nosocomial pathogens.7 Care should be taken not to allow the condensate to drain back to the patient.

**A (Ambu bag):** Disposable ambu bags should be used with each new patient.8 Reusable bags are subject to cross-contamination and may predispose patients to VAP.

**P (Please wash hands):** Frequent hand washing is the best way to reduce germ transmission. Hand washing removes transient bacteria from the hands and helps prevent the spread of microorganisms.7 The Centers for Disease Control and Prevention recommends washing hands before and after each patient contact. An alcohol-based waterless antiseptic agent may be used instead of soap and water if hands are not visibly soiled.

**Summary**

Nurses often feel inundated with the sheer quantity of evidence-based practice guidelines they are expected to remember and implement in their daily practice. Mnemonics are mental techniques that assist us to recall large amounts of information. The mnemonic CHOOSE NO VAP can be used to help to recall the numerous interventions that aid in the reduction of VAP.

References


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Memory Aide to Reduce the Incidence of Ventilator-Associated Pneumonia
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