

The Facts About Ventilator-Associated Pneumonia and Continuous Aspiration of Subglottic Secretions

VAP Incidence and Mortality

- Ventilator-associated pneumonia (VAP) is the second most common nosocomial infection in the United States. It is estimated to occur in 9% to 25% of ICU patients.^{1,2,3}
- VAP is associated with increasing ICU stays by up to 22 days and hospital stays by up to 25 days.⁴
- Mortality that is directly attributable to VAP is estimated to be as high as 27.1%.⁵

Associated Cost of VAP

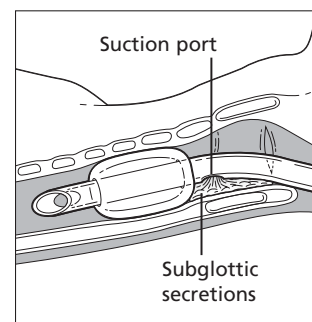
- VAP is associated with more than \$40,000 in increased hospital costs per patient³ and may be higher in certain units.
- A study in a shock trauma ICU found that VAP costs \$57,000 per occurrence.⁶

Pathogenesis and Risk Factors

- Aspiration of oral and/or gastric secretions is the primary route of bacterial entry into the lungs and is believed to be a primary factor in the development of VAP.
- Each day on mechanical ventilation increases patient risk for VAP by 1% to 3%.⁷
- Independent predictors of VAP include burns, trauma, central nervous system disease, respiratory disease, cardiac disease, mechanical ventilation in the previous 24 hours, witnessed aspiration and paralytic agents.⁷

Continuous Aspiration of Subglottic Secretions

- Continuous aspiration of subglottic secretions (CASS) removes oral and/or gastric secretions from above the endotracheal tube cuff before they can be aspirated. CASS must be done with a specialized endotracheal tube with a separate dorsal suction lumen.
- Five randomized, controlled studies examined the efficacy of CASS in reducing VAP. Their findings are summarized in the chart below.



Outcome Improvements with CASS

- A meta-analysis of the five studies found that, in patients expected to be ventilated >72 hours, continuous aspiration of subglottic secretions:
 - Reduced the risk of ventilator-associated pneumonia by nearly half
 - Reduced ICU length of stay by 3 days
 - Reduced duration of mechanical ventilation by 2 days
 - Delayed the onset of VAP by 6.9 days¹³

Author/Date	Patient Profile	# of pts	VAP Rate Study*	VAP Rate Control*	% Reduction
Smulders ⁸ 2002	Med/Surg ICU patients expected to be ventilated >72 hrs	150	9.2	22.5	59%
Bo ⁹ 2000	Surgical ICU patients expected to be ventilated >72 hrs	68	23% (percent incidence)	45% (percent incidence)	48%
Kollef ¹⁰ 1999	Cardio-Thoracic ICU patients (average ventilation 1.5 days)	343	34.5	43.2	Not statistically significant
Valles ¹¹ 1995	Med/Surg ICU patients expected to be ventilated >72 hrs	190	19.9	39.6	50%
Mahul ¹² 1992	Med/Surg ICU patients expected to be ventilated >72 hrs	145	13% (percent incidence)	29% (percent incidence)	55%

* Incidence per thousand ventilator days.

Guidelines and Recommendations

- Based on the available evidence, the following organizations recommend use of CASS to reduce the incidence of ventilator-associated pneumonia:
 - American Thoracic Society/ Infectious Diseases Society of America (ATS/IDSA) – Level I⁴
 - Centers for Disease Control (CDC) – Category II¹⁵
 - American Association of Critical Care Nurses (AACN)¹⁶
 - Agency for Healthcare Research and Quality (AHRQ)¹⁷

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