Ventilator Associated Pneumonia Prevention in the Traumatically Injured Patient: Beyond the Bundle!

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**Background**

Ventilator associated pneumonia (VAP) is the most significant nosocomial infection impacting morbidity & mortality in critically ill patients.

**Precursors to VAP in the traumatically injured patient:**
- poor neurological function
- prolonged ventilator dependent days
- frank or silent aspiration due to prolonged recumbent position for tests, procedures or operations
- poor oral health

**Interventions**

- Institute for Health Care Improvement (IHI) VAP prevention bundle implemented
- Comprehensive and ongoing education to RNs and RTs in adult and pediatric critical care settings, emphasizing:
  - Analgesia and sedation weaning strategies
  - Implementation of a standard pack for q 4 hour oral care
  - Standardization of electronic documentation for all elements of IHI bundle and q 4 hour oral care
  - Utilization of endotracheal tube with subglottal suction port for patients at high risk for VAP
- Chlorhexidine 0.12% solution q 12 hours to reduce oral cavity bacterial load - all adult intensive care units
- Root cause analysis form developed by trauma ICU nurses, to review each VAP occurrence
- Product change to endotracheal tube with subglottal suction port enhanced with a conical cuff design to reduce incidence of silent aspiration and occurrence of late VAPs
- Chlorhexidine 2% disposable cloths for daily bath q 24 hours to reduce skin flora
- Aspiration of the gut prior to procedures to reduce the risk of aspiration
- Glycemic control maintained between 90-140 mg/dl
- Early mobility to promote muscle strength and early liberation from mechanical ventilation
- Virtual rounds by remote ICU nurses to assure proper head of bed elevation

**Outcomes**

The hospital VAP rate has steadily declined from 5.7 (2006) to 1.4 (2010).

Within the 14 bed trauma ICU, the VAP rate went from 7.1 (2006) to 1.7 (2010).

**Lessons Learned**

- No single “Silver Bullet” to reduce VAPs
- Comprehensive, continuous campaign hits the target, to include:
  - Evidence based guidelines
  - Ongoing education using a variety of methods
  - Interprofessional stakeholder engagement and accountability
  - Leadership commitment and oversight
  - Use of a root cause analysis form, developed by the trauma ICU nurses, to review each VAP case.

**Next Steps**

- Concurrent monitoring of action items
- Transparent reporting through Quality Visibility Boards
- Development of electronic document for root cause analysis to capture and recognize actionable items