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Evaluating Respiratory Tract Culturing in Mechanically Ventilated Patients: Opportunity for Diagnostic Stewardship

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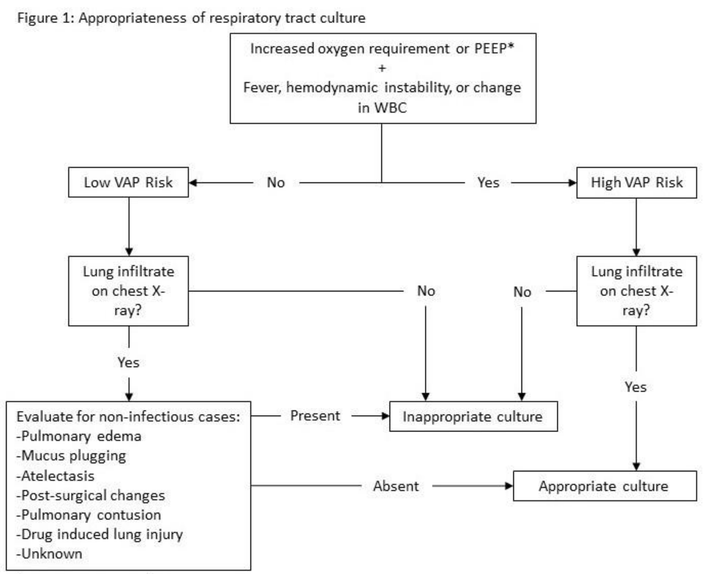
Background

- Incidence of ventilator associated pneumonia (VAP) in the ICU setting has been reported between 10 to 40%
- Through comprehensive review, it has been demonstrated that a significant portion, up to 58%, of patients diagnosed with VAP did not, in fact, have a consistent clinical syndrome
- Patients inaccurately diagnosed with VAP are more likely to receive antibiotics with an indication of VAP

Methods

- Respiratory cultures from mechanically ventilated adult patients in the Neuroscience and Cardiac Surgery Intensive Care Units at the University of Maryland Medical Center in Baltimore, Maryland between March 1 and June 30, 2021, were evaluated using the below algorithm:

Figure 1: Appropriateness of respiratory tract culture



*PEEP = Positive End Expiratory Pressure

Adapted from Kenaa B, Richert ME, Claeys KC, et al. *Curr Infect Dis Rep*. 2019;21(12):50

- Exclusion criteria:
  - Mechanically ventilated <48 hours
  - History of heart or lung transplant
  - Repeat culture within 14 days of previous culture

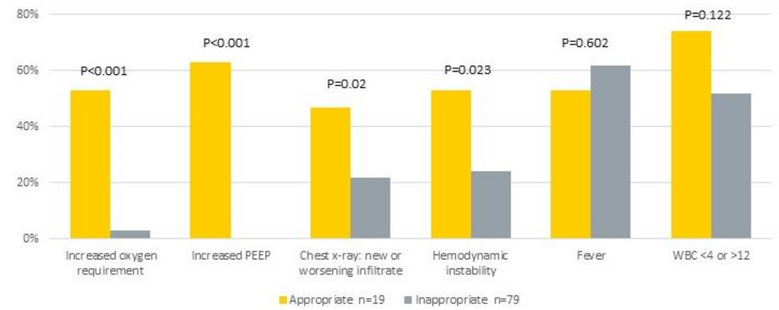
Objective

- Evaluate the appropriateness of respiratory tract culturing in mechanically ventilated patients in a standardized manner

Results

Figure 2: Appropriateness of respiratory tract culturing, n=98

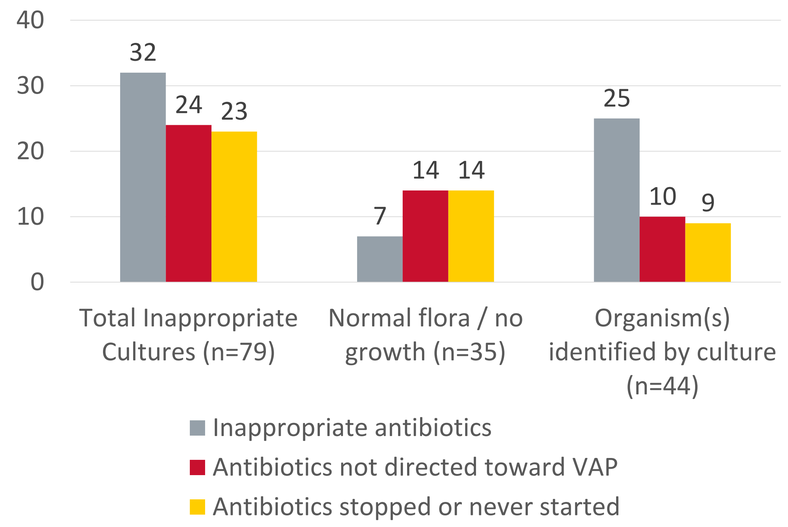
Figure 3: Clinical characteristics of patients with appropriate and inappropriate respiratory tract cultures, n=98



- Comparing appropriate vs inappropriate cultures, there were similar rates of fever and leukocytosis, but patients whose cultures were deemed appropriate were more likely to have changes in oxygenation, chest imaging, or hemodynamic instability
- Of the inappropriate cultures, those cultures which identified an organism (as opposed to no growth or normal flora) were more likely to receive inappropriate antibiotics (p<0.001)
- The median days of therapy for inappropriate antibiotics was 6 (IQR 2.5, 7)

Results, cont.

Figure 4: Appropriate vs inappropriate antibiotics



Conclusions

- Mechanically ventilated patients undergo significant amounts of inappropriate respiratory tract sampling and receive a significant amount of inappropriate antibiotics
- Incorporating respiratory tract specific attributes into clinical decision making may be an opportunity for diagnostic stewardship

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