The Impact of the Curetis Unyvero® in Pneumonia Management
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Introduction & Purpose
A significant disease burden is attributable to hospital-associated pneumonia (HAP), especially in the intensive care unit (ICU). Due to high morbidity & mortality rates, antibiotics are often given empirically, leading to inadequate therapy in up to 40% of cases (1). The gold standard for the diagnosis of ventilator-associated pneumonia (VAP) is microbiological culture of broncho-alveolar lavage (BAL) specimens, with results taking 48-72 hours. As antimicrobial resistance is becoming increasingly prevalent, it would be of great value to identify bacteria & their resistance mechanisms more rapidly. The Curetis Unyvero® is a molecular diagnostic instrument which can identify 21 microorganisms & 19 antibiotic resistance genes in 5 hours.

Keywords
Hospital-associated pneumonia, Curetis Unyvero

Aims
• To compare routine microbiological culture of BAL samples to the Curetis Unyvero® in the diagnosis of pneumonia in adult ICUs – could this replace or supplement the current service?
• To retrospectively review whether patient management would have been changed had the Unyvero® data been made available to clinicians in real-time

Methods
• 37 BAL samples from suspected HAP patients from 2 adult ICUs
• 6 months: June-December 2017

Sample Workflow

Antimicrobial stewardship interventions in 34.3% patients

Results

Detection
• Unyvero® detected 27 significant pathogens from 37 specimens (73%)
• Culture detected 21/37 (56.8%)

Concordance
• Organism detection: 73% (27/37) – 10/27 agreed on positives & 17/27 on negatives
• Antibiotic resistance mechanisms: 100% (37/37)
• 40% of discordance: negative or insignificant bacterial culture compared to a positive molecular test
• 30% of discordance: detection of multiple pathogens by Unyvero when only a single bacterium was cultured

Discussion & Conclusions
• Improved detection rate of the Unyvero® could reflect an increased sensitivity, challenging the concept of culture as the gold standard (could also be due to the molecular detection of non-viable organisms)
• For some organisms e.g. Legionella pneumophila, the Unyvero® could save up to 9 days, decreasing mortality, hospital stay, costs & inappropriate treatment regimens
• The Unyvero® panel contains some organisms that are routinely unculturable e.g. Mycoplasma pneumoniae
• Issues with the Unyvero® detection limit (10⁴ cfu/ml): some pathogens are significant in low numbers
• Significant pathogens not included in the Unyvero® panel e.g. Acinetobacter
• Decreased TAT by 56.3 hours (2.3 days) could lead to empirical therapy being replaced by evidence-based targeted treatments, improving patient outcomes, enhancing antimicrobial stewardship, decreasing hospital stay & decreasing adverse drug events
• WGS showed that the Unyvero® may be misidentifying Stenotrophomonas maltophilia (especially when detected alongside Pseudomonas aeruginosa)
• Unyvero® could remove the need for surveillance BAL

References

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