A comparison of two molecular panels for culture independent detection of lower respiratory tract pathogens

Authors: A. Ghadikolai, W. Sinclair, J. Wallentine, J. Carlquist, B. K. Lopansri; Intermountain Med. Ctr., Murray, UT
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Abstract

Introduction: Management of patients with pneumonia is often empiric in nature as traditional culture and antimicrobial susceptibility take days to result. The increasing prevalence of antibiotic resistance has heightened the need for rapid pathogen and resistance detection. Two commercially available multiplex molecular panels (BioFire® FilmArray® Pneumonia [FAP] panel and Curetis Unyvero® Lower Respiratory Tract panel [LRTP]) have the potential to improve patient care through rapid, culture independent detection of pathogens and key resistance markers.

Objective: The primary objective of this evaluation was to assess the performance of both panels in lower respiratory samples submitted to a centralized microbiology laboratory.

Method: From May 2019 to December 2019, we tested 120 samples (68 sputum, 37 bronchoalveolar lavage, 15 tracheal aspirates) submitted to the Intermountain Central Laboratory. We collected a convenience sample and performed testing according to the manufacturer's recommendations. Respiratory cultures were processed in the clinical microbiology laboratory according to locally established protocols. Viral pathogens were excluded from analysis.

Results: Three tracheal aspirates and one sputum resulted in an invalid result for either FAP or LRTP, and were excluded from the analysis. Of the 116 cultures performed, 52 samples were positive for 68 pathogens, 16 samples were positive for non-pathogenic organisms, 12 samples were reported as no growth, and 36 with mixed respiratory flora. The LRTP and FAP identified 82 and 95 pathogens, respectively. The sensitivity/specificity/PPV/NPV, based on culture positivity as a reference, for the LRTP was 89%/98%/67%/99.6% and for the FAP 95%/98%/62%/99.8%. Of the resistance markers included in the panels, mecA in both and tem in LRTP were detected. When compared to culture, FAP was positive for MRSA in 8 samples, two of which were negative by culture and LRTP. The LRTP was positive for MRSA in 7 samples, one of which was not detected by culture or FAP. Four samples positive for Haemophilus influenzae had tem resistance detected by LRTP.

Conclusion: Both pneumonia panels are sensitive tests in detecting respiratory pathogens with high negative predictive values. While both panels detect the most common bacterial pathogens, each have unique features which can be useful in different clinical settings.