PCR AND ELECTROSPRAY IONIZATION MASS SPECTROMETRY (PCR/ESI-MS) FOR IDENTIFYING VIRAL RESPIRATORY INFECTIONS

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Background: Diagnosis of viral respiratory infections traditionally relies on culture or antigen detection. PCR/ESI-MS, using base composition signatures obtained from PCR amplification of broadly conserved regions of microbial genomes, provides an innovative approach to identification of common and emerging respiratory viruses.

Objectives: To evaluate the use of a PCR/ESI-MS respiratory virus assay for the detection of viruses in appropriate samples.

Methods: Nasopharyngeal aspirates collected from emergency department patients from the 2007-8 respiratory season were assessed. ESI-MS (Ibis T5000, Ibis Biosciences) was performed with a respiratory virus surveillance kit designed to detect the following virus groups: Respiratory Syncytial Virus/human Metapneumovirus, Influenza A and B, Parainfluenza types 1-4, Adenoviridae, Coronaviridae, and human Bocavirus.

Results: In the initial analysis, the Ibis T5000 system correctly detected 74/96 known positive samples from an archived set (sensitivity 77.1%) as well as 59/67 known positive samples from a prospective study (sensitivity 88.1%). The Ibis T5000 system also additionally identified viruses in 13/261 culture negative archived samples (5%) and 15/197 culture negative prospective samples (7.6%). Several viruses not detectable with conventional methods were identified by PCR/ESI-MS including human Bocavirus, Coronavirus, and human Metapneumovirus. Including discrepant resolution data, and excluding samples that were unavailable for discrepant analysis, the sensitivity was 87.1% for archived and 88.1% for prospective samples. Specificity was 96.9% and 92.3% respectively. Viral load ranged from 15 - >2000 copies/well. Time to first result was 8 hrs.

Conclusion: The Ibis T5000 technology rapidly and accurately detected most viruses identified by traditional virological methods as well as viruses not currently tested by traditional methods.