

Evaluation of Temporal Bone Infections - Comparing Sensitivity of Multiplex Assay to Standard Bacterial Culture

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Background: The multiplex assay is a nucleic acid/base assay that can detect a wide array of distinct nucleic acid sequences from different pathogens. This study hopes to show the necessity and utility of this technology in detecting pathogens that cause middle ear infections.

Methods: This observational study was conducted from May 2021-July 2022 to assess the sensitivity of a multiplex assay in a microfluidics pouch in the detection of bacterial and viral pathogens in middle ear fluids. Standard bacterial culture was used as a control. Middle ear fluid was obtained from 98 pediatric patients undergoing tympanostomy to treat otitis media. The BioFire PNA panel was used, which detects bacterial, viral, drug resistance, and atypical bacterial nucleic acid targets. Patient demographics, past medical history, and otitis media risk factors were also recorded.

Results: A total of 107 ear samples were assessed from 98 patients. The average age of study subjects was 3.53 ± 2.99 years. The population of this study was 61.22% male, 75.51% Caucasian, 22.44% African American, and 2.04% Other, 88.78% Non-Hispanic, 10.2% Hispanic, and 1.02% Unknown. We found that *Haemophilus influenzae* was the most common pathogen detected (multiplex; culture) - (34.58%; 14.02%), followed by *Moraxella catarrhalis* (10.28%; 4.67%), *Streptococcus pneumoniae* (6.54%; 2.80%), *Staphylococcus aureus* (1.5%; 5.61%), and *Proteus spp.* (.94%; 0%). All bacteria, except *Staphylococcus aureus* were identified in more ear specimens by multiplex testing than bacterial culture.

Conclusion: Our study demonstrates that multiplex testing is more sensitive than culture in identification of pathogens in middle ear fluid from patients undergoing tympanostomy for treatment of otitis media. The increased sensitivity for bacterial identification and simultaneous detection of viral targets in a very limited patient specimen make the multiplex assay a novel diagnostic tool which may be useful in the management of patients with otitis media in the future.