Biofire Pneumonia Panel Use in Severe Pneumonia and Antibiotic Treatment in COVID-19 Patients

Erica J. Stohs, MD, MPH[1]; Maureen McElligott, MD[2]; Hannah M. Creager, PhD[3]; Paul D. Fey, PhD[4]; Trevor C. Van Schooneveld, MD[1]

Department of Medicine, Divisions of Infectious Diseases[1] and Pulmonology and Critical Care[2], University of Nebraska Medical Center, Omaha, NE.
Department of Pathology & Microbiology, University of Pittsburgh Medical Center, Pittsburgh, PA.[3] Department of Pathology & Microbiology, University of Nebraska Medical Center, Omaha, NE. [4]

Background

- Antibiotics were overly prescribed early in COVID-19 pandemic[1-2]
- Biofire Pneumonia Panel: rapid molecular diagnostic tool for respiratory cultures that can identify targets for the following:[3]

18 bacteria | 8 viruses | 7 resistance genes

Objectives

- We sought to describe **pneumonia panel utilization** and influence on **antibiotic use** in patients hospitalized with COVID-19 lower respiratory infection.

Methods

- Retrospective observational review (5/4/20-12/8/20) for the following eligible patients:

Hospitalized | +SARS-CoV-2 PCR | Pneumonia

- Pneumonia panel implemented 5/4/20 with antimicrobial stewardship education, guidance documentation,[4] and intermittent audit & feedback.
- Respiratory tract cultures paired with pneumonia panel
- Order restricted to critical care or infectious disease physicians
- Data: demographics, clinical, microbiologic, empiric and modified antibiotics within 24 hours of specimen collection
- Analysis: descriptive statistics

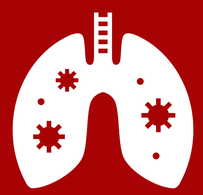
Results

Table 1. Selected Patient Characteristics (n=133)

Characteristics	Parameter
Age in years, median (IQR)	61 (52-70)
Male, n (%)	93 (70%)
Mechanically ventilated, n (%)	93 (70%)
Respiratory sample, n (%) Sputum/tracheal aspirate Bronchoalveolar lavage	 120 (90%) 13 (10%)
Days from initial positive SARS-CoV-2 PCR, median (IQR)	5 (1-4)
Days between pneumonia panel and admission, median (IQR)	4 (1-9)
Death within 30 days of pneumonia panel	68 (51%)

Key Takeaways:

- Secondary bacterial pneumonia targets identified in hospitalized COVID-19 patients in 2020 were mainly community acquired; few grew on culture.
- However, most received empiric antibiotics for hospital-acquired pneumonia organisms.
- Antibiotic modifications were rapid, presumably more so than waiting for sputum culture results.



Conclusion:

The **Biofire Pneumonia Panel** was a useful tool to evaluate **secondary bacterial pneumonia** in **critically ill COVID-19 patients** and may assist clinicians in **expediting antibiotic discontinuation** or **de-escalation**.

Results, continued

Table 2. Number of Targets Identified on Pneumonia Panel

Target	N (%)	Target growth on culture
No target identified	63 (47%)	-
MSSA	32 (24%)	16/32 (50%)
Hemophilus influenzae	12 (9%)	2/12 (17%)
Strep. agalactiae	12 (9%)	1/12 (8.3%)
Strep. pneumoniae	11 (8.3%)	4/11 (36.3%)
Klebsiella pneumoniae	9 (7%)	3/9 (33%)
MRSA (via mecA+)	8 (6%)	5/8 (63%)
E. coli	6 (4.5%)	1/6 (17%)
Serratia marcescens	5 (4%)	0
Moraxella catarrhalis	4 (3%)	1 of 4 (25%)
Pseudomonas aeruginosa	3 (2.2%)	3/3 (100%)
>1 target identified	29 (22%)	-

Table 3. Empiric Antibiotics and Modifications in 133 Patients

Empiric Antibiotic(s)	Number (%)
No antibiotics	57 (43%)
Vancomycin	70 (53%)
Cefepime	63 (47%)
Ceftriaxone	40 (30%)
Azithromycin	22 (16.5%)
Meropenem	11 (8.3%)
Doxycycline	5 (4%)
Ertapenem	3 (2%)
Levofloxacin	2 (1.5%)
Amoxicillin-clav. or amoxicillin-sulbactam	2 (1.5%)
Linezolid	2 (1.5%)
Antibiotic Modifications within 24h of pneumonia panel result	
Anti-MRSA cessation	39 of 72 (54%)
Anti-Pseudomonal cessation	21 of 78 (27%)
Any antibiotic modification	71 of 133 (53%)
Cessation of all antibiotics	13 of 76 (17%)

References

- [1] Langford BJ et al. “Bacterial co-infection and secondary infection in patients with COVID-19: a living rapid review and meta-analysis. *CMI* 2020;26:1622-29.
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- [4] UNMC Antimicrobial Stewardship Program – Clinical Pathways. See “Respiratory Infections.” https://www.unmc.edu/intmed/divisions/id/asp/clinicalpath.html