

Utilization of the BioFire® FilmArray® Pneumonia Panel in Critically Ill Patients with Influenza Pneumonia

Contact Information:
 Benjamin Ereshefsky, PharmD
 400 W Mineral King Ave
 Visalia, CA 93291
 Email: beresh@kdhcd.org



Benjamin Ereshefsky¹, PharmD, BCIDP; Mina Raju², DO

¹Department of Pharmacy, ²Division of Infectious Diseases, Kaweah Delta Health Care District, Visalia, CA

Background

- Seasonal influenza virus infects between 9 million and 45 million Americans every year resulting in up to 800,000 hospitalizations nationwide¹
- Coinfection rates have ranged from between 10-50% of inpatient influenza cases depending on patient location (e.g. ICU vs. med/surg floor) and condition (e.g. ARDS)^{2,3}
- Bacterial coinfection results in higher rates of ICU admission, requirement for mechanical ventilation, and septic shock, and increases the risk for mortality^{2,4,5}
- The most frequent bacterial pathogens that complicate influenza infection are *S. aureus* (including MRSA) and *S. pneumoniae*, followed by *H. influenzae*, β -hemolytic streptococci, and *P. aeruginosa*^{4,6}
- Empiric anti-MRSA and anti-pseudomonal coverage are frequently used in critically ill patients with influenza
- Rapid molecular diagnostic tests (RDT), such as BioFire® FilmArray® Pneumonia (PNA) panel, provides quicker results than conventional organism identification and susceptibility testing⁷
- Use of RDT may allow for faster time to targeted therapy

Materials and Methods

- Design:** single-center, retrospective case series
- Inclusion criteria:** admitted to an ICU and requiring mechanical ventilation, ≥ 18 years of age, positive influenza tests, evaluable BioFire® PNA panel results
- Time frame:** December 1, 2019 — March 31, 2020
- Objective:** to compare results from rapid diagnostic testing with traditional culture results, and to describe the impact on time to results and time to de-escalation of antibiotics
- A total of 21 patients with 22 BioFire® PNA panel results were included (only 20 were clinically evaluable)

Table 1: Baseline and Clinical Characteristics (N=21)

Female	9 (43%)
Age (mean \pm SD), years	63.6 \pm 13.9
Comorbidities	
Diabetes mellitus	6 (29%)
COPD	7 (33%)
Recent steroids (previous 30 days)	3 (14%)
Influenza results	
Influenza A	19 (90.5%)
Influenza B	2 (9.5%)
Hospital LOS (median [IQR]), days	10 (6-20)
ICU LOS (median [IQR]), days (n=20)	5.5 (3.75-12.25)
Vasopressor use (n=20)	18 (90%)
ARDS (n=20)	6 (30%)
ECMO (n=20)	3 (15%)
In-hospital mortality (n=20)	8 (40%)
Empiric antibiotics (n=22)	
Vancomycin	18 (22%)
Ceftriaxone	6 (27%)
Piperacillin/tazobactam	15 (68%)
Meropenem	1 (5%)
Azithromycin	10 (45%)
Antivirals	
Oseltamivir	20 (95%)
Baloxivir	3 (14%)
Positive blood culture	
MSSA	2 (10%)
MRSA	1 (5%)
<i>P. aeruginosa</i>	2 (10%)
Other GNR	1 (5%)
Bacterial Coinfection	17 (81%)

Results

Figure 1: Organisms Identified by BioFire PNA Panel and Respiratory Culture

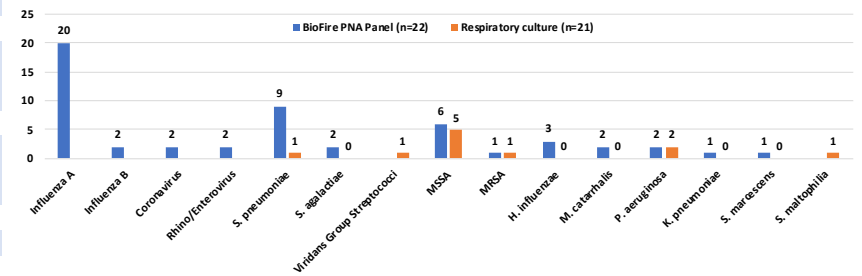
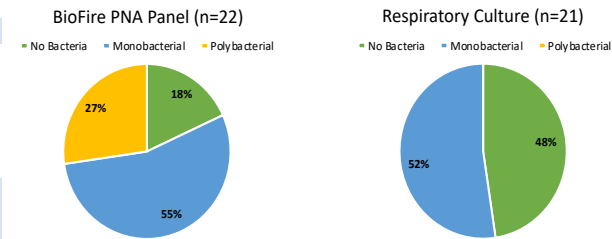


Figure 2: Comparison of PNA Panel and Respiratory Culture



Traditional culture techniques only identified 10 (48%) coinfections

Table 2: Time to Result and Antibiotic Modification

Duration of antibiotics before culture collection (n=20), hours	11.3 (5.8-16.5)
Respiratory culture results (n=21), hours	45.8 (31.5-55.6)
PNA panel results (n=22), hours	5.1 (2.7-11.3)
Duration of empiric antibiotics (n=18), hours	38.2 (25.7-44.8)
PNA panel results to antibiotic modification (n=18), hours	13.2 (1.7-24.0)

Conclusion

- Bacterial coinfection was common in this cohort of intubated, critically ill patients with influenza
- Use of the BioFire® PNA panel resulted in detection of a greater number of bacterial pathogens than traditional culture techniques
- Antibiotic modification occurred more quickly with use of an RDT

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