Impact and Evaluation of BioFire® FilmArray® Respiratory Panel on Clinical Decision Making and Antibiotic Prescribing

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BACKGROUND:

- The BioFire® FilmArray® respiratory panel (RFA) has been proposed as a tool for timely diagnosis and treatment of respiratory tract infections. However, the impact of the RFA on clinical decision making, most notably antibiotic prescribing, de-escalation and duration has been varied.

METHODS:

- Retrospective study conducted at 3 hospitals in Des Moines, Iowa, part of an integrated health system. Study dates were March 3- March 16, 2019. We included adults ≥ 18 years old who received an RFA at presentation to the emergency departments (ED) or within 48 hours of admission.
- Patients were excluded if they had a non-respiratory infection with defined indication for antibiotics.
- RFA results were categorized as influenza, non-influenza virus or negative.
- Negative binomial regression models were used to calculate rate ratios (RR) for the association between RFA result and DOT.

KEY FINDINGS:

Study results suggest that different strategies need deployment in the ED compared to inpatient services in order to optimize the use of results of rapid molecular tests to guide antibiotic use.

Among patients hospitalized, RFA results did not impact DOT, and in this group, antibiotic use was driven by urine cultures.

Among patients discharged from the ED, a non-influenza virus or a negative RFA was associated with much higher rates of DOT.

RESULTS:

- 486 patients were included (243 admitted to the hospital and 243 discharged from the ED).
- Baseline Demographics

Variable	All patients N=486 (%)	Admitted n=243 (%)	Discharged n=243 (%)
Age (median, IQR)	57 (38-74)	66 (56-79)	48 (28-63)
Male sex	203 (41.8)	109 (44.9)	94 (38.7)
Ordering Service			
ED	437 (89.9)	197 (81.1)	240 (98.8)
IM	26 (5.4)	24 (9.9)	2 (0.8)
ICU	9 (1.9)	9 (3.7)	0 (0)
Other	14 (2.9)	13 (5.4)	1 (0.4)
SBP (median, IQR)	131 (115 – 145)	131 (112 – 147)	132 (117 – 144)
Pulse (median, IQR)	92 (80 – 104)	93 (79 – 107)	92 (80 – 102)
Comorbid Conditions			
Diabetes	122 (25.1)	86 (35.4)	36 (14.8)
CHF	73 (15.0)	59 (24.3)	14 (5.8)
Cancer	32 (6.6)	26 (10.7)	6 (2.5)
Transplant	9 (1.9)	3 (1.23)	6 (2.47)
Dialysis	9 (1.9)	8 (3.3)	1 (0.4)
Urine Culture			
Not Obtained	333 (68.5)	134 (55.1)	199 (81.9)
Obtained	153 (31.5)	109 (44.9)	44 (18.1)

RESULTS (continued):

- Impact of RFA result on antibiotic days of therapy adjusted for covariates among patients admitted to the hospital

Variable	Incidence rate ratio (95% CI)	*P*-value
RFA result		
Influenza	Baseline	-
Negative	0.90 (0.59-1.35)	0.598
Other virus	1.11 (0.64-1.92)	0.706
Age	1.01 (0.99 – 1.02)	0.154
Fever	1.24 (0.82 – 1.86)	0.312
WBC		
Low	1.17 (0.50 – 2.72)	0.723
Normal/Not obtained	0.78 (0.54 – 1.11)	0.163
Chest X-Ray		
Clear	0.60 (0.34 – 1.04)	0.067
Infectious	1.28 (0.71 – 2.30)	0.414
Indeterminate	0.91 (0.52 – 1.60)	0.747
Urine Culture Obtained	1.85 (1.32 – 2.59)	<0.0001

Impact of RFA result on antibiotic days of therapy adjusted for covariates among patients discharged from the ED

Variable	Incidence rate ratio (95% CI)	*P*-value
RFA result		
Influenza	Baseline	-
Negative	5.24 (1.99-13.8)	0.001
Other virus	4.18 (1.16-14.9)	0.028
Age	1.01 (0.99 – 1.03)	0.272
Fever	2.86 (0.97 – 8.40)	0.056
Urine Culture Obtained	1.13 (0.36 – 3.56)	0.829

CONCLUSIONS:

- Different strategies need deployment according to care setting in order to optimize the use of results of rapid molecular tests to guide antibiotic use.

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