Multiplex respiratory viral panel use in the intensive care unit and its effect on antibiotic usage and patient outcomes.

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Background

Pneumonia is one of the top causes of mortality of all age groups in the United States and was associated with 1.1 million hospitalizations and 53,282 deaths in 2013[1].

In the intensive care unit (ICU), respiratory tract infections are a frequent cause for antibiotic use and majority of this is driven by empiric therapy[2].

Multiplexed nucleic acid amplification tests have been developed for detection of respiratory viruses and have a high sensitivity and specificity[3].

In the ICU, 17%-43% of these infections are attributed to a viral cause. Rhinovirus is the most common cause identified using this newer technology[4-5].

Studies have shown that when a respiratory viral infection is identified as the cause of a pneumonia in an outpatient setting, it leads to de-escalation of antibiotics[6].

However the role of the multiplexed respiratory viral panel (MRVP) and its impact on antibiotic de-escalation in the inpatient setting is minimal at best[7].

Objective

Primary outcome: To evaluate the impact of the MRVP on aggregate antibiotic use in patients admitted to the ICU with a diagnosis of pneumonia.

Secondary outcome: To determine the impact of the MRVP on 30 day attributable mortality, hospital and ICU length of stay (LOS).

Methods

Retrospective Cohort, single site 1300 bed university hospital.

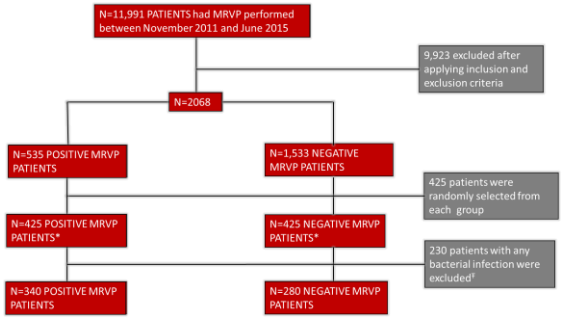
Inclusion Criteria	Exclusion Criteria
ICU admission	Less than 18 years of age at the time of admission
Diagnosis of pneumonia	Prisoners
Empiric treatment with antibiotics	Previously admitted to ICU within 90 days
Radiographic evidence of pneumonia	No radiographic evidence of pneumonia
Performance of MRVP	Positive respiratory bacterial culture

Categorical variables assessed using the chi-square test.

Continuous variables described using the Student's t-test.

Methods, cont.

Figure 1. Sample size flowchart



* Analysis of these patients included in the abstract

† Patients with any bacterial infection had a higher length of hospital and ICU stay, higher 30 day mortality and longer aggregate duration of antibiotic use.

Results

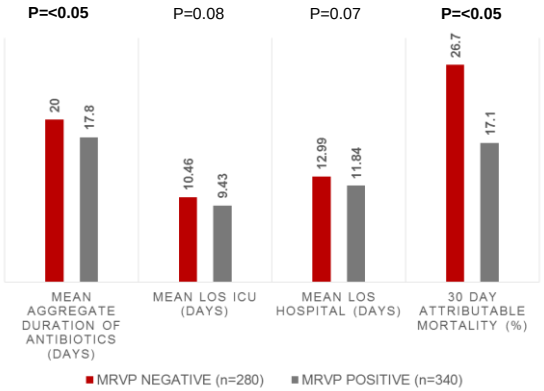
Table 1. Baseline patient characteristics

Baseline Patient Characteristics*	MRVP POSITIVE (n=340)	MRVP NEGATIVE (n=280)
Gender	46.8% (n=159)	56.1% (n=157)
	53.2% (n=181)	43.9% (n=123)
Race	77.4% (n=263)	74.3% (n=208)
	18.3% (n=62)	19.6% (n=55)
Mean age at visit (SD)	57.43 (16.29)	57.45 (15.45)
Mean Body Mass Index (SD)	29.54 (9.8)	30.3 (8.71)
Charlson Comorbidity Score (SD)	5.5 (5.08)	5.83 (5.59)
Chronic lung disease	48.2% (n=164)	46.8% (n=131)
Immunosuppressed	42.6% (n=145)	38.9% (n=109)
Transplant Status	8.8% (n=30)	7.5% (n=21)
Intubated	20% (n=68)	22.8% (n=64)
Patient discharged within 30 days from the hospital	9.7% (n=33)	7.5% (n=21)

*p=>0.05 for all values

Results, cont.

Figure 2. Primary and secondary patient outcomes



Conclusions

Patients who had a positive MRVP had a shorter duration of aggregate antibiotic use and reduced 30-day attributable mortality.

There was a trend towards reduced hospital and ICU LOS.

This study indicates a possible utility of the MRVP for antimicrobial management in the ICU.

Further studies are indicated.

References

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