Evaluation of polymerase chain reaction respiratory panel testing in antibiotic decision making

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INTRODUCTION

- Diagnostic testing is widely used to limit the time from presentation to appropriate treatment.
- Polymerase chain reaction (PCR) respiratory panel is used in practice to determine a bacterial or viral etiology of a patient’s respiratory illness.
- The BioFire FilmArray PCR rapidly detects 20 common viral and bacterial respiratory pathogens as an in-house lab which results in ~1 hour.
- The Diatherix PCR detects 33 viral and bacterial respiratory pathogens as a send-out lab which results in ~8 hours.
- The objective of this study was to evaluate the clinical utility in antibiotic (ABX) decision making based on the BioFire FilmArray Respiratory Panel compared to Diatherix PCR.

METHODS

- A retrospective chart review was conducted using the electronic EHR at a large community hospital from January 1, 2019 to June 30, 2019.
- Patients greater 18 years old were included if they had a BioFire FilmArray PCR ordered and resulted during study period.
- Participants who were pregnant, from outside hospitals, had inappropriate sources or sample amounts, or died during admission were excluded.
- Data collected included demographics, diagnosis, length of stay, 30 day readmission, physician specialty, collection source, and PCR results.
- Records were analyzed to determine if an BioFire results were utilized to change antibiotic decision making based on the BioFire FilmArray Respiratory Panel compared to Diatherix PCR.

RESULTS

- A total of 274 BioFire and 195 Diatherix Respiratory Panels were ordered during pre-specified study periods.
- After exclusions were made, a total of 251 BioFire and 118 Diatherix Respiratory Panels were evaluated.
- With the implementation of BioFire, the percentage of appropriate source collection significantly improved (p=0.033).
- Collectively, ID (p=0.134) and non-ID providers (p=0.265) had a similar pattern of PCR result utilization.
- After transitioning from Diatherix to BioFire, there was a decrease in the utilization of test results (44.1%, 34.7%, respectively). This result was not statistically significant.
- Of the panels evaluated (n=369), PCR results were not utilized in 230 (62.3%) cases.

DISCUSSION

- We anticipated BioFire to improve antibiotic decision making and clinical outcomes as compared to Diatherix due to the oversight of in-house testing.
- The implementation of BioFire significantly improved appropriate source collection for PCR respiratory testing.
- Based on the results of this study, the transition to BioFire testing did not improve utilization.
- The overall utilization of respiratory PCR testing to drive antibiotic decision making at our facility was 37.7%. This low percentage of action based on PCR results was an unexpected finding of this evaluation.
- An evaluation of best practices with regard to PCR respiratory testing is needed to achieve better utilization among providers.
- Additionally, a cost effectiveness analysis is warranted based on the results of this evaluation.

REFERENCES