Retrospective Review of BioFires FilmArray Gastrointestinal Panels Detection of Multiple Pathogens in Adults Patients.

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Published In/Presented At

INTRODUCTION

• Pathogens are only identified in 1.5 to 5.6 percent of stool cultures for acute diarrhea1
• Multiplex stool PCR is an accurate diagnostic tool to detect multiple intestinal pathogens in a single sample with rapid turnaround and high sensitivity/specificity
• BioFire’s FilmArray Gastrointestinal Panel is an FDA approved syndromic multiplex PCR assay which evaluates stool for 22 common bacterial, viral, and parasitic targets

METHODS

• The study was designed as a retrospective, descriptive, hypothesis-generating study to evaluate the co-detection of pathogens with BioFire FilmArray Gastrointestinal Panel in an adult community population
• Patients with stool PCR positive for ≥1 pathogen within the date range of 01/01/15-06/30/16 were obtained
• Inclusion criteria was age ≥18 and having a stool PCR with ≥1 pathogen within a community health network in the study date range
• Patients with tests repeated within 14 days of initial sample were excluded from the analysis
• Demographic data at the time of sample collection were obtained

RESULTS

• 710 patients with pathogen detection
• 119 patients with a pathogen detected had ≥1 pathogen (16.8%)
• Bacterial-viral co-detections were seen in 50.4% of co-detection samples, while 39.5% of co-detections were bacterial-bacterial (Table 1)
• Viral-viral, bacterial-para-sitic, and bacterial-para-sitic-viral co-detections were less frequent
• Certain organisms when positive on stool PCR testing, had a ≥50% occurrence as a co-detection rather than in isolation:
  - E. coli O157:H7 100% (1/1), P. shigeloides 88% (5/6), Sappovirus 70.6% (12/17), EAECD 62.9% (22/35), and Cryptosporidium 50% (5/10) when positive on stool PCR testing

• The most common patterns of co-detection were:
  - Norovirus/C. difficile (19.3%), EPEC/E. coli (7.6%), EPEC/Campylobacter (5.9%), and EPEC/Norovirus (5.9%) (Table 2)

• Currently the clinical implication of detecting multiple pathogens is poorly understood

DISCUSSION

• Our study highlights a high frequency (16.8%) of pathogen co-detection in patients with a positive stool PCR test
• It also suggests that bacterial-viral co-detections are the most commonly identified combination
• The most frequent pathogen-specific combination was Norovirus with C. difficile accounting for 19.3% of co-detections
• More information is needed on the significance of co-detections and their treatment
• Further analysis will evaluate the contribution of demographics and immunosuppressing conditions to the likelihood of co-detection

Table 1. Organism Classification in Co-Detections

<table>
<thead>
<tr>
<th>Co-detection Pathogen Classification</th>
<th>Incidence in Co-detections</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bacterial-Viral</td>
<td>50.4% (60/119)</td>
</tr>
<tr>
<td>Bacterial-Bacterial</td>
<td>39.5% (47/120)</td>
</tr>
<tr>
<td>Viral-Viral</td>
<td>5.0% (6/120)</td>
</tr>
<tr>
<td>Bacterial-Para-sitic</td>
<td>3.4% (4/120)</td>
</tr>
<tr>
<td>Bacterial-Para-sitic-Viral</td>
<td>1.7% (2/119)</td>
</tr>
</tbody>
</table>

Table 2. Incidence of Pathogens

<table>
<thead>
<tr>
<th>Highest Incidence of Co-Detected Pathogens</th>
<th>Incidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>C. difficile, Norovirus</td>
<td>19.3% (22/118)</td>
</tr>
<tr>
<td>C. difficile, EPEC</td>
<td>7.6% (9/120)</td>
</tr>
<tr>
<td>Campylobacter, EPEC</td>
<td>5.9% (7/120)</td>
</tr>
<tr>
<td>EPEC, Norovirus</td>
<td>5.9% (7/120)</td>
</tr>
<tr>
<td>C. difficile, EAECD</td>
<td>4.2% (2/119)</td>
</tr>
<tr>
<td>EAECD, EPEC</td>
<td>4.2% (2/119)</td>
</tr>
</tbody>
</table>

References:


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