"Clostridium difficile: Out with the Old and In with the New"

Update on *C. difficile* diagnostic testing for Jackson Health System

An important initial step in the treatment of *C. difficile* infection (CDI) is cessation of the inciting antibiotic as soon as possible. Treatment with concomitant antibiotics (ie, antibiotics other than those given to treat *C. difficile* infection) is associated both with significant prolongation of diarrhea and with increased risk of recurrent *C. difficile* infection

Diagnostic modalities:
- Previous JHS Procedure: 3 unformed stool samples 8 hour apart sent to the microbiology laboratory
- New JHS Procedure (implemented in 2011):
  - **ONE** unformed stool sample will be sent to the microbiology laboratory (refer to testing algorithm below)
  - If the clinician has a strong index of suspicion despite negative results, please contact the microbiology lab for repeat testing (305-585-6508); samples can be sent 3-7 days later

![Testing Algorithm Diagram](image)

**Step 1**
Enzyme Immunoassay GDH and Toxin (s) A/B Kit

- **GDH Positive**
  - **Toxin Negative**
    - GDH Negative Toxin Negative
    - Report **Negative Result** (do NOT treat)
  - **Toxin Positive**
    - GDH Positive Toxin Positive
    - Report **Positive Result** (treat)
- **GDH Negative**
  - **Toxin Negative**
    - GDH Negative Toxin Negative
    - Report **Negative Result** (do NOT treat)
  - **Toxin Positive**
    - GDH Positive Toxin Positive
    - Report **Positive Result** (treat)

**Step 2**
Polymerase chain reaction (PCR)

- **Negative**
  - Report **Negative Result** (do NOT treat)
- **Positive**
  - Report **Positive Result** (treat)

**Microbiology Lab Procedure Change @ JHS**

**Note:** Repeat stool assays are NOT warranted during or following treatment in patients who are recovering or are symptom free. Up to 50% of patients have positive stool assays for as long as six weeks after the completion of therapy

Diagnostic modalities:
- Glutamate dehydrogenase (GDH)—bacterial antigen
  - More sensitive than enzyme immunoassays (EIA) but less specific (great screening tool)
  - Colonization of asymptomatic patients occurs (lab will only accept unformed stool samples)
- EIA’s
  - Rapid turnaround; lacks adequate sensitivity—leads to false negative’s
- Nucleic acid amplification test (NAAT)
  - JMH equivalent of NAAT is a polymerase chain reaction (PCR) test; quick turn-around time
  - More sensitive than toxin EIA’s (90% vs. 40-80%)
  - Demonstrate excellent specificity—detects genes associated with toxigenic *C. difficile* in the stool
The example below depicts a patient who tested negative using the toxin EIA (less sensitive) however had a confirmed positive toxin PCR (more specific and sensitive) therefore this patient has clinical disease and should receive treatment—GDH will always be present if patient is colonized (asymptomatic)

Patient example above (refer to the information in red box):
*C. difficile* GDH—Positive
*C. difficile* toxin A/B—Negative
Discrepancy between the two tests requires further confirmation with stool PCR for toxin genes—PCR Positive therefore treatment is required and this patient has confirmed *C. difficile* infection

**Clostridium difficile** infection Treatment Recommendations JHS:

<table>
<thead>
<tr>
<th>Preferred Treatment for First Episode</th>
<th>Length of Therapy</th>
<th>Hospital Cost</th>
<th>Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mild:</strong> Metronidazole PO 500mg q 8 hours</td>
<td>10-14 days</td>
<td><strong>$15.00 (10 days)</strong></td>
<td>IV metronidazole can be used for patients with N/V or ileus</td>
</tr>
<tr>
<td><strong>Severe:</strong> Vancomycin PO 125mg q 6 hours (i.e pts with WBC &gt;15,000 or SrCr &gt;1.5mg/dL)</td>
<td>10-14 days</td>
<td><strong>$20.00 (10 days)</strong></td>
<td>JHS pharmacy compounds the IV formulation for PO route*</td>
</tr>
</tbody>
</table>

* Vancomycin intravenously is inactive against *C. difficile*. The oral formulation (capsules) of vancomycin is expensive, however pharmacy and home health care agencies usually are able to compound the oral formulation using the IV formulation at a lower cost for the patient