INTRODUCTION

- Clostridium difficile infection (CDI) is the most common nosocomial infection, representing 12% of all hospital acquired infections.
- Relapse of CDI is another major problem which complicates up to 25% of cases.
- It is known that antibiotic use is a major cause of CDI. Several studies, including one from our institution, indicate prophylaxis of patients who recently had CDI with oral vancomycin decreases the risk of a relapse when exposed to antibiotics.

OBJECTIVES

- To determine the effect of antibiotic administration on the risk and timing of relapse of CDI, and study the efficacy of oral vancomycin prophylaxis in preventing relapses of CDI.

METHODOLOGY

All patients with a positive polymerase chain reaction (PCR) for Clostridium difficile at our institution between 2012 and 2014 were evaluated for receipt of antibiotics within three and six months of a positive PCR. Patients who received metronidazole were excluded to remove the potential confounding effect.

The relapse rate for all patients, patients who received any antibiotics, patients who received broad spectrum antibiotics and high-risk (fluoroquinolones, clindamycin, beta-lactams, cephalexin, and, carbapenems), and patients who did not receive any antibiotics were calculated.

Timing of the relapse from the last episode of CDI and from receipt of antibiotics was determined.

Patients who received oral vancomycin for secondary prophylaxis were identified.

RESULTS

- A total of 6,536 patients were identified, representing 8,000 episodes of CDI. The relapse rates and timing based on prior CDI episodes and receipt of additional antibiotics prior to relapse are shown in table 1.
- There were 1,375 episodes of CDI where antibiotics were given within three months of the episode, and 1,848 episodes where antibiotics were given within six months. Of these, 33 patients received prophylaxis with oral vancomycin, and none of those relapsed within three or six months.
- The timing of the relapse relative to the prior episode of CDI and receipt of antibiotics is shown in Figure 1.
- For antibiotics given within 3 months 72.4%, 83.6%, and 92% of relapses occur within 7, 14, or 21 days of antibiotics respectively. For antibiotics given within 6 months 65%, 76.2%, and 82.7% of relapses occur within 7, 14, or 21 days of antibiotics respectively.

Table 1: Relapse rates and timing of relapses of Clostridium difficile Infections

<table>
<thead>
<tr>
<th>Category</th>
<th>Relapse rate</th>
<th>Days since last CDI (Mean)</th>
<th>Days since antibiotics (Mean)</th>
<th>Days since last CDI (Median)</th>
<th>Days since antibiotics (Median)</th>
</tr>
</thead>
<tbody>
<tr>
<td>All episodes within 3 months</td>
<td>12.5%</td>
<td>38.4</td>
<td>N/A</td>
<td>32</td>
<td>N/A</td>
</tr>
<tr>
<td>Any antibiotics prior</td>
<td>11.9%</td>
<td>45.9</td>
<td>7.2</td>
<td>40</td>
<td>3</td>
</tr>
<tr>
<td>High-risk antibiotics prior</td>
<td>12.5%</td>
<td>46.5</td>
<td>7.2</td>
<td>42</td>
<td>3</td>
</tr>
<tr>
<td>Low-risk antibiotics prior</td>
<td>6.4%</td>
<td>35.8</td>
<td>8</td>
<td>26</td>
<td>3</td>
</tr>
<tr>
<td>No antibiotics prior</td>
<td>12.6%</td>
<td>36.9</td>
<td>N/A</td>
<td>30</td>
<td>N/A</td>
</tr>
<tr>
<td>All episodes within 6 months</td>
<td>14.6%</td>
<td>50.6</td>
<td>N/A</td>
<td>36</td>
<td>N/A</td>
</tr>
<tr>
<td>Any antibiotics prior</td>
<td>12.4%</td>
<td>69.6</td>
<td>13.6</td>
<td>58</td>
<td>3</td>
</tr>
<tr>
<td>High-risk antibiotics prior</td>
<td>13.9%</td>
<td>70.1</td>
<td>13.6</td>
<td>59.5</td>
<td>3</td>
</tr>
<tr>
<td>Low-risk antibiotics prior</td>
<td>5.7%</td>
<td>62.4</td>
<td>12.8</td>
<td>34.5</td>
<td>2</td>
</tr>
<tr>
<td>No antibiotics prior</td>
<td>15.1%</td>
<td>46.1</td>
<td>N/A</td>
<td>53</td>
<td>N/A</td>
</tr>
</tbody>
</table>

DISCUSSION

- While antibiotics clearly are a major risk factor for CDI, our study shows that the receipt of antibiotics after an episode of CDI does not change the overall rate of CDI relapse compared to patients who received no additional antibiotics prior to the relapse.
- When the timing of the relapses after antibiotics is examined, the relapses occur later in patients who received antibiotics following an episode of CDI and shortly after antibiotics administration.
- The majority of antibiotics given were considered high risk but low risk antibiotics did have a significantly lower rate of relapse.
- Those patients who received oral vancomycin as secondary prophylaxis did not have a relapse of CDI.

CONCLUSIONS

- It is likely that in the majority of cases of relapsed CDI where antibiotics are given after a recent episode of CDI, the antibiotics trigger relapses in patients who otherwise would not have relapsed.
- The risk of relapse after antibiotics is given mainly in the first week and is nearly gone by three weeks.
- Oral vancomycin prophylaxis appears to be effective in preventing relapses in patients given antibiotics after an episode of CDI.

REFERENCES

