Evaluation of the Microbiology of Intraabdominal Abscesses in Children and Implications for Treatment and Outcomes

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Evaluation of the Microbiology of Intraabdominal Abscesses in Children and Implications for Treatment and Outcomes

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Background

- In children, the incidence of postoperative abscess ranges from 20-30% in cases of perforated appendicitis
- Fluid cultures obtained during surgery may be used to inform choice of antibiotic regimen though studies have suggested that empiric broad spectrum antibiotic coverage is adequate
- Recent literature suggests a simplified antibiotic regimen of once daily ceftriaxone and metronidazole is as effective as historical regimens though *Pseudomonas aeruginosa* is not covered with this combination
- Prior to transitioning the empiric antibiotic regimen to once daily ceftriaxone and metronidazole at Lehigh Valley Children’s Hospital, we conducted a retrospective review of bacterial cultures obtained from intraabdominal fluid collections in children that underwent surgical treatment of perforated appendicitis and/or intraabdominal abscesses

Primary Objective:

- Determine the predominant organisms of intraabdominal fluid cultures in children admitted to Lehigh Valley Children’s Hospital

Secondary Objectives:

- Calculate the occurrence of intraabdominal abscess in patients who present with perforated appendicitis
- Characterize the empiric antibiotic regimens and determine if antibiotic therapy was modified following availability of culture results
- Describe clinical outcomes and determine if there is a significant relationship with the organism isolated and/or antibiotics utilized

Results

- Seventy-two children met inclusion criteria, 42 (58.3%) were male with a median age of 10 years (IQR 6.2)
- Twenty-six patients (36.1%) developed an intraabdominal abscess with abscess identified prior to surgery in 11 patients (42.3%)
- Organisms were identified in 50 of 53 cultures obtained and the vast majority were polymicrobial (92%)
- Most frequently prescribed oral antibiotic regimen upon discharge was amoxicillin/clavulanate (75%)
- Total median length of antibiotic therapy was 9 days (IQR 8)
- Twenty-one patients (29.2%) experienced post-operative complications including 13 (18%) readmissions within 30 days of discharge and one surgical site infection (1.4%)

<table>
<thead>
<tr>
<th>Organism Isolated</th>
<th>Cultures n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aerobic and facultative</td>
<td>42 (84)</td>
</tr>
<tr>
<td>Escherichia coli</td>
<td>12 (24)</td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td>6 (12)</td>
</tr>
<tr>
<td>Eikenella corrodens</td>
<td>19 (38)</td>
</tr>
<tr>
<td>Gram-positive cocci</td>
<td>14 (28)</td>
</tr>
<tr>
<td>Alpha-hemolytic streptococcus</td>
<td>6 (12)</td>
</tr>
<tr>
<td>Streptococcus spp. (other)*</td>
<td>29 (58)</td>
</tr>
<tr>
<td>Enterococcus spp.</td>
<td>9 (18)</td>
</tr>
<tr>
<td>Anaerobic</td>
<td>4 (8)</td>
</tr>
<tr>
<td>Bacteroides fragilis</td>
<td>2 (4)</td>
</tr>
<tr>
<td>Bacteroides (not fragilis)</td>
<td>2 (4)</td>
</tr>
<tr>
<td>Peptostreptococcus spp.</td>
<td>2 (4)</td>
</tr>
<tr>
<td>Fusobacterium</td>
<td>2 (4)</td>
</tr>
</tbody>
</table>

*Includes S. anginosus, S. intermedius, S. constellatus, S. pneumoniae, and beta-hemolytic group F and G streptococci

Antibiotics and Complications

- Age, gender, incidence of abscess, and isolated organisms were similar to published reports
- Majority of patients (79.1%) received antibiotic regimens targeted toward culture results
- Incidence of complications did not appear to be affected by whether the antibiotic regimen was targeted to adequately cover the organism
- Due to the small number of pseudomonal isolates identified in culture, piperacillin/tazobactam may be too broad of an empiric antibiotic regimen
- Once daily ceftriaxone and metronidazole may be considered for empiric therapy for appendicitis based on the results of this study

Discussion

- Empiric therapy for appendicitis based on the results of this study

Methods

- Obtained list of patients less than 18 years of age who underwent appendectomy at Lehigh Valley Children’s Hospital from April 2016 to April 2018
- Included patients admitted to pediatric units with perforated appendicitis and/or intraabdominal abscess
- Performed a retrospective chart review to collect demographics, antibiotic regimens, culture results, and clinical outcomes

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