Surgical Globetrotting

Typhoid Intestinal Perforations in Nigerian Children

Donald E. Meier, M.D., John L. Tarpley, M.D.

Department of Surgery, Baptist Medical Centre, Ogbomoso, Nigeria

Abstract. This study was a retrospective analysis of 75 children with perforated typhoid enteritis treated at the Baptist Medical Centre in Ogbomoso, Nigeria over a 4-year period. The mean age was 11.4 years. The usual symptoms were fever and abdominal pain, with a mean duration of 10.5 days. The diagnosis of perforation was usually based on the history and physical examination alone. The time interval from hospital presentation to operation was 11 hours, during which intravenous crystalloid and antibiotics were administered. Among the 75 children, 53 (71%) had a single perforation, and 22 had multiple perforations. Débridement and two-layered closure was performed in 71 (95%) and resection with anastomosis in 4 (5%). Ileus resolution was usually not complete until the eighth postoperative day, and the mean time until the surviving children were afebrile was 10 days. Complications other than death occurred in 7 (9%) children, and there were 15 deaths (20% mortality). All deaths were attributed to overwhelming sepsis, and all but one of the deaths occurred during the first 72 postoperative hours. The only factor statistically significant as a predictor of mortality was the duration of abdominal pain. Improvement in perioperative management including intensive care nursing and more effective antibiotics, although expensive, could result in decreased mortality. A significant decrease in mortality can occur only when the prevention of typhoid fever becomes a higher priority than its treatment.

Typhoid fever is a serious global health problem that usually occurs in places with the fewest resources available for effective treatment. Enteric perforation is the complication of typhoid fever associated with the highest morbidity and mortality. This report reviews a 4-year experience with the management of perforated typhoid enteritis in children presenting to a Nigerian general medical practice hospital.

Materials and Methods

The records of 75 consecutive children with perforated typhoid enteritis treated at the Baptist Medical Centre in Ogbomoso, Nigeria, between January 1991 and December 1994 were analyzed retrospectively and form the database for this report. Statistical analysis was performed using logistic regression.

The diagnosis of typhoid fever was generally based on the history and physical examination alone. Blood cultures were obtained as a supplement in some children, but serologic tests such as the Widal test were not utilized. Intestinal perforation was diagnosed solely on the basis of the history and physical findings in most cases, but radiographs, if available, were used to look for pneumoperitoneum when the diagnosis was uncertain after evaluation of the history and physical examination. As soon as the diagnosis of perforation was entertained, nasogastric decompression and intravenous fluid resuscitation with Ringer’s lactate solution or normal saline were implemented. Intravenous antibiotics, including gentamicin, chloramphenicol, and ampicillin or penicillin, were administered to all children. Some children were also given metronidazole by rectum, but parenteral metronidazole was not used because of its prohibitive cost in our location. Acetaminophen and tepid sponge baths were used as needed to control pyrexia. After adequate urine output was established, operative exploration was undertaken.

General endotracheal anesthesia with ketamine and halothane as the only anesthetic agents was used routinely. Operative exploration was conducted through a lower midline incision. The degree of peritoneal contamination and the number and location of the perforations were recorded. Single perforations were débrided and a two-layered bowel closure performed. If multiple perforations were found to be adequately spaced, multiple débridements and two-layered closures were utilized; but if the perforations were close together, resection and primary anastomosis was performed. The fascia was closed with a monofilament permanent suture, and the subcutaneous and skin layers were left open to minimize wound infections.

Postoperatively, children were extubated and observed in an open children’s ward, as we do not have an intensive care unit or a pediatric ventilator. Intravenous fluid therapy was monitored using physical findings and urine output as parameters. Our laboratory is unable to perform serum electrolyte determinations. Parenteral antibiotics were continued until a return of bowel function, at which time oral ampicillin and chloramphenicol were substituted. Metronidazole was given rectally in some patients until ileus resolution and was then switched to oral administration. Antibiotics were continued for at least 2 weeks following operation. Oral intake was resumed following resolution of the ileus, and the child’s “normal diet” was supplemented with “homemade” soybean milk to provide as many calories and as much protein as possible. After discharge from the hospital, children were monitored for continued growth and well-being in an outpatient clinic.
Table 1. Symptoms.

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Children with symptom (%)</th>
<th>Duration (days) (mean of whole series)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fever</td>
<td>96</td>
<td>11</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>95</td>
<td>5</td>
</tr>
<tr>
<td>Vomiting</td>
<td>40</td>
<td>6</td>
</tr>
<tr>
<td>Constipation</td>
<td>36</td>
<td>4</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>31</td>
<td>5</td>
</tr>
<tr>
<td>Headache</td>
<td>19</td>
<td>9</td>
</tr>
</tbody>
</table>

Results

Seventy-five consecutive children with the diagnosis of perforated typhoid enteritis were operatively managed at Baptist Medical Centre in Ogbomoso, Nigeria between January 1991 and December 1994. There were 47 males and 28 females with a mean age of 11.4 years (range 2–18 years). There was no seasonal variation, with the rainy, dry, and transitional seasons equally represented.

The most common presenting symptoms (Table 1) were fever and abdominal pain, and the mean duration of symptoms was 10.5 days. Less common symptoms were vomiting, constipation, diarrhea, and headache. Most children appeared volume-depleted on presentation, and all had generalized abdominal tenderness. The mean time interval from hospital presentation to operation was 11 hours, during which intravenous crystalloid was used to establish urine output and antibiotics were administered.

The mean operating time was 90 minutes. Altogether 53 (71%) children had a single perforation, 16 had two perforations, 3 had three perforations, and 1 child each had four, five, and six perforations. Typically perforations were located on the antimesenteric portion of the ileum 20 cm (range 0.5–60.0 cm) proximal to the ileocecal valve. In no instance had the omentum succeeded in sealing the perforation or even in localizing the resultant infection. Peritoneal contamination was moderate or severe in 67 (89%) children and mild in only 8 (11%). Perforations were managed by debridement and two-layered closure in 71 (95%) children, and resection with primary anastomosis was performed in 4 (5%). Twelve (16%) children underwent additional suture imbrication of “preperforations.”

Ileus resolution usually began around the fifth postoperative day, but progress to a “regular” prehospital diet could not be achieved until the eighth postoperative day. The mean postoperative time until the surviving children were afebrile was 10 days, and the mean time until hospital discharge was 14 days. Complications other than death occurred in 7 (9%) children. Early postoperative morbidity necessitating a repeat operation included one child with a leak from a previously closed perforation, one with a metachronous perforation (7 days after the first perforation), one with a pelvic abscess, and one with a fascial dehiscence. One child with an enterocutaneous fistula was successfully managed postoperatively in a 27-bed, open ward.

Discussion

The Baptist Medical Centre (BMCO) in Ogbomoso, Nigeria is a 180-bed general medical practice hospital that faces daily operational impediments similar to those faced by most, if not all, hospitals in less developed countries (LDCs) [1, 2]. The only consistent factor about the supply of water and electricity is the inconsistency. X-ray film and developing solutions are expensive and scarce, and therefore radiographs are used only when the result might modify patient care. The only reliable laboratory tests available at BMCO are the complete blood count, serum glucose assay, urinalysis, and routine bacterial cultures. The only appropriate antibiotics that are readily available for bowel flora are penicillin, ampicillin, gentamicin, chloramphenicol, and enteral metronidazole. Parenteral metronidazole, cephalosporins, and quinolones, if available at all, are economically inaccessible to almost all of our patients. A nurse anesthesia service at BMCO provides good general anesthesia with endotracheal intubation; but at many LDC hospitals laparotomy is, of necessity, performed using ketamine and diazepam without an endotracheal tube. There is no intensive care unit at BMCO, and children are managed postoperatively in a 27-bed, open ward. Parenteral nutrition is unavailable. Without the availability of computed tomography scanning and ultrasonography, postoperative intraabdominal abscesses are presumptively diagnosed by clinical examination and confirmed by the ultimate diagnostic modality, exploratory laparotomy.

Children with typhoid fever generally present to our hospital during the second week of their illness. They have usually been treated at home with chloramphenicol, which is readily available without prescription. Many children have also been treated with various other medicinals by traditional healers or traveling “injections.” When the abdominal pain fails to improve, they are brought to the hospital as a last resort. At this point they are generally seriously ill with obvious volume depletion, and it is easy to diagnose typhoid fever. The difficulty comes when deciding whether the bowel has perforated. Many children have obvious peritonitis on physical examination, and the decision to operate is readily made. There are children with more subtle findings, however, and the diagnosis of perforation is not as obvious in these cases. One helpful physical test in these instances is the