Isolated ileal perforation 
in infancy: a lethal initial 
presentation of Hirschsprung’s 
disease

Fadi Iskandarani,1,2 
Chawki Hammoud,1,2 Sarah Srour,1,2 
Gloria Pelizzo,3 Ghassan Nakib,4 
Valeria Calcaterra,5,6 Amir Khanafer1,2 
5Faculty of Medicine, Lebanese 
University, Hadath, Beirut, Lebanon; 
6Sahel General Hospital, Ghobeiri, 
Beirut, Lebanon; 3Pediatric Surgery 
Unit, Children’s Hospital, Istituto 
Medicinale di Eccellenza Pediatrica, 
Palermo, Italy; 4Department of Pediatric 
Surgery, Medclinic Middle East, 
Mediclinic City Hospital Dubai, United 
Arab Emirates; 2Pediatric Unit, 
Department of Maternal and Children’s 
Health, Fondazione IRCCS Policlinico 
San Matteo, Pavia; 2Department of 
Internal Medicine, University of Pavia, 
Italy

Abstract

A rare case of ileal perforation, as a fatal initial presentation of total colonic aganglionosis (TCA) in infancy is reported. A 10-week-old boy, was brought to the emergency department with symptoms of complicated intestinal obstruction. He looked ill, was lethargic, markedly dehydrated and had a severely distended abdomen. An abdominal X-ray revealed multiple air fluid levels seen in a distended small intestine. During exploratory laparotomy the ileum was massively dilated with distal segment perforation. Ileal perforation repair was performed. A totally collapsed microcolon was identified. Biopsies were taken from the high rectum, sigmoid and hepatic flexure. Appendectomy and ileostomy were performed. A totally collapsed microcolon was identified. Biopsies were taken from the high rectum, sigmoid and hepatic flexure. Appendectomy and ileostomy were performed. All biopsies, as well as the appendix, showed absence of ganglion cells. Despite this procedure the patient progressively deteriorated and later died due to sepsis. Ileal perforation in infants is a rare, but potentially fatal initial presentation of TCA. Early detection is essential to prevent life-threatening complications.

Case Report

A 10 weeks old male infant, with no relevant medical history, was brought to the emergency department with severe abdominal distention and lethargy.

Three days prior to presentation, the mother noted fever, poor feeding and vomiting which was mainly post-prandial, non-projectile, non-bilious and non-bloody. The infant’s condition deteriorated one day prior to presentation, with cessation of bowel movements and subsequent progressive abdominal distention and irritability at first, then lethargy.

The baby was born at term by vaginal delivery, with a weight of 1.860 grams (small for gestational age). No delay in passing meconium at birth nor history of constipation were reported. He was being breast fed and his vaccination schedule was up to date. No family history of Hirschsprung’s disease or congenital disorders was present.

On physical examination, the baby measured 30 cm long (<3 percentile for age and sex) and weighed 3430 grams (<3 percentile for age and sex). He was afebrile (37°C), fair heart rate (124 beats/minute), tachypneic (45 breaths/minute), hypotension 60-35 mmHg), and maintained an oxygen saturation on room air of 97%. He looked unwell, lethargic (low activity, weak crying, poor sucking), markedly dehydrated (decreased skin turgor, pale mottled skin), and had a markedly distended abdomen which was tense and tender to palpation with reduced bowel sounds (agitation and crying).

Laboratory investigations revealed a high leukocyte count of 20.56×10⁹/L neutrophilia (41%), thrombocytosis (994×10⁹/L), elevated C-reactive protein (25.5 U/L), electrolyte disturbance (hypokalemia 129 mEq/L), hyperglycemia (196 mg/dL), elevated liver function tests (SGOT 164 U/L and SGPT 232 U/L) and compensated metabolic acidosis on arterial blood gas test (PH 7.124, PaCO₂ 34.2 and HCO₃⁻ 17,2). A plain abdominal X-ray revealed multiple air fluid levels seen in distended loops of small intestine; no pneumoperitoneum was noted (Figure 1).

The baby was treated for clinical sepsis, which involved immediate fluid resuscitation and initiation of broad spectrum parenteral antibiotics. An initial diagnosis of complicated intestinal obstruction was made and urgent laparotomy was performed. During surgery, the ileum was massively dilated with identification of a distal segment perforation (10 inches from ileocecal valve). Primary repair of the ileal perfo-
Case Report

TCA. 1-6 neural origin have been also associated with is higher (12.4% to 33%) than that in syndrome as well as ileal atresia and tumors of somal and congenital hypoventilation syndrome, such as chromosomal anomalies found, it had been related family history of HD, nor any and mortality rates.1-3

and is usually associated with higher morbidity and mortality rates.1-3 In this case enterocolitis was associated with perforation in TCA. This association is infrequently reported in infants less than 1 year old.7-26 and in the majority of cases, absence of enterocolitis was inferred from the case descriptions.

Theoretically, every HD patient is at risk for developing associated enterocolitis. Studies have shown that several factors contribute to this risk, such as family history, long segment disease and previous episodes of enterocolitis.1-6,27 Our little patient had no personal or familial anamnestic data of enterocolitis, but pathology results confirmed the long segment character of the disease. Additionally, as in our report, untreated HD patients are at high risk of associated enterocolitis. Pathologically, enterocolitis is defined as an inflammation of the lining of either the colon or the small intestine. As the disease progresses, the lining erodes, and the inside of the intestine becomes filled with pus.27 If the process is left to progress untreated, patients become very ill and perforation of the intestine may occur. Enterocolitis is as a functional obstruction at or shortly after birth (failure to pass meconium within 24-48h of birth, abdominal distension, bilious emesis, and enterocolitis). Paradoxically later presentation is not uncommon in TCA, where passage of meconium is often reported. These cases can easily be missed without a high index of suspicion.

Isolated ileal perforation in infants as a primary presentation is uncommon. In the literature, 66 documented cases of HD in which bowel perforation was a primary presenting sign were reported, but only in 4 of these was the ileum involved.7-26 The addition of our case brings this total to five. All these reported cases had TCA; only our infant was older than 2 months at initial presentation (Table 1).7-26

Aganglionosis is the most common cause of large bowel obstruction in the young infant and therefore colonic or small bowel perforation should raise the suspicion of HD. As reported by Newman,6 where bowel perforation occurred early in the course of HD, the majority of cases (62%) were associated with long-segment HD or TCA. The most common sites of perforation were the proximal colon (68%) and appendix (18%) or distal small bowel (6%).5,6 In cases with a short or intermediate length of aganglionic bowel, the perforation was proximal to or at the site of transition, but in 84% of infants with TCA the perforation was situated in aganglionic bowel. The mechanism of perforation in HD appears to be directly related to increased intraluminal pressure from distal obstruction, rather than any inflammatory process, subsequent bacterial overgrowth or intestinal wall ischemia.1,24

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Discussion

A case of ileal perforation associated with enterocolitis, as a fatal initial presentation of TCA in an infant older than 2 months is reported.

Hirschsprung’s disease is a relatively common developmental disorder in neonates characterized by aganglionosis in the distal colon, resulting in a functional obstruction. Clinical classification of HD has evolved with further understanding of the disease, from ultra-short, short and long segment HD, to colonic and TCA with or without involvement of the small bowel.1-4

Total colonic aganglionosis represents a relatively uncommon form of HD and is defined as aganglionosis extending from the anus to at least the ileocecal valve but involving no more than 50 cm of small bowel proximal to the ileocecal valve. Even thought, in this case, there was no related family history of HD, nor any and associated anomalies found, it had been reported that the familial incidence of TCA is higher (12.4% to 33%) than that in patients with classical HD. A number of developmental conditions, such as chromosomal and congenital hypoventilation syndrome as well as ileal atresia and tumors of neural origin have been also associated with TCA.1-6

Compared to the classic cases of HD, TCA presents more diagnostic problems and is usually associated with higher morbidity and mortality rates.1-3

The initial presentation of HD is often

Figure 1. Multiple air fluid levels seen in distended small intestine, but no pneumoperitoneum.
usually accompanied by abdominal distension in 99% of cases, explosive diarrhea in 82%, vomiting in 61%, fever in 40%, lethargy in 32%, rectal bleeding in 6%, shock in 6%. Our baby presented with acute onset abdominal distension and lethargy. Fever and vomiting were reported by the mother several days earlier, responsive to anti-pyretics which were administered rectally, but no actual documentation of fever exists before and during hospitalization. Enterocolitis in patients with HD may be considered a risk factor for the fulminant, rapidly progressive and lethal form, with subsequent death, especially in the context of a late presentation.1-4, 8, 10

Total colonic aganglionosis presents other diagnostic problems. X-ray studies may show enlarged loops of bowel, and a contrast enema may show a question mark-shaped colon owing to the rounded edges of the large intestines. However, there are no specific pathognomonic finding on barium enema and X-ray studies are diagnostic in only 20% to 30% of all patients with TCA.3, 4 The diagnosis of TCA must be entertained if clinical symptoms of intestinal obstruction persist in the absence of any other known causes despite a radiologically normal-looking colon.3 The definitive diagnosis of TCA is obtained by performing laparotomy and intraoperative seromuscular biopsies of the rectum, colon, and ileum. In our case, during the laparotomy, the transitional zone was very well identified at the ileocecal valve; the entire colon was collapsed and the distal ileum was very dilated and perforated around 10 inches proximal to the valve. This strongly suggested a diagnosis of TCA, which was confirmed by the biopsy results; because of the absence of an ileal biopsy, the ileal involvement remains unknown.

Ultimate treatment for TCA is surgical. Despite recent advances in surgical techniques and meticulous pre- and post-operative management, surgical treatment for TCA remains challenging. The affected patients often require multiple procedures; long-term results are suboptimal and complications are common.1-4 In this report, definitive surgery was not performed as the condition of the baby was critical and his small bowel severely inflamed. A protective ileostomy only was created with definitive surgery planned once there had been improvement of the general status of the infant.

Table 1. Literature survey of patients with Hirschsprung’s disease presenting with ileal or other location of perforation as initial presentation

<table>
<thead>
<tr>
<th>Reference</th>
<th>N. of patients</th>
<th>Age</th>
<th>Location of perforation</th>
<th>Extent of aganglionic segment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ileal perforation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bowden et al.7</td>
<td>1</td>
<td>18 days</td>
<td>Terminal ileum</td>
<td>Total colonic aganglionosis</td>
</tr>
<tr>
<td>Keefer6</td>
<td>1</td>
<td>13 days</td>
<td>Terminal ileum</td>
<td>Total colonic aganglionosis</td>
</tr>
<tr>
<td>Patel et al.5</td>
<td>1</td>
<td>2 days</td>
<td>Terminal ileum</td>
<td>Total colonic aganglionosis</td>
</tr>
<tr>
<td>Swenson et al.3</td>
<td>1</td>
<td>Newborn</td>
<td>Ileum</td>
<td>Total colonic aganglionosis</td>
</tr>
<tr>
<td>This report</td>
<td>1</td>
<td>2 months and 2 weeks</td>
<td>Terminal ileum</td>
<td>Total colonic aganglionosis</td>
</tr>
<tr>
<td>Other location of perforation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arliss et al.10</td>
<td>1</td>
<td>7 days</td>
<td>Appendix</td>
<td>Rectosigmoid</td>
</tr>
<tr>
<td>Asch et al.11</td>
<td>2</td>
<td>8 weeks</td>
<td>Appendix</td>
<td>Total colonic aganglionosis</td>
</tr>
<tr>
<td>Bowden et al.7</td>
<td>1</td>
<td>5 days</td>
<td>Cecum</td>
<td>Total colonic aganglionosis</td>
</tr>
<tr>
<td>Donald et al.12</td>
<td>2</td>
<td>2 days; 4 days</td>
<td>Cecum</td>
<td>Sigmoid; transverse colon</td>
</tr>
<tr>
<td>Forsshall et al.13</td>
<td>1</td>
<td>4 days</td>
<td>Cecum</td>
<td>Ascending colon</td>
</tr>
<tr>
<td>Frech14</td>
<td>4</td>
<td>1 month</td>
<td>Colon</td>
<td>Total colonic aganglionosis</td>
</tr>
<tr>
<td>Gastrin et al.15</td>
<td>1</td>
<td>11 days</td>
<td>Appendix</td>
<td>Distal half colon</td>
</tr>
<tr>
<td>Grobl6</td>
<td>3</td>
<td>1-2 days</td>
<td>Cecum (1); splenic flexure (2)</td>
<td>Distal (2); not recorded (1)</td>
</tr>
<tr>
<td>Hiatt17</td>
<td>2</td>
<td>Newborns</td>
<td>Sigmoid colon</td>
<td>Rectosigmoid</td>
</tr>
<tr>
<td>Leonidas et al.18</td>
<td>1</td>
<td>2 days</td>
<td>Cecal perforation with enterocolitis</td>
<td>Distal</td>
</tr>
<tr>
<td>Martin et al.19</td>
<td>3</td>
<td>1 day; 15 days; 33 days</td>
<td>Appendix</td>
<td>Transverse colon; splenic flexure (2)</td>
</tr>
<tr>
<td>Newman et al.6</td>
<td>3</td>
<td>1 day; 2 days; 4 months</td>
<td>Cecum (2); appendix</td>
<td>Distal (sigmoid); total colonic aganglionosis (2)</td>
</tr>
<tr>
<td>Ojyoi et al.20</td>
<td>2</td>
<td>1 day</td>
<td>Cecum</td>
<td>Distal</td>
</tr>
<tr>
<td>Sane et al.31</td>
<td>2</td>
<td>1 month</td>
<td>Proximal colon (2)</td>
<td>Total colonic aganglionosis</td>
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<tr>
<td>Sarioglu et al.22</td>
<td>2</td>
<td>40 days; 27 days</td>
<td>Appendix</td>
<td>Total colonic aganglionosis; descending colon</td>
</tr>
<tr>
<td>Sing et al.21</td>
<td>14</td>
<td>Newborns</td>
<td>Transverse-sigmoid colon or splenic flexure (14, but not individually defined)</td>
<td>Not defined</td>
</tr>
<tr>
<td>Soltero-Harrington et al.34</td>
<td>1</td>
<td>6 weeks</td>
<td>Ascending colon</td>
<td>Total colonic aganglionosis</td>
</tr>
<tr>
<td>Soper et al.25</td>
<td>1</td>
<td>1 day</td>
<td>Cecum</td>
<td>Sigmoid</td>
</tr>
<tr>
<td>Swenson et al.3</td>
<td>15</td>
<td>Newborns</td>
<td>Colon (14); appendix (1)</td>
<td>Descending colon (2); transverse colon (4); cecum (1); sigmoid (5); terminal ileum (2); total colonic aganglionosis (1)</td>
</tr>
<tr>
<td>Wylie16</td>
<td>1</td>
<td>7 days</td>
<td>Appendix</td>
<td>Not recorded</td>
</tr>
</tbody>
</table>
Conclusions

Ileal perforation in infants is a rare but potentially lethal initial presentation of TCA. TCA must be a major differential consideration in all neonates or young infants with persistent symptoms referable to the gastrointestinal tract even when no delay in passing meconium at birth was reported. It is challenging, but imperative to establish early diagnosis and proper management in order to prevent unexpected progression of the disease to life threatening complications.

References