Rare case of intussusception in an adult with acute myeloid leukemia

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Abstract

Intussusception is rarely reported in adult patients with acute leukemia. We report a case of intussusception in a 29-year-old woman with acute myeloid leukemia (AML). She developed right lower quadrant pain, fever, and vomiting on day 16 of induction chemotherapy. Physical examination showed tenderness and guarding at the right lower quadrant of the abdomen. Abdominal computed tomography (CT) showed distension of the cecum and ascending colon, which were filled with loops of small bowel, and herniation of the ileocecal valve into the cecum. We proceeded to laparotomy and revealed ileocecal intussusception with the ileocecal valve as the leading point. The terminal ileum was thickened and invaginated into the cecum, which showed gangrenous changes. Right hemicolectomy was performed and microscopic examination of the colonic tissue showed infiltration of leukemic cells. The patient recovered after the operation and was subsequently able to continue treatment for AML. This case demonstrates that the diagnosis of intussusception is difficult because the presenting symptoms can be non-specific, but abdominal CT can be informative for preoperative diagnosis. Resection of the involved bowel is recommended when malignancy is suspected or confirmed. Intussusception should be considered in any leukemia patients presenting with acute abdomen. A high index of clinical suspicion is important for early diagnosis.

Key words: Intussusception; Acute leukemia; Abdominal pain; Colon; Malignancy

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Core tip: Gastrointestinal complications are common in patients with acute leukemia, but intussusception is rarely reported in adult leukemia patients. Previous reports have mainly been in children with leukemia. We report a case of intussusception in an adult after chemotherapy for acute myeloid leukemia (AML). A 29-year-old woman with AML presented with fever, vomiting and right lower quadrant pain. Abdominal computed tomography showed features of intussusception. Resection of the involved bowel was...
performed and the patient recovered from the operation. A high index of clinical suspicion is important for early diagnosis.


INTRODUCTION
Gastrointestinal complications are common in patients with acute leukemia. They can be due to leukemic invasion of the bowel, an altered immune state, or the toxicity of chemotherapy[1]. Intussusception is the telescoping of one segment of the gastrointestinal tract into an adjacent one, and it is more common in children than in adults[2,3]. It is rarely reported in adult patients with acute leukemia and there is only one other case report of intussusception in an adult patient with AML, confirmed by bone marrow examination[4].

We report a case of intussusception in an adult with acute myeloid leukemia (AML). Although this complication is rare in adults, it should be considered as a differential diagnosis in patients with acute leukemia presenting with abdominal pain.

CASE REPORT
A 29-year-old woman was diagnosed with AML, confirmed by bone marrow examination, which showed AML with maturation (WHO classification) and poor-risk cytogenetics. She was given induction chemotherapy with daunorubicin 60 mg/m$^2$ daily for 3 d and cytarabine 100 mg/m$^2$ daily for 7 d. On day 16 of induction treatment, she developed right lower quadrant pain, fever, and vomiting. There was no history of prior surgery. Physical examination showed tenderness and guarding at the right lower quadrant of the abdomen, but no palpable abdominal mass. Bowel sounds were normal.

Blood tests showed that the patient’s white cell count was $0.3 \times 10^9$/L (normal: $4.0 \times 10^9-9.7 \times 10^9$/L), hemoglobin 7.0 g/dL (normal: 11.9-15.1 g/dL), and platelet count 15 $\times 10^9$/L (normal: 150 $\times 10^9$-384 $\times 10^9$/L). Liver and renal function tests were normal, and testing for HIV antibody was negative. Blood cultures were taken and the patient was given an intravenous injection of empirical broad-spectrum antibiotic.

Abdominal computed tomography (CT) showed that the cecum and ascending colon appeared distended and filled with loops of small bowel (Figure 1). The ileocecal valve was herniated into the cecum. The wall of the ascending colon and cecum appeared thickened, and adjacent stranding was noted around the cecum, likely due to inflammation. The transverse colon appeared collapsed and the proximal small bowel was dilated with increased air-fluid level. Intussusception was suspected and emergency surgery was performed.

Laparotomy revealed ileocecal intussusception with the ileocecal valve as the leading point. The terminal ileum was thickened and invaginated into the cecum, which showed gangrenous changes. Right hemicolectomy was performed and a 5-cm long segment of ileum and a 5-cm long segment of ascending colon were examined. Macroscopic examination showed a mass 2 cm from the ileocecal junction. The mass had a whitish/brownish cut surface and was firm in consistency. The mucosal surface of the cecum and colon appeared edematous. Microscopic examination of the mass and colonic tissue showed that the submucosal and muscle layers were extensively infiltrated by leukemic cells. The cells were medium sized with irregular nuclear membranes and scanty cytoplasm (Figure 2). The cells were immunoreactive to myeloperoxidase, which is a myeloid marker.

The patient developed a wound infection after the operation. She was treated with a course of antibiotics and the wound infection improved. The patient was subsequently able to continue treatment of AML.

DISCUSSION
Intussusception is the telescoping of a proximal segment of the gastrointestinal tract within the lumen of the...
A: Low-power examination showed infiltration of leukemic cells into the submucosa; B: High-power examination showed that the leukemia cells were medium-sized with irregular nuclear membranes.

Figure 2  Histological examination of the resected colonic specimen. A: Low-power examination showed infiltration of leukemic cells into the submucosa; B: High-power examination showed that the leukemia cells were medium-sized with irregular nuclear membranes.
### Table 1  Summary of intussusception in patients with leukemia

<table>
<thead>
<tr>
<th>Number</th>
<th>Age/sex</th>
<th>Underlying leukemia</th>
<th>Clinical features</th>
<th>Imaging findings</th>
<th>Treatment</th>
<th>Clinical outcome</th>
<th>Ref.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5-yr/F</td>
<td>ALL</td>
<td>Abdominal pain, abdominal distension and constipation</td>
<td>X-ray showed fluid levels in bowel</td>
<td>Gastric suction, antibiotic therapy and supportive measures</td>
<td>Patient died. Autopsy showed most of the intussuscepted small bowel was gangrenous. An intramural hematoma was the leading point of the intussusception.</td>
<td>Feldman <em>et al.</em>[5]</td>
</tr>
<tr>
<td>2</td>
<td>7-yr/M</td>
<td>ALL</td>
<td>Abdominal distension</td>
<td>Not available</td>
<td>No surgical intervention</td>
<td>Patient died and intussusception was diagnosed at autopsy.</td>
<td>Dudgeon <em>et al.</em>[4]</td>
</tr>
<tr>
<td>3</td>
<td>4-yr/M</td>
<td>ALL</td>
<td>Abdominal pain, fever, vomiting and a right lower quadrant abdominal mass</td>
<td>Abdominal X-ray demonstrated small intestinal obstruction</td>
<td>At laparotomy, necrotic ileum and cecum were resected. A primary ileocolic anastomosis was performed. Laparotomy showed a necrotic ileo-ileal intussusception. An ileal resection with primary anastomosis was performed.</td>
<td>Patient died with perforation of ileocolic anastomosis with peritonitis</td>
<td>Dudgeon <em>et al.</em>[4]</td>
</tr>
<tr>
<td>4</td>
<td>14-yr/M</td>
<td>ALL</td>
<td>Vomiting, intermittent abdominal pain</td>
<td>Barium enema demonstrated an intussusception in descending colon reduced to ileoceal valve</td>
<td>Surgical reduction of intussusception</td>
<td>Patient died with perforation of ileocolic anastomosis with peritonitis</td>
<td>Dudgeon <em>et al.</em>[4]</td>
</tr>
<tr>
<td>5</td>
<td>11-yr/M</td>
<td>AML</td>
<td>Abdominal pain, vomiting and diarrhea</td>
<td>Abdominal X-ray showed air-fluid levels in bowel</td>
<td>Supportive treatment</td>
<td>Patient died of intussusception</td>
<td>Karakousis <em>et al.</em>[8]</td>
</tr>
<tr>
<td>6</td>
<td>4-yr/F</td>
<td>ALL</td>
<td>Abdominal pain and vomiting</td>
<td>Not available</td>
<td>Resection of the involved bowel</td>
<td>Patient died of intussusception</td>
<td>Karakousis <em>et al.</em>[8]</td>
</tr>
<tr>
<td>7</td>
<td>7-yr/F</td>
<td>ALL</td>
<td>Fever and colicky abdominal pain</td>
<td>X-ray showed dilated loops of small bowel</td>
<td>Surgical reduction of intussusception</td>
<td>Recovered from operation and continued treatment of acute leukemia</td>
<td>Micallef, Eynaud <em>et al.</em>[12]</td>
</tr>
<tr>
<td>8</td>
<td>13-yr/F</td>
<td>ALL</td>
<td>Abdominal distension, abdominal pain, vomiting, symptoms of bowel obstruction</td>
<td>Barium enema showed small bowel intussusception</td>
<td>Surgical excision of the involved bowel</td>
<td>Recovered from operation and continued treatment of acute leukemia</td>
<td>Seckl <em>et al.</em>[10]</td>
</tr>
<tr>
<td>9</td>
<td>7-mo/M</td>
<td>ALL</td>
<td>Abdominal distension, small bowel obstruction</td>
<td>CT scan showed small bowel obstruction</td>
<td>Surgical reduction of intussusception with resection of leading edge</td>
<td>Recovered from operation and continued chemotherapy for leukemia</td>
<td>Manglani <em>et al.</em>[14]</td>
</tr>
<tr>
<td>10</td>
<td>8-mo/F</td>
<td>ALL</td>
<td>Vomiting, blood and mucus in stool</td>
<td>Abdominal X-ray showed increased gas shadows in small intestine</td>
<td>Reduction of ileocolic intussusception</td>
<td>Recovered from operation and continued treatment of acute leukemia</td>
<td>Kumari <em>et al.</em>[16]</td>
</tr>
<tr>
<td>11</td>
<td>3-yr/M</td>
<td>ALL</td>
<td>Abdominal pain, diarrhea, ileus</td>
<td>US showed thickened bowel loops with target lesion</td>
<td>Reduction of ileocolic intussusception</td>
<td>Patient died due to Escherichia coli septicemia</td>
<td>Gavan <em>et al.</em>[16]</td>
</tr>
<tr>
<td>12</td>
<td>7-yr/F</td>
<td>ALL</td>
<td>Fever and colicky abdominal pain</td>
<td>X-ray showed a soft tissue mass in right iliac fossa, US revealed target lesion</td>
<td>Reduction of intussusception</td>
<td>Recovered from operation and continued treatment of acute leukemia</td>
<td>Arestis <em>et al.</em>[16]</td>
</tr>
<tr>
<td>13</td>
<td>7-yr/F</td>
<td>ALL</td>
<td>Fever, diarrhea and colicky abdominal pain</td>
<td>US showed a target-shaped soft tissue mass in descending colon</td>
<td>Right hemicolecotomy was performed</td>
<td>Recovered from operation and continued treatment of acute leukemia</td>
<td>Arestis <em>et al.</em>[16]</td>
</tr>
<tr>
<td>14</td>
<td>25-yr/M</td>
<td>AML</td>
<td>Epigastric pain and vomiting, intestinal obstruction</td>
<td>Not available, but laparotomy was performed and a segment of thickened ileum which had led to ileo-ileal intussusception was found</td>
<td>Ileo-ileal intussusception was resected to relieve obstruction</td>
<td>Patient died of leukemia</td>
<td>Kini <em>et al.</em>[16]</td>
</tr>
<tr>
<td>15</td>
<td>29-yr/F</td>
<td>AML</td>
<td>Right lower quadrant pain, fever, vomiting</td>
<td>CT scan showed that the cecum and ascending colon appeared distended and filled with loops of small bowel, and ileocecal valve was herniated into the cecum</td>
<td>Right hemicolecotomy was performed</td>
<td>Recovered from operation and continued treatment of acute leukemia</td>
<td>Present case</td>
</tr>
</tbody>
</table>
in adult patients with acute leukemia. Diagnosis can be difficult because the presenting symptoms are often non-specific, but abdominal CT can be informative in making a preoperative diagnosis. Resection of the involved bowel is recommended. Intussusception should be considered in any leukemia patients presenting with acute abdomen. A high index of clinical suspicion is important for early diagnosis.

**REFERENCES**


