Spontaneous Intramural Small-Bowel Hematoma

Clinical Presentation and Long-term Outcome

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Hypothesis: To review our experience with the treatment of patients with nontraumatic spontaneous intramural small-bowel hematoma. Our hypothesis was that this condition resolves spontaneously in most patients.

Design: A retrospective review of the records of 13 patients with nontraumatic spontaneous intramural small-bowel hematoma who presented to Mayo Clinic (Rochester, Minn; Scottsdale, Ariz; and Jacksonville, Fla) between January 1, 1983, and December 31, 2000.

Setting: A tertiary care medical institution.

Patients: Mean age at presentation was 64 years (8 men, 5 women). Patients presented with abdominal pain (13 patients), intestinal obstruction (11 patients), and biliary obstruction (1 patient). Mean duration of symptoms was 4 days. Eight patients were receiving anticoagulant therapy (mean international normalized ratio, 11.6). Only 1 patient was anemic at presentation, but 11 patients became anemic during hospitalization. Computed tomography established the diagnosis in all patients.

Main Outcome Measures: Short- and long-term outcomes obtained from clinical records and telephone interviews.

Results: Single and multiple hematomas were present in 11 patients and 2 patients, respectively. Two patients had an exploratory operation, but no bowel resection was performed. The other 11 patients were managed with bowel rest. Two patients died of sepsis related to their coexisting medical conditions, and 11 patients left the hospital without short-term complications. At follow-up (mean, 35 months), 4 patients had died of unrelated causes, and 7 were alive; none had recurrence of bowel hematoma or intestinal obstruction.

Conclusion: Nonoperative treatment of spontaneous small-bowel hematoma has a good outcome in most patients.

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INTRAMURAL HEMATOMA of the small bowel has been recognized for many years as a complication of blunt trauma, especially in children. Nontraumatic spontaneous intramural small-bowel hematoma (SISBH), once considered a rare complication of anticoagulation, is being reported with increasing frequency. Warfarin toxicity is the most common cause of SISBH. Other risk factors include leukemia, lymphoma, myeloma, hemophilia, chemotherapy, pancreatitis, pancreatic carcinoma, polyarteritis nodosa, Henoch-Schönlein purpura, and idiopathic thrombocytopenic purpura. The presentation of SISBH can vary from mild and vague abdominal pain to intestinal obstruction and an acute abdomen. Often the diagnosis is not suspected and is established only after radiological imaging or after an exploratory celiotomy is performed.

Because of the rarity of SISBH, no single institution has gathered considerable experience treating patients with this condition. Most of the data available to manage this condition have been derived from a few case reports by various institutions. Little information is available about the short-term and long-term outcomes of patients with SISBH, especially with regard to the recurrence of bleeding or the potential risk for future intestinal stricture and obstruction. The aim of this study was to review our experience treating patients with SISBH.

PATIENT CHARACTERISTICS

Thirty-one cases of SISBH were identified, but only 13 cases were nontraumatic. The mean age at presentation of the 13 patients was 64 years (age range, 20-86...
PATIENTS AND METHODS

We searched the computerized patient database at Mayo Clinic (Rochester, Minn; Scottsdale, Ariz; and Jacksonville, Fla) for patients diagnosed as having nontraumatic SISBH between January 1, 1983, and December 31, 2000. The medical records of these patients were analyzed retrospectively for demographics, coexisting medical conditions, previous abdominal operations, medications, clinical presentation, laboratory and radiological imaging findings, management interventions, and hospitalization course. Long-term follow-up and outcome information was available for all patients and was obtained from the medical records and from telephone interviews. This study was approved by the Mayo Foundation institutional review board.

Table 1 lists patient demographics and coexisting medical conditions. Risk factors for bleeding were identified in all patients and included the adverse effects of warfarin sodium in 8 patients, cirrhosis in 1, hemophilia and cirrhosis in 1, liver failure after chemotherapy in 1, systemic lupus vasculitis in 1, and idiopathic thrombocytopenic purpura in 1.

CLINICAL PRESENTATION

The average duration of symptoms was 4 days (range, 1-22 days; median, 3 days). Table 2 summarizes the presenting symptoms, signs, and physical examination findings. The most common presenting symptoms were abdominal pain (13 patients) and emesis (11 patients). On physical examination, 9 of 13 patients had guarding and rebound tenderness. At initial presentation, stool was positive for blood in 6 of 13 patients.

LABORATORY FINDINGS

Table 3 summarizes the laboratory findings at admission and after 48 hours of hospitalization. Mean international normalized ratio was 8.7 (range, 1.4-17.7) for the entire group but 11.6 (range, 6.8-17.7) in patients receiving anticoagulant therapy. Only 1 patient was anemic at presentation (hemoglobin level, ≤12 g/dL). However, 11 patients became anemic within 48 hours of hospitalization. Leukocytosis was present in 9 patients; the mean leukocyte count was 11,900 cells/µL (range, 200-23,700 cells/µL), and the mean neutrophil percentage was 73.4%.

COMPUTED TOMOGRAPHIC FINDINGS

Computed tomography (CT) was performed in all patients, upper gastrointestinal tract studies with small-bowel follow-through in 3 patients, and enteroclysis or barium enema in 1 patient. The diagnosis was evident on CT in all patients. Imaging characteristics included wall and mucosal thickening on CT (Figure 1) or “stack-of-coins” appearance on upper gastrointestinal tract or enteroclysis studies (Figure 2). Small-bowel obstruction was present in 11 patients; it was partial in 8 patients and complete in 5 patients. Biliary obstruction was present in only 1 patient and was caused by a duodenal hematoma (Figure 3). A single hematoma was noted in 11 cases, and multiple hematomas were noted in 2 cases. The hematoma most commonly involved the jejunum (9 patients), followed by the ileum (5 patients) and duodenum (3 patients). The small-bowel hematoma extended into the cecum in 2 patients. The small bowel was extensively involved with the hematoma in 2 patients. The length of the involved small-bowel segment could be estimated from the CT scan in 9 patients and was a mean of 23 cm. The shortest involved segment measured 8 cm and affected the duodenum.

PATIENT OUTCOMES

The average hospital stay was 12 days (range, 2-38 days), and the average intensive care stay was 2 days (range, 0-17 days). Seven patients required a packed red blood cell transfusion with an average of 3 U (median, 2 U; range, 0-20 U). Additional blood products for these patients in-
cluded an average of 9 U of fresh frozen plasma (median, 4 U; range, 0-75 U) and 12 U of platelets (median, 0 U; range, 0-146 U). Eleven patients were observed and treated medically. Two patients had surgical exploration, 1 for peritoneal signs and 1 for an obstructing duodenal mass (hematoma), and neither required a bowel resection. Nasogastric tube decompression was necessary in most patients and lasted an average of 4 days (median, 4 days; range, 0-13 days). Most patients resumed oral intake after 4 days.

Two patients died during hospitalization: multiorgan failure due to sepsis and disseminated intravascular coagulopathy developed in a patient with lymphoma who was receiving chemotherapy; another patient with cirrhosis died of gram-negative septicemia. Both patients had extensive hematomas at presentation; 1 hematoma involved the duodenum and the entire jejunum, and 1 extended from the proximal jejunum to the ascending colon. The other 11 patients left the hospital without short-term complications. At discharge, 4 patients resumed warfarin therapy, and daily aspirin was prescribed for 1 patient. Long-term follow-up information was available for all 11 patients (mean, 35 months; range, 3-62 months). Four patients eventually died of causes unrelated to their previous small-bowel hematoma (liver failure, congestive heart failure, metastatic colon cancer, or chronic obstructive pulmonary disease), and 7 were alive and well at last follow-up. None of the patients had recurrence of intestinal hematoma, abdominal pain, or intestinal obstruction. Follow-up CT scans obtained from 7 patients demonstrated interval resolution of the hematoma without evidence of intestinal obstruction.

**COMMENT**

The first report describing small-bowel hematoma was published in 1838 when McLauchlan described an obstructing duodenal hematoma due to a pseudoaneu-

<table>
<thead>
<tr>
<th>Laboratory Test</th>
<th>No. of Patients</th>
<th>Normal Value</th>
<th>Values at Admission to the Hospital</th>
<th>Values After 48 h of Hospitalization</th>
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</thead>
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<td>INR</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>All patients</td>
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<td>8.7 (1.4-17.7)</td>
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<td>. . .</td>
<td>11.6 (6.8-17.7)</td>
<td>1.6 (1.1-1.7)</td>
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<tr>
<td>PT, s</td>
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<td></td>
</tr>
<tr>
<td>All patients</td>
<td>13</td>
<td>12-15</td>
<td>61 (16-128)</td>
<td>17.2 (10.9-22.1)</td>
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<tr>
<td>Patients receiving anticoagulation therapy</td>
<td>8</td>
<td>. . .</td>
<td>78.8 (33-127)</td>
<td>13 (10.9-16.2)</td>
</tr>
<tr>
<td>Hemoglobin, g/dL</td>
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<td>13.2-16.7</td>
<td>13.9 (9.1-16.1)</td>
<td>10.6 (7.1-11.9)</td>
</tr>
<tr>
<td>Leukocyte count, cells/µL</td>
<td>13</td>
<td>4200-10200</td>
<td>11 900 (200-23 700)</td>
<td>7500 (1000-19 300)</td>
</tr>
</tbody>
</table>

*Data are given as mean (range) unless otherwise indicated. INR indicates international normalized ratio; ellipses, not applicable; and PT, prothrombin time.

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Figure 1. Computed tomographic scan of the abdomen. Partial intestinal obstruction due to jejunal hematoma (arrows).

Figure 2. Radiograph of the small bowel using enteroclysis. “Stack-of-coins” appearance of jejunal hematoma (arrows).

Figure 3. Computed tomographic scan of the abdomen. Proximal duodenal obstruction due to 5.5-cm hematoma (arrow).
rysm at autopsy. Although the cause of the pseudoaneurysm was unknown, it was presumed to be traumatic. In 1904, Sutherland²⁶ reported a case of a nontraumatic hematoma in a child with Henoch-Schönlein purpura presenting with intussusception. Four years later, von Khautz²⁷ diagnosed this condition in a patient with hemophilia. Because of these early reports, SISBH has become increasingly recognized as a complication of anticoagulation; bleeding disorders, such as hemophilia and idiopathic thrombocytopenic purpura; malignancies, such as leukemia and lymphoma; inflammatory and immune diseases, such as vasculitis; or chemotherapy and bone marrow transplantation.¹⁴-²¹ In our study, risk factors for bleeding were identified in all patients; warfarin toxic effects were the most common cause. The development of SISBH has been reported as early as 10 days after initiation of therapy.³

Most patients present with SISBH after having had symptoms for several days; abdominal pain and emesis are the most common complaints.⁴-⁶,ⁱ⁰-¹²,¹⁵,²⁰,²³,²⁴ It is unclear why patients present after several days of symptoms. Judd et al²⁸ theorized that the progression of symptoms and development of obstruction are related to the hyperosmotic effect of the liquefying hematoma that causes expansion of the bowel wall by drawing fluid from the surrounding tissues. However, their theory has not been substantiated by any experimental model. Furthermore, one cannot exclude the progression of bleeding as the underlying reason for the clinical deterioration seen in most patients at the time of presentation. The hemorrhage is usually located in the submucosal layer of the bowel and originates from a small vessel producing slow bleeding.

In addition to intramural bleeding, intraluminal, intramesenteric, and retroperitoneal hemorrhage can occur, especially when the duodenum is involved.¹³ In a review of 170 cases of traumatic and spontaneous hematomas published in the literature, Birns et al²⁰ reported intraluminal gastrointestinal tract bleeding in 30% of cases, with major bleeding in 3.5% of patients. None of our patients had associated intramesenteric or retroperitoneal hemorrhage. Bloody ascites were present in 7 of our patients, either observed at the time of laparotomy or demonstrated on CT scan by Hounsfield units of measurement. This common finding has been widely reported and may be related to leakage of blood from an engorged, thickened, and inflamed bowel wall with submucosal bleeding extending into and through all layers.⁵-⁷,⁹,¹²,²³,²⁴

Intestinal obstruction was present in 11 of our patients, but biliary obstruction was uncommon (1 patient). Most hematomas were single and most commonly involved the jejunum. These findings have been documented by others⁷,¹⁰,¹²,¹³,¹⁹,²¹,²³,²⁴,²⁶ and are different from those seen in traumatic small-bowel hematomas, which most commonly affect the duodenum.²² Because traumatic hematomas of the small bowel tend to be focal, the length of involved bowel appears longer in spontaneous hematomas.⁸ In 2 of our patients, there was extension of the hematoma into the ascending colon or cecum, but none had an isolated colonic hematoma. Isolated cases of intramural colonic hematoma without small-bowel involvement are rare.⁶-¹⁰,¹²,¹⁴,¹⁵,¹⁸-²⁴,²⁶,²⁸,²⁹ It is uncertain why the large bowel is less commonly involved, although one can speculate that the taeniae coli may play a protective role against the initiation or expansion of the hemorrhage.

Leukocytosis was present in 9 of our patients, similar to the 72% reported in a review of 260 cases of traumatic and spontaneous hematoma by Hughes et al.²³ One patient in our study was anemic on presentation, but most of our patients became anemic within 48 hours of hospital admission. This finding has been noted by others.¹⁹,²⁰,²⁴ We speculate that the drop in hemoglobin levels after admission in a patient with intestinal obstruction who is dehydrated and hemoconcentrated is related to vigorous fluid resuscitation. Persistent bleeding is less likely because coagulopathy was corrected at the time of admission in most patients, and the anemia was established after rehydration in patients without clinical signs of active bleeding.

In the past, exploratory laparotomy, evacuation of hematoma, resection, or intestinal bypass played a role in the diagnosis and treatment of SISBH.²⁵,¹⁶,¹²,²⁴ However, the inherent complications of operative intervention, including death, were real.¹⁸ With the recent advances of cross-sectional imaging, exploratory celiotomy is rarely necessary to establish the diagnosis. In our case series, the diagnosis was evident on CT scan in all patients. In addition, there is little need for therapeutic celiotomy because most patients will improve with nonoperative management.¹⁴,¹⁵,¹⁹,²³

Patients with a spontaneous hematoma tend to recover without short-term complications unless they present with sepsis due to coexisting medical diseases. Both patients in our study who died had sepsis with an extensive small-bowel hematoma. Clinical improvement is mirrored by interval resolution of the hematoma, which occurs within days to weeks from onset of symptoms. In our study, radiographic resolution of the hematoma was documented as early as 1 week in some patients. For instance, Eiland et al¹⁹ described a patient with hemophilia who had an intestinal hematoma and died of hematemesis several weeks after the initial presentation. At autopsy, the small bowel appeared normal except for some petechial hemorrhages. Similarly, Barnes and Duncan²⁹ described a child who had an operation for intestinal obstruction and 9 days later underwent surgical exploration for wound dehiscence. At the time of the second operation, the ileum appeared normal.

No long-term sequela of SISBH was observed in our patients. No recurrence of intestinal obstruction or hematoma was observed, even though 4 of our patients resumed anticoagulant therapy at the time of discharge. It appears safe to resume anticoagulant therapy in patients as long as it is administered within the therapeutic range. In our review of the literature,³,²⁹ we identified only 1 patient who had a recurrent hematoma 1 month after discharge; this patient was readmitted with a toxic reaction to warfarin.⁸

Finally, some authors have raised the possibility that all intestinal hematomas might originate from trauma, even if a history of trauma is not obtained, especially in children. However, several facts support a nontraumatic cause in a subgroup of patients such as ours.
contrary to traumatic hematomas, which tend to involve the duodenum, most spontaneous ones involve the jejunum. Second, although most traumatic hematomas are reported in children, spontaneous hematomas affect older patients with risk factors for bleeding. Third, all patients receiving anticoagulant therapy in our case series and others presented with warfarin toxic effects. Fourth, in traumatic hematomas, short and focal segments are usually present, whereas in spontaneous hematomas, longer segments are noted as a result of the inability of blood to clot because of anticoagulation or an underlying blood dyscrasia. Fifth, if these hematomas were truly traumatic, one would expect all anticoagulated patients to be at increased risk compared with those with a supratherapeutic level, as seen in patients with SISBH. The reason for spontaneous hematomas in patients receiving supratherapeutic anticoagulation is unclear. One may speculate that a high level of anticoagulant therapy may cause injury or impair a healing mechanism of the small blood vessel wall. This theory may be supported by the fact that this condition can occur in patients with diseases such as vasculitis and in patients receiving chemotherapy.

CONCLUSIONS

Although nontraumatic SISBH is rare, the incidence is expected to increase. This is because of several factors, including a growing number of patients with hematologic malignancies receiving chemotherapy and an aging population requiring more long-term anticoagulant therapy. Even in the absence of trauma, spontaneous bleeding can occur in anticoagulated patients or in patients with blood dyscrasias. Prompt recognition of this condition by the surgeon, gastroenterologist, and radiologist is crucial for best patient outcome. Acute abdominal pain associated with bowel obstruction in a patient receiving anticoagulant therapy should raise suspicion for SISBH. Although its presentation can mimic disorders requiring operative intervention, SISBH should usually be managed nonoperatively if the diagnosis is made by radiographic studies. Computed tomography is the imaging technique of choice. An operation should be advised if the small-bowel abnormality might be malignant, if the diagnosis is uncertain, or if there is active intraluminal hemorrhage, perforation, or ischemia. If the small-bowel hematoma is found at exploratory celiotomy, no intestinal resection is warranted, except for the reasons stated above, because most hematomas will heal without short- or long-term sequelae. Bowel rest, nasogastric decompression, blood transfusion, and correction of a hypocoagulable state, if present, constitute the core of therapy. As the hematoma slowly resolves, resumption of normal gastrointestinal tract function occurs within a few days. It appears safe to resume warfarin therapy in patients after resolution of the hematoma, as long as the patient is carefully monitored.

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REFERENCES


Editor’s Note

The word “spontaneous” is frequently used in this context suggesting that there is no underlying disease or injury process. Perhaps this is a matter of semantics, but it is a bit troublesome to envision the rupture of any normal organ in the absence of disease or trauma.

Claude H. Organ, Jr, MD
Oakland, Calif.