

Abdominal Apoplexy: Rupture of Short Gastric Artery After Retching

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Summary

Abdominal apoplexy, or idiopathic spontaneous intraperitoneal hemorrhage (ISIH), is a rare but often fatal condition resulting from a variety of disease processes affecting abdominal vasculature. A 30-year-old woman presented with acute abdominal pain and breathlessness and was in class II hypovolemic shock. She had a history of multiple episodes of retching with non-bilious vomiting prior to that. Computed tomography (CT) reported a non-rotation of the gut, gross intraperitoneal free fluid with debris, and possible perforated appendicitis. Laparoscopy revealed a gross hemoperitoneum of 2.5 L, with bowel findings consistent with non-rotation of the gut, but technical difficulty in identifying the source of bleeding led to conversion to laparotomy. A ruptured short gastric artery was ascertained to be the source of bleeding and was successfully ligated. A retrospective review of the preoperative CT showed intraperitoneal free fluid with Hounsfield unit measurements of 48 and 52, suggestive

of acute hemoperitoneum. ISIH is often a delayed diagnosis or missed diagnosis due to its low incidence. The presence of vomiting and abdominal pain with hypovolemic shock, especially in a young individual, should raise the suspicion of ISIH, which can be confirmed via early CT imaging to facilitate achieving hemostasis during surgery.

Keywords: Intraperitoneal hemorrhage, abdominal apoplexy, acute abdomen, short gastric artery, hemoperitoneum

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Introduction

Abdominal apoplexy, or idiopathic spontaneous intraperitoneal hemorrhage (ISIH), is a rare but often fatal condition resulting from a variety of disease processes affecting abdominal vasculature. ISIH was first reported by Barber in 1909, as he described a case of a pregnant woman who had intraperitoneal

hemorrhage in the absence of trauma or surgery and the source of bleeding could not be identified (1). A total of 110 cases of ISIH have been reported between 1909 and 1998 by Carmeci et al. (2). In their series, a preponderance to the male sex (male/female ratio: 3:2) and the fifth and sixth decades of life were noted (2).

Patients often presented with hypovolemic shock and an acute abdomen (2). We herein report a case of 30-year-old lady with a significant history of retching who presented with abdominal pain and hypovolemic shock that turned out to be ISIH secondary to a ruptured short gastric artery.

Case report

A 30-year-old woman presented with acute epigastric pain and breathlessness with a duration of 1 day. She had a history of multiple episodes of retching for more than 10 times with non-bilious vomiting prior to that. She was diagnosed with type 2 diabetes mellitus 8 years ago but was not on treatment or regular follow-up. She had no prior history of abdominal trauma or surgery. Physical examination revealed a pale, conscious woman. She was in class II hypovolemic shock, with a weak, rapid pulse of 107 bpm and blood pressure of 135/72 mmHg. She was able to maintain saturation with oxygen supplementation of 2 L/min. Her abdomen was distended but was soft with generalized tenderness. Blood investigations revealed a hemoglobin of 8.3 g/dL (normal, 11–13 g/dL) with a hematocrit level of 30% (normal, 42–52%) and total white cell count of $10.4 \times 10^9/L$ (normal, $4.5\text{--}11.0 \times 10^9/L$). Her blood sugar level, platelet count, and coagulation profile were normal. Serum amylase and cardiac enzymes were within normal limits, and her urine pregnancy test was negative. Electrocardiogram showed no signs of ischemia. Chest radiography had no signs of pneumoperitoneum or pneumomediastinum.

She responded to resuscitation with fluids followed by packed cell transfusion and was subsequently subjected to computed tomography (CT) of the abdomen. CT imaging reported non-rotation of the gut, gross intraperitoneal free fluid (Figure 1) with debris, and an elongated thickened appendix suggestive of a perforated appendicitis. In view of the clinico-radiological discrepancy, a decision was made for a diagnostic laparoscopy.

Laparoscopy revealed a gross hemoperitoneum of 2.5 L, with small bowel loops located to the right and the right

hemicolon located centrally consistent with non-rotation of the gut. Continuous pooling of blood was noted from the left hypochondrium, but the source was not identifiable laparoscopically. Conversion to laparotomy revealed active arterial bleeding from a short gastric artery. The bleeding vessel appeared normal, with no obvious aneurysmal dilatation or pathology and was successfully ligated with non-absorbable sutures. The rest of the abdominal organs were examined and noted to be grossly normal.

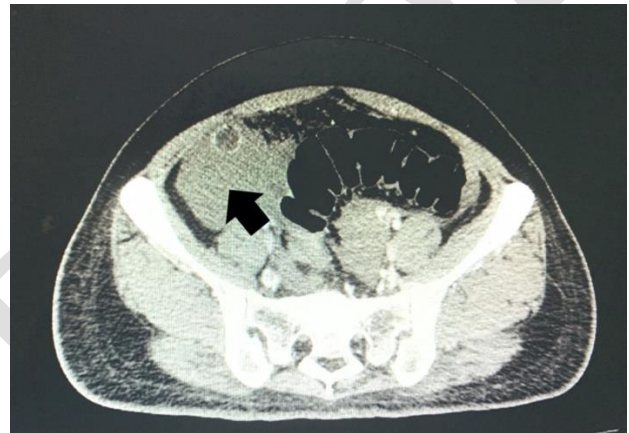


Figure 1. Abdominal CT scan (axial) with intravenous contrast demonstrating free fluid (black arrow) in the right iliac fossa. The extraluminal fluid is denser than the intraluminal water contrast. 124x87mm (762 x 762 DPI)



Figure 2. Contrast-enhanced abdominal CT (axial view) demonstrated 2 fluid densities namely 52.0 HU (yellow point) and 48.0 HU (blue point) that are suggestive of hemoperitoneum with possible recent or active bleed in view of HU of unclotted blood is less than 5. 304x215mm (300 x 300 DPI)

Post-operative recovery was uneventful, with her hemodynamic status, hemoglobin, and hematocrit levels having normalized, and she was discharged home well 5 days later. A retrospective review of the preoperative imaging revealed intraperitoneal free fluid with Hounsfield unit (HU) measurements of 48 and 52, suggestive of hemoperitoneum with possibility of a recent or active bleed (Figure 2).

Ethical approval was obtained from the hospital's ethics committee (approval no. NMRR-20-232-53361). The authors obtained consent from the patient.

Discussion

Intraperitoneal hemorrhage is a common occurrence in trauma; however, it rarely occurs spontaneously. ISIH is usually due to a predisposing vascular lesion. Arteriosclerosis is the most commonest cause in the elderly, whereas in the young, defects in the medial coat of the visceral arteries are proposed to be responsible (3). However, it can also be idiopathic (4). In our patient, the only obvious predisposing factor was the protracted retching and multiple episodes of vomiting. Although the act of emesis is commonly associated with Mallory-Weiss tear, gastrointestinal bleeding, or disruption in the continuity of the esophagus, cardio-esophageal junction, or the stomach, literature search suggests that it can also cause rupture of the short gastric artery (5,6). Retching may cause partial volvulus and pull the gastrosplenic ligament, causing a shearing force that results in a tear of the short gastric artery (7). Although the majority of cases reported describe bleeding from a single vessel as in our case, there are also cases that involved two vessels (8).

ISIH has no cardinal signs or symptoms. Symptoms of hemoperitoneum are often divided into three phases, namely, initial, latent, and terminal phases. The initial phase presents with mild to severe abdominal pain, which is due to the sudden expansion of the peritoneal cavity due to the increasing volume, causing stretching and irritation of the parietal peritoneum. The latent phase may last from hours to days, and patients may be devoid of symptoms. It is during the terminal phase that the patient's condition rapidly deteriorates with the

onset of hypovolemic shock (9). The constellation of symptoms that may help in the diagnosis of ISIH includes sudden onset of severe abdominal pain, distension, and signs of generalized peritoneal irritation associated with unexplained hypotension (10). This is evident retrospectively in our patient who presented with all the symptoms mentioned above and class II hypovolemic shock.

The best imaging modality to diagnose this condition would be CT of the abdomen with measurement of the HU of the fluid in the peritoneal cavity to identify hemoperitoneum. HU can be used to accurately diagnose the presence of blood, and the HU for blood is 13 to 75 HU (11). In this case, despite using CT, the diagnosis was not confirmed due to its rare occurrence and low index of suspicion preoperatively. Surgery was needed to determine the diagnosis. In a retrospective review of our imaging, the diagnosis of ISIH was inferred by the presence of free fluid with densities of 48 and 52 HU, both suggestive of early bleeding and clotted blood, respectively. The role of CT imaging is important to preoperatively ascertain the diagnosis and the possible area of pathology in order to facilitate and increase the chances of achieving therapeutic laparotomy.

Surgery remains the mainstay of management in ISIH; historically, mortality is inevitable for non-operative management of such cases. If the patient is hemodynamically unstable for imaging, emergent exploratory surgery should be performed. Unfortunately, in nearly 40% of the cases, bleeders were not localized or only a hematoma was identified intraoperatively, and the reported mortality associated with non-therapeutic exploratory laparotomy ranges from 40% to 66% and is reduced to 8.6% if the bleeding source is ligated (8,12). Hemostasis is typically achieved via a laparotomy, with only one case reported to have secured the bleeding vessel laparoscopically (7). Laparoscopy with gross hemoperitoneum can be technically challenging, especially if there is active bleeding, as the surgical view is compromised by the persistent pooling of blood at the surgical field. Imaging

and successful localization of the source preoperatively increase the chances of successful laparoscopic hemostasis, as the surgery will be more focused, and the patient can be positioned to elevate the area of interest and thus improve visualization by preventing pooling of blood at the operative field. Trans-arterial embolization is also an alternative minimally invasive treatment option in selected cases if the expertise of an interventional radiologist is available.

Conclusion

ISIH is often a delayed diagnosis or missed diagnosis due to its low incidence. The presence of vomiting and abdominal pain with hypovolemic shock, especially in a young individual, should raise the suspicion of ISIH. If clinically suspected, early imaging with CT should be performed to ascertain the diagnosis, localize the site of bleeding, and facilitate identifying the causative vessel and achieving hemostasis during surgery to reduce the high rates of mortality associated with ISIH.

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