

Primary aortoduodenal fistula without abdominal aortic aneurysm¹

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Primary aortoduodenal fistula is an uncommon entity usually associated with untreated abdominal aortic aneurysms. The third reported case of primary aortoduodenal fistula without an aneurysm is presented. The diagnosis of primary aortoduodenal fistula is often difficult to make because conventional studies, such as an upper gastrointestinal series or aortography, have not been reliable. Fiberoptic upper gastrointestinal endoscopy to the fourth portion of the duodenum has been diagnostic in 58% of secondary aortoduodenal fistulas, and this technique may be used for the diagnosis of primary aortoduodenal fistulas. Definitive operative therapy consists of repairing the duodenal fistula and aortic resection with tube graft replacement or extra-anatomic reconstruction. A review of the experience with primary aortoduodenal fistulas from the current literature is presented.

Index terms: Case reports • Intestinal fistula
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A 71-year-old hypertensive, alcoholic man was admitted to the hospital with a massive upper gastrointestinal hemorrhage. One month earlier, the patient had been evaluated for anemia; the upper gastrointestinal series and barium enema examination were reported as normal. On examination, the patient was orthostatic and tachycardic. The re-

mainder of the cardiovascular examination was normal. The abdomen was obese, soft, and mildly distended without palpable masses. The patient passed melanic stools during the examination. The hematocrit was 12.0%. The prothrombin time was 14.7 seconds with a control of 11.3 seconds. The partial thromboplastin time was 28.2 seconds with a control of 29.5 seconds. The serum bilirubin level was 0.4 mg/dL, the alkaline phosphatase concentration was 125 IU/L, and the SGOT was 24 IU/L. The remaining laboratory values were normal. Emergent upper endoscopy demonstrated two longitudinal, nonbleeding lacerations of the gastroesophageal junction presumed to be Mallory-Weiss tears. The remainder of the stomach and duodenum could not be thoroughly examined because of pooled blood. Repletion of blood loss initially required 5 U. The patient rebled 30 hours after admission, requiring an additional 7 U despite iced saline lavage and nasogastric administration of Levophed. Laparotomy was performed with a presumptive diagnosis of bleeding peptic ulcer. At operation, a gastrotomy was performed; multiple clots were evacuated, but no ulcer was identified. Intraoperative endoscopy localized the bleeding to the distal duodenum. Mobilization of the duodenum was performed because of the endoscopic findings and an infrarenal aortoduodenal fistula was identified. The aorta was soft, of normal caliber, and had atherosclerotic plaques involving the anterior wall. There was no evidence of retroperitoneal sepsis. The gastrotomy was repaired. The fistula was taken down and the duodenum oversewn. After regowning and redraping the field, the infrarenal aortic defect was excised and repaired using a tube graft. An omental patch was used to protect the graft. The postoperative course was initially complicated by continued intra-abdominal bleeding from a coagulopathy related to massive transfusion of blood products. The coagulopathy was controlled, followed by evacuation of an intra-abdominal hematoma on the first postoperative day. Subsequent cardiac, renal, and pulmonary failure in addition to *Enterobacter aerogenes* sepsis led to the patient's death 24 days after the operation. The autopsy revealed a dehiscence

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of the duodenal repair at the site of the previous fistula, acute tubular necrosis, and acute myocardial ischemia. The vascular suture lines were intact.

Discussion

Primary aortoduodenal fistula is an infrequent complication of abdominal aortic aneurysms. A primary fistula is defined as a communication between the native aorta and the gut. A secondary fistula is a communication between a prosthetic graft suture line and the gut.^{1,2} Over 100 cases of primary aortoduodenal fistula have been reported,^{3,4} but only two cases prior to this have noted a fistula in the absence of an aneurysm.^{5,6} We suspect the etiology for the fistula was repeated trauma to the duodenum from the underlying atherosclerotic aorta.

In 73% of the reported primary aortoduodenal fistulas, the etiology is a pulsatile atherosclerotic aortic aneurysm.⁴ In the remaining 27%, traumatic and mycotic aneurysms (including salmonella, tuberculosis, and syphilis) have been implicated.⁶⁻¹⁵ Other unusual causes for aortoduodenal fistula include malignancy,¹⁶⁻¹⁸ pancreatic pseudocyst,¹⁹ and iatrogenic causes.¹² Approximately 81% of the fistulas communicate with the duodenum and 58% of these are located in the third part of the duodenum.³ Other sites for fistula formation are the stomach, small bowel, and colon.

Presenting symptoms typically include abdominal or back pain and bleeding, either hematemesis, melena, or both. The bleeding is characteristically intermittent. An abdominal mass is felt in 56%³ to 70%⁷ of the patients.

The diagnosis of aortoduodenal fistula is difficult to make and requires a high index of suspicion. Any patient with a gastrointestinal hemorrhage and abdominal aortic aneurysm, determined by history or examination or previous prosthetic graft replacement of the abdominal aorta or its branches, is considered to have an aortoenteric fistula until proved otherwise. Both situations require prompt laparotomy.²⁰

The most effective diagnostic procedure is upper gastrointestinal endoscopy since findings suggestive of an aortoduodenal fistula or other sources responsible for bleeding can be identified. Endoscopic findings include a clot adherent to the medial or posterior duodenal wall, an extraluminal pulsatile mass, or active hemorrhage into the duodenum.²² A review of 19 documented secondary aortoduodenal fistulas found

endoscopy to be diagnostic in 58%.²³ The results of endoscopy should be interpreted cautiously since the examination is incomplete unless the terminal duodenum is examined. Repeat examinations may be required to identify the source of bleeding.

In a review of 21 survivors of repaired primary aortoduodenal fistula, 11 patients had undergone a preoperative gastrointestinal series which was not diagnostic.²¹ Gastrointestinal angiography is highly specific but not sensitive for determination of the diagnosis of aortoduodenal fistula. This is because the patient is rarely studied at the time of active bleeding or the bleeding is not rapid enough to demonstrate the fistulous tract. Angiography may also help eliminate other etiologies as the source of blood loss.

Since the accumulated experience with primary aortoduodenal fistula without an aneurysm is limited, the discussion of operative management is based on the collected experience of a primary aortoduodenal fistula in the presence of an abdominal aortic aneurysm.

Operative management begins with careful exploration of the abdomen. Mobilization of the duodenum off the aorta is usually required to identify the site of the fistula.^{5,20,24,25} This is important since patients with aortoduodenal fistula have been subjected to unnecessary extensive surgery when gastrointestinal resection was carried out blindly without an attempt made at identification of a fistula. The duodenum is repaired primarily after excision of the fistula tract.

The aortic defect after resection may be repaired with a standard prosthetic replacement,^{11,20,21} or ligation of the distal aorta with extra-anatomic reconstruction.^{2,12,26,27} The choice of repair depends on the clinical situation and must be individualized. Patients whose preoperative course demonstrated no evidence of febrile illness, bacteremia, salmonella infection, and no intraoperative findings of sepsis are candidates for standard aortic reconstruction. In the presence of clinical infection or retroperitoneal sepsis, an extra-anatomic bypass is performed in order to avoid prosthetic graft infection with the possibility of subsequent secondary aortoduodenal fistula formation.

Long-term survival has been achieved with aortic resection and standard aortic reconstruction^{11,21} or extra-anatomic bypass,^{26,27} demonstrating that both techniques are successful in the surgical management of primary aortoduodenal

fistula. Review of the literature leads us to conclude that aortic resection with standard aortic reconstruction or resection with distal aortic ligation and extra-anatomic bypass are successful techniques in the management of primary aortoduodenal fistula.

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