Aortoenteric fistula associated with acute myocardial infarction

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ABSTRACT: A 64-year-old male with a prior abdominal aortic graft for lower limb ischemia presented with melena and myocardial infarction. Despite aggressive investigation, an aortoenteric fistula was not diagnosed until after massive gastrointestinal hemorrhage. The patient's myocardial infarction may have been precipitated by hypotension induced by hemorrhage through the aortoenteric fistula. Patients with prior abdominal aortic graft surgery presenting with gastrointestinal bleeding, abdominal pain or occult sepsis need to be aggressively investigated to determine whether an aortoenteric fistula is present. Laparotomy should be done in such patients if no cause for these symptoms can be determined. *Can J Gastroenterol* 1990;4(6):223-226

Key Words: Aortic surgery, Aortoenteric fistula, Gastrointestinal hemorrhage – etiology, Myocardial infarction

Fistule aorto-intestinale accompagnant un infarctus myocardique aigu

RESUME: Un patient âgé de 64 ans ayant subi un pontage de l'aorte abdominale motivée par une ischémie des membres inférieurs a présenté un méléna et un infarctus myocardique. Malgré un examen complet, une fistule aorto-intestinale n'a pu être détectée avant la survenue d'une hémorragie intestinale massive. L'infarctus myocardique a peut-être été causé par l'hypotension provoquée par l'hémorragie provenant de la fistule aorto-intestinale. Il faut examiner soigneusement les patients ayant un pontage de l'aorte abdominale et présentant une hémorragie gastro-intestinale, des douleurs abdominales ou un sepsis occulte, afin de détecter une éventuelle fistule aorto-intestinale. Une laparotomie est indiquée s'il est impossible de déterminer la cause des symptômes.

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AORTOENTERIC FISTULAS ARE serious complications of aortic graft surgery (1-3). Their presentation is nonspecific and a high degree of suspicion is needed in order to diagnose them. In this report, a patient with a previous aortobifemoral arterial bypass graft who presented with acute myocardial infarction and aortoenteric fistula is described. Despite intensive investigation, the fistula was not diagnosed prior to laparotomy. This case illustrates the difficulties associated with diagnosing aortoenteric fistulas and emphasizes the need for primary care physicians and gastroenterologists to be familiar with the condition.

CASE PRESENTATION

A 64-year-old man presented to the emergency department of the University of Alberta Hospital after a syncopal episode. Upon regaining consciousness, he was short of breath, diaphoretic and nauseated, and complained of central chest pain.

In the prior four days, several bowel movements had been melanic in nature. There was a three month history of central chest tightness associated with diaphoresis and nausea on exertion and occasionally at rest, and a his-

tory of epigastric pain with heartburn relieved by antacids.

Abdominal aorta and left iliac endarterectomy had been carried out eight years previously for treatment of left hip claudication. An aortobifemoral bypass graft was inserted three years prior to his current presentation, for bilateral hip claudication.

Examination demonstrated no abnormality other than melena on rectal examination. Symptoms had resolved following oxygen administration. An ECG demonstrated inferior lead changes consistent with acute myocardial infarction.

The patient was admitted to the coronary care unit. He continued to have melena intermittently and required multiple blood transfusions. Shortly after admission, he underwent gastroscopy, which was unremarkable. A subsequent small bowel enteroclysis, three red blood cell nuclear scans and colonoscopy did not demonstrate a bleeding source. At colonoscopy, generalized diverticulosis was noted.

Surprisingly, further investigations, including two abdominal aortograms, a computed tomography scan of the abdomen with contrast, and repeat gastroscopies, did not show a source of gastrointestinal blood loss. Coronary angiography showed subtotal proximal right coronary artery occlusion with akinetic left ventricular posterior, inferior and posterolateral walls.

Occult diverticular bleeding or aortoenteric fistula were considered probable causes of blood loss. An elective laparotomy was being scheduled when, 29 days after admission, the patient became hypotensive following an episode of hematemesis. After fluid resuscitation, gastroscopy demonstrated bright red blood in the duodenal lumen. At laparotomy, a 5 mm defect was found in the third part of the duodenum which communicated with the proximal suture line of the aortobifemoral graft. The graft was excised, the aortic stump oversewn and a left axillobifemoral graft constructed.

Persistent postoperative left leg ischemia necessitated a left above knee amputation. The patient was discharged after 59 days in hospital.

DISCUSSION

Aortoenteric fistulas complicate up to 4% of abdominal aortic graft procedures (4). Two theories of pathogenesis have been postulated (5). Adhesion of bowel to prosthetic graft may induce scarring and inflammation with foreign body reaction around the prosthesis. Subsequent pressure necrosis of the bowel wall results in bowel perforation, exposure of the graft to bacteria and digestive enzymes resulting in graft erosion and fistulization. Alternatively, the prosthesis may be contaminated at insertion with subsequent chronic low grade infection. This is followed by anastomotic disruption, pseudoaneurysm formation, duodenal erosion and finally, fistulization. Factors contributing to fistula formation may include suture line disruption due to dissolution of suture material or degradation of host aorta. Other factors such as bowel wall trauma or ischemia may increase the risk of fistulization. Pathogenesis may be a combination of infectious and mechanical processes.

The frequency of secondary aortoenteric fistulas has decreased as a result of improved surgical techniques, Dacron graft material replacing homograft and Teflon, more durable synthetic rather than silk sutures and recognition of the need to interpose tissue between graft and intestine (6). A recent series demonstrated aortoenteric fistulas as complications of 0.5% of all aortic reconstructive procedures (3).

Most fistulas involve the proximal graft suture line. In one series, 71% of aortoenteric fistulas were found at this location (7). Paraprosthetic enteric fistulas consist of sinus formation between the bowel and the outer connective tissue capsule of the graft. Patients with this condition are more likely to present with sepsis, abdominal pain or nonexsanguinating hemorrhage (1). Almost any level of the gastrointestinal tract may be involved. In a series of 22 patients, 60% of cases involved duodenum, 12% jejunum, 18% ileum, 8% cecum and 4% appendix. Fistulization occurred a mean of 36 months following surgery (2).

Eventually, all aortoenteric fistulas

result in bleeding. However, in a series of 33 patients, only 79% presented with bleeding (8). Bleeding is commonly episodic, occurring over several days. In a series of 25 patients, only three presented with exsanguinating hemorrhage as their first symptom (9). Patients may present for elective investigation of melena, hematemesis or coffee ground emesis (10). Intermittent blood loss results from thrombosis of the fistulous tract followed by dislodgement of clot and hemorrhage into the gut lumen. A herald bleed may precede major bleeding. In a series of 22 patients, four had herald bleeds (2).

In a series of 33 patients, 42% presented with back or abdominal pain (8). Sepsis may ensue as the aortic graft erodes into the bowel. In the same series, 30% presented with fever and 24% with chills and diaphoresis.

In a series of nine patients, seven had signs of infection (3). Presentations suspicious for aortoenteric fistula include gastrointestinal bleeding with an epigastric bruit (11) or with fever, lower limb abscesses, and positive femoral artery blood cultures with negative upper limb venous blood cultures in patients with prior abdominal aortic graft surgery (12). In a series of 25 patients, only eight were diagnosed prior to laparotomy (9).

Gastroscopy constitutes the investigation of first choice. It may be most valuable in detecting other sources of gastrointestinal blood loss. It should include visualization of the third and fourth parts of the duodenum, which is sometimes difficult and time consuming and may precipitate massive hemorrhage (13). Caution should be exercised in sucking out any clot in these areas, since profuse bleeding may result due to unplugging of the fistula (14). Findings suggestive of aortoenteric fistulas include visualization of the graft, a bile stained intraluminal structure or suture line, presence of an extrinsic pulsatile mass compressing the duodenum, and arterial bleeding emanating from the distal duodenum (15). The presence of a peptic ulcer or nonbleeding varices may confuse the diagnosis. In a series of 20 patients with aortoenteric fistulas, 40% had previously been found to have

a duodenal ulcer (7). Contrast-enhanced computerized axial tomography scanning of the abdomen constitutes the investigation of second choice. Suggestive findings include the presence of periprosthetic gas or fluid (16). Other suspicious findings on computed tomography include disrupted aortic wall conspicuity and effacement of the fat plane between aorta and juxtaposed intestine (17). Arteriography may demonstrate the presence of a pseudoaneurysm or extravasation of contrast into the gut lumen if bleeding is brisk. False negative angiograms may occur as a result of thrombus occluding the fistulous tract (11). Upper gastrointestinal barium studies may demonstrate an ulcer crater in an unusual site or with an unusual appearance, a rounded filling defect in the third part of the duodenum with mucosal irregularity, an extrinsic mass compressing the bowel wall, or a corrugated graft outlined by barium in an irregular cavity (18). Barium studies may make subsequent studies such as gastroscopy or angiography difficult to interpret. Red blood cell scan may show a focus of gastrointestinal blood loss and gallium scan may demonstrate increased uptake at the site of an infected graft. Colonoscopy and barium enema may be valuable in ruling out alternative causes of gastrointestinal blood loss.

In a series of 19 patients admitted to hospital after a gastrointestinal bleed who had prior abdominal aortic graft surgery, five aortoenteric fistulas were found (19). By contrast, in a series of 52 patients with previous abdominal aortic graft surgery who presented with gastrointestinal blood loss, only one aortoenteric fistula was identified (20).

Optimal therapy of aortoenteric fistulas requires oversewing of the defect in the intestinal tract, excision of all prosthetic graft material, oversewing of the abdominal aortic stump, and creation of an extra-anatomic axillo-bifemoral arterial graft. With this approach, a mortality of 38% has been recorded (21). In one series, 27% of survivors required amputation of one or both lower limbs (8). The amputation rate may be reduced when construction of the axillobifemoral graft precedes

Figure 1) Investigation of suspected aortoenteric fistulas (AEF). *Consider barium studies, colonoscopy, gallium scan, red blood cell scan. CT Computed tomography

removal of the aortic graft (8,22). Alternate therapies, such as local repair of the fistula, graft excision, or graft excision with in situ prosthetic revascularization result in higher mortality rates (21). Early causes of mortality include uncontrollable blood loss, multi-system failure, sepsis or cardiovascular complications. Late causes of mortality include refistulization or rupture of the aortic stump. Serial abdominal imaging should be done in patients surviving operations for aortoenteric fistulas to diagnose early signs of impending aortic suture line complications (9). A long term survival rate of 15% has been recorded (7).

In the present case, the patient's myocardial infarction probably occurred following hypotension induced by acute blood loss through the aortoenteric fistula. Increased mortality has been documented in patients with recent myocardial infarctions undergoing surgery (23). It was hoped that a

source of bleeding treatable without surgery could be discovered on endoscopic assessment. Such was unfortunately not the case.

In patients with previous abdominal aortic surgery, gastrointestinal blood loss must be considered due to an aortoenteric fistula until proven otherwise. Figure 1 outlines the investigation of a suspected aortoenteric fistula.

Prompt investigation with early gastroscopy is crucial. Investigations should be carried out on an inpatient basis in a centre with vascular surgery capacity. It has been suggested that in patients operated in emergency situations in centres without vascular surgery capacity, the afferent and efferent loops of bowel close to the fistula be stapled to tamponade the fistula prior to transfer for more definitive surgery (14). In a series of 22 patients, an average of 25 days lapsed between initial gastrointestinal bleeding and laparotomy (2).

Successful management is dependent on early recognition and prompt surgical approach. A patient with undiagnosed gastrointestinal bleeding and prior abdominal aortic surgery should undergo laparotomy to rule out an aortoenteric fistula.

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