

Primary Aorto-Duodenal Fistula

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Summary

Primary aorto-duodenal fistula is a rare and life-threatening cause of upper gastro-intestinal bleed. In this case report, a patient presented acutely with several episodes of haematochezia and pulseless lower limbs bilaterally. Primary aorto-duodenal fistula with peripheral vascular disease was diagnosed after an urgent CT angiogram was performed. She underwent left axillo-bifemoral bypass, resection of the fistula, Roux-en-Y gastro-jejunostomy, pyloric exclusion and controlled duodenal fistula the following day.

Key Words: Primary aorto-duodenal fistula, Gastro-intestinal bleed

Introduction

A primary fistula between the abdominal aorta and the duodenum is a rare event. Secondary aorto-duodenal fistula is a well-recognised late complication of aortic reconstruction and it may occur in 0.5 to 2.4 percent of patients three to five years after the operation¹. However, primary aorto-duodenal fistula remains rare and less than two hundred cases have been reported in the English language literature since the original description by Astley Cooper in 1822 and the first report by Salmon in 1843².

Primary aorto-duodenal fistula is a life-threatening condition with a very high mortality rate, in excess of eighty percent³. This is mainly due to the fact that the diagnosis is difficult to make, especially in hospitals with no access to the appropriate imaging modalities and lack of surgical expertise, and the patient usually bleeds catastrophically resulting in his demise before or during emergency operation.

Case Report

A sixty-six years old lady was referred from a private hospital with a one-day history of four episodes of fresh per rectal bleed. There was no history of abdominal pain, hematemesis or fever. She also had no history of alteration in bowel habit, recent weight loss or loss of appetite. She also denied any history of intermittent claudication or rest pain. She was not a smoker, hypertensive or diabetic. Her lipid profile was not known. She underwent two previous operations more than thirty years ago, i.e. an appendectomy and an operation on her left knee.

She appeared comfortable and afebrile on clinical examination on admission. Her blood pressure was 140/60 mm of Hg with a regular radial pulse rate of 80 per minute. Her lungs were clear. Abdominal examination revealed a non-tender, expansile and pulsatile mass at the peri-umbilical region, measuring six by six centimeters. Digital rectal examination was unremarkable, without any

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altered blood. Her distal lower limbs pulses were absent bilaterally from the femoral arteries downwards. Her lower limbs remained warm with intact sensation and normal power bilaterally. Her ankle-brachial systolic index (ABSI) was 0.4 bilaterally. Her femoral and popliteal arteries showed biphasic signals on continuous wave Doppler ultrasonography, but her dorsalis pedis and posterior tibial arteries showed only monophasic signals bilaterally.

Her hemoglobin level was at 9.3 g/dL. Her platelet count and leucocytes count were normal, at 203,000 and 9,200 per cubic mm respectively. Her coagulation profile and renal profile were within normal limits. Plain computerized tomography (CT) performed at a private hospital showed infra-renal abdominal aortic aneurysm, measuring 6.7 by 7 centimeters. An urgent CT angiogram with intravenous contrast was then performed on the day of her admission, showing an infra-renal abdominal aortic aneurysm, with extensive intra-aneurysmal thrombus with complete occlusion of the distal part of the aneurysm. Evidence of chronic leak and reconstitution at the level of the iliac arteries through collateral vessels was noted. Air within the aneurysmal thrombus and a short fistulous tract between the abdominal aortic aneurysm and the third part of the duodenum (Figure 1) was also noted in the CT films.

An emergency operation was performed within twenty-four hours of admission. An extra-anatomical left axillo-bifemoral artery bypass, between the first part of the axillary artery and both common femoral arteries using poly-tetra-fluoro-ethylene (PTFE) graft. Through a midline laparotomy the normal segment of infra-renal aorta above and below the aneurysm was oversewn with non-absorbable sutures. The aorto-duodenal fistula was then excised after identifying it (Figure 2). Pyloric exclusion, Roux-en-Y gastro-jejunosomy and controlled duodenal fistula (by inserting a Foley's catheter between the second part of duodenum and the overlying skin through the anterior abdominal wall, in order to protect the proximal duodenal stump) were then performed. Lastly, a feeding jejunostomy (entero-cutaneous anastomosis) was inserted intra-operatively to facilitate feeding.

She was transferred to an intensive care unit after the operation. Post-operatively, she recovered well and did not require any inotropic support. She was extubated on the first post-operative day and was transferred to a general ward on the following day. Her vital signs remained stable and her legs were warm bilaterally. Her dorsalis pedis and posterior tibial arteries showed biphasic signals bilaterally. The culture from the patient's peri-duodenal tissue was negative. She improved gradually in the general ward and was discharged well eighteen days after the operation.

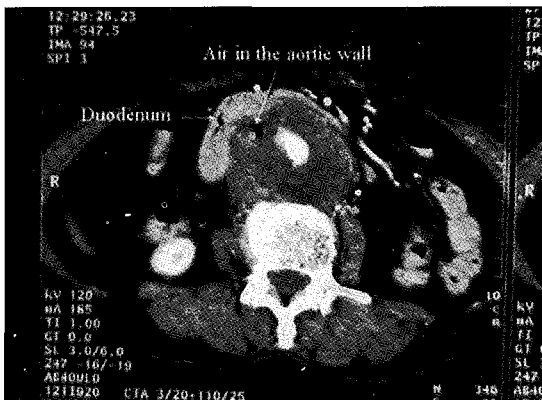


Fig. 1: Air within the aneurysmal thrombus and a fistulous tract between the aneurysm and the duodenum

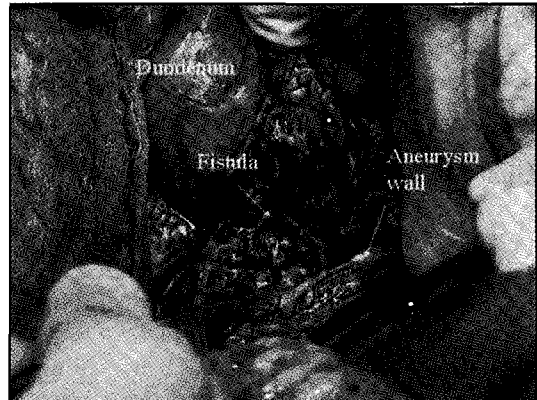


Fig. 2: Aorto-duodenal fistula site identified and excised

Discussion

Atherosclerosis with aneurysmal changes of the abdominal aorta is the commonest cause of primary aorto-duodenal fistula, and most patients have a fistulous communication between infra-renal abdominal aortic aneurysm and the third part of the duodenum, as in this patient. Other less common causes of primary aorto-duodenal fistula are mycotic or infected abdominal aortic aneurysm, such as due to Salmonella or Klebsiella, tuberculosis, syphilis. Pancreatic carcinoma, gallstones, duodenal ulcer and foreign body ingestion have also been implicated as the causes of this deadly condition^{1,4}. External beam radiotherapy has also been implicated as a rare cause of primary aorto-duodenal fistula, by causing intimal damage with thrombosis initially, that leads to atheroma development with peri-arterial fibrosis, and also predisposes to arterial rupture and fistulisation between the aorta and the intestine¹.

The classical triad of an aorto-duodenal fistula consists of abdominal pain, a palpable abdominal mass and gastro-intestinal bleeding^{3,5}. The classical presentation however only occurs in the minority of patients, with most patients presenting following massive upper gastro-intestinal haemorrhage. The patient in this case report did not present with this classical triad. She did not complain of abdominal pain. She however presented with gastro-intestinal bleed, a palpable abdominal mass and pulselessness of both lower limbs secondary to aortic occlusion which is a very unusual association with primary aorto-duodenal fistula and has not been reported in the literature.

The initial herald bleed is important to recognize because a third of patients die within the first six to twelve hours due to massive haemorrhage². A high clinical index of suspicion and urgent diagnostic procedure is certainly required to achieve a favourable outcome. However, it should be realised that there is difficulty in making the correct diagnosis. Upper endoscopy is indicated to exclude other much more common causes of upper gastro-intestinal bleed such as peptic ulcer

or oesophageal varices, but it was only helpful in diagnosing aorto-duodenal fistula in a handful of cases. Arteriography is another imaging modality that can be utilized in diagnosing this condition but the positive pick-up rate is low (about a third of all cases) and there is the real danger of dislodging fresh thrombus in the fistula and causing massive bleed^{3,4}.

Urgent computerised tomography (CT) scan of the abdomen is the imaging modality of choice in stable patients with suspected primary aorto-duodenal fistula because it is non-invasive and able to detect the presence, size and site of the abdominal aneurysm and also suggests the presence of primary aorto-duodenal fistula if extraluminal gas is observed in the peri-aortic region^{2,5}.

Emergency surgical operation is mandatory to treat this deadly condition. In this case report, the patient was successfully treated with extra-anatomic arterial reconstruction to the lower limbs, resection of the diseased segment of the aorta and the fistula, pyloric exclusion and gastro-jejunostomy Roux-en-Y.

Some authors have reported success with primary duodenal repair combined with repair of the pseudo-aneurysm or replacement of the aorta with an in-situ Dacron graft for the treatment of primary aorto-duodenal fistula of non-infectious origin. They argue that even in primary aorto-duodenal fistula of infectious origin; early intervention, primary duodenal repair, aortic reconstruction with an in-situ Dacron graft and prolonged bactericidal antibiotic therapy offer long-term survival. They believe that extra-anatomic arterial reconstruction is only justified in the presence of a grossly purulent operative field^{2,4}.

In summary, when a patient presents with gastro-intestinal bleed, and signs and symptoms of abdominal aortic aneurysm, a clinical suspicion of primary aorto-duodenal fistula should be suspected and an urgent CT scan of the abdomen should be arranged. For a successful outcome, an emergency operation should be performed before catastrophic bleed occurs.

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