Aortoduodenal Fistula Caused by a Mycotic Aneurysm: a case report

Yueh-Lin Lee¹  Chen-Ju Fu¹  Hung-Chang Hsieh²  Yi-Kang Ku¹  Yuan-Chang Liu¹

Department of Medical Imaging and Intervention¹, Division of Thoracic and Cardiovascular Surgery, Department of Surgery², Chang Gung Memorial Hospital at Linkou, Chang Gung University

Aortoduodenal fistula (ADF) is a rare condition with a high mortality rate when diagnosis is delayed. The clinical presentation of this disorder is insidious. We report a 48-year-old male patient who had a fever for 1 month, abdominal pain for 10 days and hematemesis for 1 day. Initial endoscopy failed to lead to a diagnosis. An abdominal aortic aneurysm, bowel wall defect and hematoma in the lumen over the 3rd and 4th portion of the duodenum were found on computed tomographic (CT) scan. An exploratory laparotomy showed a ruptured mycotic aortic pseudoaneurysm with an aortoduodenal fistula. The patient survived and was symptom-free following the operation. Extravasation of contrast medium from the aorta to the duodenum is definite evidence of ADF on a CT image. Other suggestive evidence includes a hematoma in the duodenal lumen, loss of the fat plane between the aorta and duodenum, and air in the retroperitoneum and within the thrombus. In our patient, loss of continuity or defect in the aneurysmal wall and direct connection to the duodenum were diagnostic for primary ADF on helical CT. The fast scanning time of helical CT makes direct detection of the fistula possible. A high index of suspicion is critical for successful diagnosis, and early surgical exploration is needed for successful management.

Aortoduodenal fistula (ADF) is a rare yet lethal condition if left untreated. It is defined as a direct connection between the aorta and duodenal lumen. Most ADFs are the secondary type, which are complications of previously implanted aortic prostheses. Primary ADF is rare. The most common primary ADF is caused by an abdominal aortic aneurysm (AAA), which may irritate the duodenum, resulting in a fistula. Other causes of primary ADF include radiation, primary or metastatic tumors, ulcers, pancreatitis, appendicitis, and ingestion of a foreign body. ADF is a potentially curable disease, but it is sometimes difficult to diagnose because of its non-specific clinical presentation. Here we report a case of primary ADF caused by a mycotic aneurysm, which was diagnosed by helical computed tomography (CT) and successfully treated in our hospital.

CASE REPORT

A 48 year-old man came to our emergency room because of intermittent fever for 1 month, intermittent abdominal pain for 10 days and hematemesis for 1 day. He was conservatively treated. Endoscopy revealed only a mild ulcer in the esophagogastric junction due to gastroesophageal reflux disease, chronic gastritis, and duodenitis. No active bleeding point was noted above the 2nd portion of the duodenum. An abdominal sonogram showed no abscess in the solid organ but revealed a suspected abdominal aortic aneurysm (AAA). Due to persistent fever and leukocytosis (WBC count 11,400/mL), emergency abdominal CT was performed to detect the focus of the infection and the cause of hematemesis CT was performed on a 4-slice multidetector helical CT scanner (LightSpeed, QXi, GE Medical Systems, Milwaukee, WI, USA), with
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A 5mm slice thickness and a pitch of 6. A total of 80mL of contrast medium was injected through a peripheral vein at a rate of 20 ml/min. CT showed a saccular type of aneurysm in the abdominal aorta abutting the 3rd–4th portion of the duodenum (Fig. 1a, 2). A hematoma was also noted in the lumen of this portion of the duodenum. Postcontrast images revealed a 1.5 cm defect in the aneurysmal wall directly connecting to the duodenum (Fig. 1b). Although there was no contrast medium extravasation directly from the aorta into the duodenum on the CT scan, the hematemesis was presumably due to an aortoduodenal fistula between the abdominal aortic aneurysm and the 4th portion of the duodenum. Emergency surgical treatment was performed and a 1.5cm aortoduodenal fistula was found, compatible with the CT findings. Surgical intervention consisted of resection of the abdominal aortic aneurysm and reconstruction with a graft covered with an omental flap. Then the defect in the duodenal wall was repaired. Salmonella was cultured from debrided tissue from the mycotic aneurysm. The patient survived and had no gastrointestinal bleeding following the operation. The patient was discharged 1 month after the operation and was symptom-free at the 3-month follow-up.

DISCUSSION

Aortoduodenal fistula (ADF) is an aortic enteric fistula directly connecting the aorta and duodenal lumen. There are two types of aortoduodenal fistulas. Primary ADF is rare and occurs spontaneously between the aortic aneurysm and duodenum, with an incidence rate at autopsy of 0.04 to 0.07% [1]. Secondary ADF mostly occurs after synthetic aortic graft placement, with a postoperative incidence rate of 0.4 to 4% [2]. The most predominant site of ADF is the 3rd and 4th portions of the duodenum because of the anatomic location of the fixed duodenum [3].

Causes of ADF other than AAA are extremely rare. Among aneurysms resulting in primary ADF, 73% are atherosclerotic in origin, and 26% are infectious (mycotic aneurysm) or traumatic (traumatic aneurysm) [4]. In mycotic aneurysms causing primary ADF, the most common infectious organism is Salmonella, as in our patient. Other possible causes include Klebsiella, tuberculosis, syphilis, mycosis, staphylococcus and streptococcus [5].

The clinical triad of primary ADF is gastrointestinal bleeding, abdominal pain and a pulsatile abdominal mass. However, this only occurs in 11% of cases [6]. Other symptoms are nonspecific, such as back pain, hematemesis, melena, fever, sepsis, shock and syncope. In most cases, bleeding is intermittent and recurs over hours and days before the final massive hemorrhage. Contracture of the bowel or partial thrombosis of the fistula is attributed to the alternating relapse and remitting of symptoms.

The diagnosis of ADF is difficult because of the nonspecific clinical presentation. Because GI

Figure 1. a. Non-contrast CT shows a saccular aneurysm (arrowhead ) in abdominal aorta abutting to 3rd–4th portion of duodenum with high-attenuated content (55 HU) suggesting intraluminal hematoma (arrow). There is no distinct fat-plane between the aneurysm and duodenum. b. Contrast-enhanced CT shows a partially thrombosed aneurysm without extravasation of contrast medium into the duodenum, but a 1.5 cm defect in the aneurysmal wall connecting to the duodenum is revealed (arrow). This finding indicates an aortoduodenal fistula.
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bleeding presents initially in most patients, fibroscope endoscopy plays an important role in the management of ADF [7]. However, visualization of an ADF is difficult because of the acute angulation of the distal duodenum and masking by the massive hematoma. Angiography is helpful in surgical planning. But very few primary ADFs are diagnosed with angiography [8]. Helical CT with intravenous contrast administration is another diagnostic choice [9]. It is less invasive and more available than endoscopy. Extravasation of contrast medium from the aorta to the duodenum is definite evidence of ADF on a CT image [10]. Other suggestive evidence includes a hematoma in the duodenal lumen, loss of the fat plane between the aorta and duodenum, and air in the retroperitoneum and within the thrombus [11]. Although there was no extravasation of contrast medium on CT in our patient, loss of continuity or defect in the aneurysmal wall and direct connection to the duodenum revealed the diagnosis of primary ADF. Because of the fast scanning time of helical CT with little motion artifact and thin slice thickness, direct detection of the fistula is possible.

The mortality rate of untreated ADF with upper gastrointestinal hemorrhage is nearly 100% [12]. Surgical intervention improves the survival rate remarkably [13]. The standard treatment of primary ADF consists of direct repair of the aneurysm with placement of a synthetic graft and primary repair of the duodenum. An endovascular technique using a covered stent is an alternative treatment, but it is not suitable for patients with suspected infection or life-threatening bleeding [14].

In summary, primary aortoduodenal fistula is rare but potentially associated with a high mortality and morbidity rate. It must be considered in patients with active gastrointestinal bleeding. CT imaging can provide a diagnosis of ADF. Direct detection of the fistula is possible by helical CT because of short scanning time.

Figure 2. Contrast-enhanced CT, reconstructed sagittal view shows the partially thrombosed aortic aneurysm displacing the duodenum anteriorly (Arrow).

REFERENCE

細菌性主動脈瘤引發主動脈十二指腸瘻管：
病例報告

李岳霖¹ 傅真如¹ 謝宏昌² 顧逸康¹ 劉原彰¹

長庚大學 林口長庚紀念醫院 影像診療科¹ 胸腔及心臓血管外科²

主動脈十二指腸瘻管是一種少見的疾病，若延遲診斷死亡率很高。此病的臨床表現是隱伏的。我們在此報導一個四十八歲的男性，發燒一個月，腹痛 10 天，吐血一天。上消化道內視鏡無法做出診斷。電腦斷層掃瞄顯示腹主動脈瘤，腸壁缺損以及腸腔內血腫在十二指腸第三及第四部分內。探索性腹部切開術發現腹主動脈瘤破裂及主動脈十二指腸瘻管。這位病人手術後安然且無症狀。確定診斷主動脈十二指腸瘻管是在斷層掃描影像中發現顯影劑從主動脈溢出到十二指腸，其他可能的發現有：在十二指腸內發現血腫，主動脈與十二指腸間的脂肪層消失，以及發現空氣出現在後腸腔或血栓內。在我們這位病人，螺旋斷層掃瞄影像中發現血管瘤壁產生不連鎖或缺陷並且與十二指腸直接連結讓我們確定診斷原發性主動脈十二指腸瘻管，因為螺旋電腦斷層的快速掃瞄時間，讓直接偵測瘻管變的可能。正確診斷此疾病需要高度警覺，及早手術探索可以有效的治療。