Colopericardial fistula presenting with massive rectal bleeding

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ABSTRACT

Colopericardial fistulae constitute a condition with a very low prevalence and a high morbidity and mortality rate. In this case report, we discuss an 80-year-old male patient who presented to emergency services for massive rectal bleeding and signs of hypovolemic shock. Abdominal arteriography and upper gastrointestinal endoscopy were negative for bleeding. Findings indicative of fistula between the left ventricle and the transverse colon were described in computed tomography angiogram and the diagnosis was confirmed endoscopically. The patient was stabilized and the bleeding was self-limited. Direct communication between the gastrointestinal tract and the pericardium, or even with the heart itself, is a rare disease and constitutes a diagnostic challenge.

CASE REPORT

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An 80-year-old male patient presented to emergency services for massive rectal bleeding characterized by abundant bright red blood, associated with abdominal pain and signs of hypovolemic shock, without fever. His past medical history included hypertension, heart failure, re vascularized coronary heart disease and anticoagulation for atrial fibrillation. Likewise, the patient disclosed a history of ventricular septal defect (VSD) treated 21 years ago through pericardial patch, with residual VSD and left ventricular pseudoaneurysm as sequelae. He denied a history of malignancy and other surgical procedures.

On admission laboratory exam revealed hemoglobin of 6.8 gr/dL (normal range: 11–16.5 g/dL), arterial gases compatible with metabolic acidosis and hyperlactatemia, findings related to hemorrhagic shock; the estimated blood loss in the bleeding episode was 2000 ml. The patient was transferred to the intensive care unit, the airway was secured, hypotensive resuscitation was initiated, vasopressor handling, polytransfusion with hemoderivatives and arteriography plus embolization of mesenteric vessels for diagnostic and therapeutic purposes were indicated by interventional radiology. The amount of normal saline for intravenous fluid resuscitation was 3000 ml.

Abdominal arteriography and upper gastrointestinal endoscopy were negative for active bleeding, with no relevant findings. Dual phase Computed tomography (CT) of the chest and abdomen was performed. Initial non contrast imaging demonstrated postsurgical changes in the apical left ventricle (Fig. 1). There was no plane of separation between the left anterior hemidiaphragm and the traverse colon loop and gas bubbles noted extending from the colon to adjacent diaphragm and pericardium. After administering the intravenous contrast medium, an apical left ventricular pseudoaneurysm was better visualized without direct communication with the gastrointestinal tract. High attenuation material also seen within distal transverse and left colon, in keeping in

hemorrhagic products (Fig. 2). The described findings were highly indicative of fistula between the left ventricle and the transverse colon as the cause of digestive bleeding.

The patient was stabilized and the bleeding was self-limited. He was transferred for colonoscopy suite and a 15 x 15 x 4 mm pulsatile mass at the junction of middle and distal transverse colon, with adhered fibrin clot and without active bleeding was reported (Fig. 3). With the diagnosis of ventriculocolonic fistula, the patient was assessed by a cardiovascular surgeon who, given the patient's age and comorbidities, emphasized on the high risk of morbidity and mortality associated with a major surgical intervention. The patient, along with his family members, refused to undergo surgical treatment; and since no new episodes of bleeding during the hospital stay were documented, he was released with recommendations and warning signs for ambulatory follow-up and monitoring.

DISCUSSION

Etiology & Demographics:

Enteropericardial fistulae constitute a condition with a very low prevalence and a high morbidity and mortality [1-3]. Etiology is diverse and sometimes difficult to specify. Enteropericardial fistulae caused by malignant/neoplastic infiltration (esophageal, gastric or pulmonary), traumatic, secondary to serious infections of pleura or abdomen, to foreign bodies, and perforated peptic ulcers have been described [4-6]. As for colopericardial fistulae, they are extremely rare and are usually described associated with colon interposition after esophageal replacement [6,7], and are mainly due to gastrocolic reflux, intestinal ischemia and/or adjuvant radiochemotherapy for esophageal cancer [2]. As of 2011, there were 95 cases of enteropericardial fistulae reported in literature, 46% of which appeared from stomach, 38% from esophagus, 11% from colon, 2% from jejunum and 1% from duodenum. The age group of occurrence is broad, with an average of 54 years and a range from 1 to 82 years [3].

As stated earlier, many patients have previously undergone surgery, considering that foreign elements such as nonabsorbable stitches, Teflon dressings, prosthetic meshes, stents or implantable defibrillators, may develop infection, migration or fistula when located next to gastrointestinal viscera [8]. Out of the 95 cases described in literature as of 2011, 55 occurred after surgery [3].

In our case, the repair site of the VSD treated through pericardial patch, added to the suture material (foreign body) and the ventricular pseudoaneurysm, were apparently related to the formation of the fistulous tract.

Clinical & Imaging findings:

Enteropericardial fistulae are suspected in patients who recently underwent esophagogastric or diaphragmatic surgery, who begin with atypical chest pain, dyspnea, hemorrhage or gastrointestinal obstruction [4]. Although many patients have these prodromal symptoms allowing an early diagnostic assessment, massive bleeding is one of the forms of presentation and may be of sudden onset, as in our case. These fistulae constitute a diagnostic challenge. A chest radiograph may demonstrate pneumopericardium and pleural thickening or effusion. A diagnosis of acute pericarditis can be made on the basis of a pericardial effusion present on echocardiogram and pericardiocentesis [3,4]. CT of the chest and abdomen usually reveal pneumopericardium, pericardial effusion and no plane of separation between a loop of bowel and pericardium. After administering the contrast medium, its patent passage to the gastrointestinal tract could be observed. Water-soluble contrast swallow studies that show contrast extravasation from the gastrointestinal tract into the pericardial sac are diagnostic, and arteriography and gastrointestinal endoscopy could show signs of active bleeding. At surgery, a loop of bowel is seen to be fistulating into the pericardium or even into the heart itself [3].

Treatment & Prognosis:

The treatment involves multiple interventions and the surgical strategy must adapt to each patient in accordance to clinical condition. The success of the surgery emphasizes the principles of gastrointestinal tract defunctioning or the transposition of healthy tissue as part of the repair [9]. Colopericardial fistulae are lethal in 50 % of the cases [1] and in relation to postoperative mortality, series of up to 15 deaths in 27 reported cases have been described [3]. It is for this reason that a conservative treatment is chosen in some cases, and some of the strategies include placing stents and monitoring stable patients.

Differential Diagnoses:

Massive gastrointestinal bleeding may be sudden and dramatic and an urgent diagnosis is necessary, especially in patients with previous thoracoabdominal surgery, even though if it might have been performed in the remote past. More common causes of gastrointestinal hemorrhage and/or severe sepsis should be ruled out (e.g. diverticular disease, cancers, angiodysplasia), looking for an etiology of new unexplained symptoms such as atypical chest pain and hemorrhage or gastrointestinal obstruction [7-9].

Diverticular hemorrhage is the most common cause of lower gastrointestinal bleeding in adults. Although the majority of diverticular bleeds will spontaneously resolve, 20% will require therapeutic interventions. CT of the abdomen usually reveals extravasation of contrast within the colon, with pooling on the portal venous phase [10].

The spectrum of etiologies for pneumopericardium is broad, including trauma, complications of procedures, fistulization from adjacent structures, barotrauma, and pericardial infections with gas-producing organisms [6]. Radiographic findings include gas in pericardial space confined by pericardial reflections. CT scan confirms the diagnosis manifesting as pericardial effusion with air-fluid level [1].

Although larger tumors are known to ulcerate and cause gastrointestinal hemorrhage, cancer is a relatively rare cause of lower gastrointestinal tract bleeding, accounting for less than 10% of all cases of bleeding in patients older than 50 years [11]. Given the chronic nature of bleeding in these patients, the diagnosis is not often made with CT, and most patients who present with bleeding first receive a diagnosis made with colonoscopy. On the other hand, the underlying causes of acquired gastrointestinal fistulae are diverse and many cases are the result of multiple contributing factors; common examples include cancer patients who have undergone radiation therapy. Most esophagopericardial fistulae for example, are due to direct invasion from esophageal cancer or a complication of treatment for cancer [4,5].

TEACHING POINT

A direct communication between the gastrointestinal tract and the pericardium, or even with the heart itself, constitutes a rare condition with a high morbidity and mortality. Patients usually present with clinical instability, with severe sepsis or major hemorrhage, and usually do not tolerate a high-complexity surgical intervention.

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FIGURES

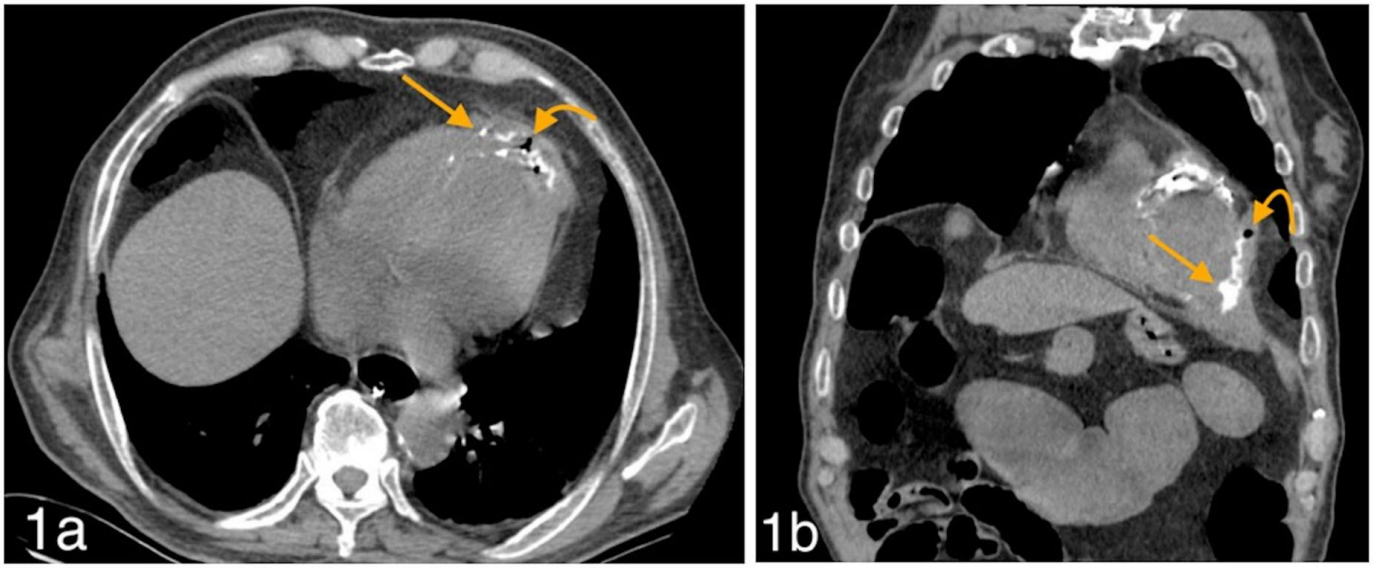

Figure 1: 80-year-old male with fistula between the left ventricle and the transverse colon as the cause of digestive bleeding.

TECHNIQUE: Simple phase axial acquisition 64 detector CT (GE Lightspeed VCT) of the thorax and abdomen acquired at 1 mm slice thickness, 120 kVp and 200 mAs. Coronal and sagittal multiplanar reconstructions were included.

FINDINGS: Suture material toward the cardiac apex (straight arrows) with gas bubbles in the pericardium (pneumopericardium) (curved arrows), a) axial; b) coronal.

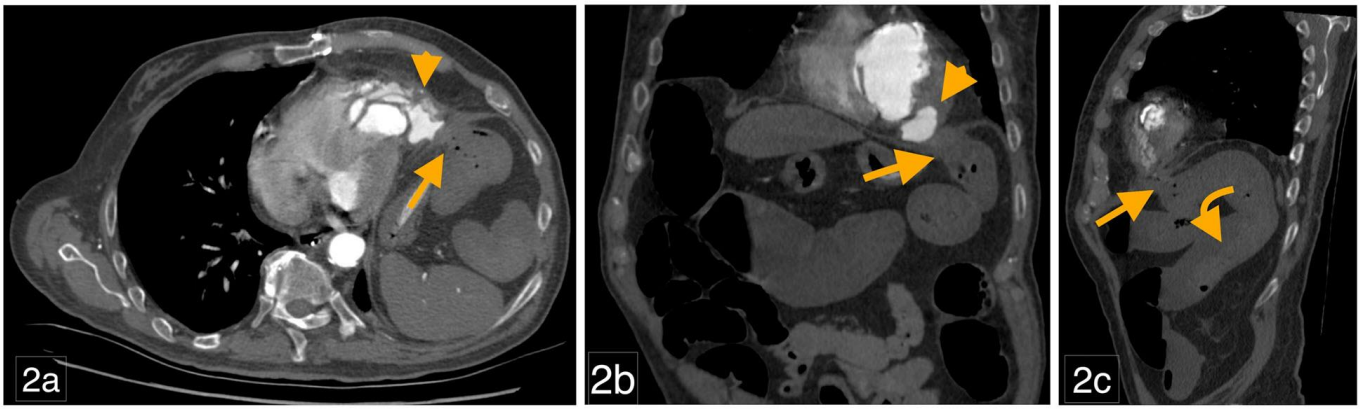

Figure 2: 80-year-old male with fistula between the left ventricle and the transverse colon as the cause of digestive bleeding.

TECHNIQUE: Arterial phase IV contrast enhanced (100 ml Omnipaque 350) axial acquisition 64 detector CT (GE Lightspeed VCT) of the thorax and abdomen acquired at 1 mm slice thickness, non-gated, 120 kVp and 200 mAs. Coronal and sagittal multiplanar reconstructions were included.

FINDINGS: Apical left ventricular pseudoaneurysm (arrowheads in a & b) with gas bubbles extending from the colon toward adjacent diaphragm and pericardium, with no plane of separation identified between these structures (straight arrows in a, b and c). Imaging also show high attenuation material in the colon, suggestive of hemorrhagic products (curved arrow in c), a) axial; b) sagittal; c) coronal.

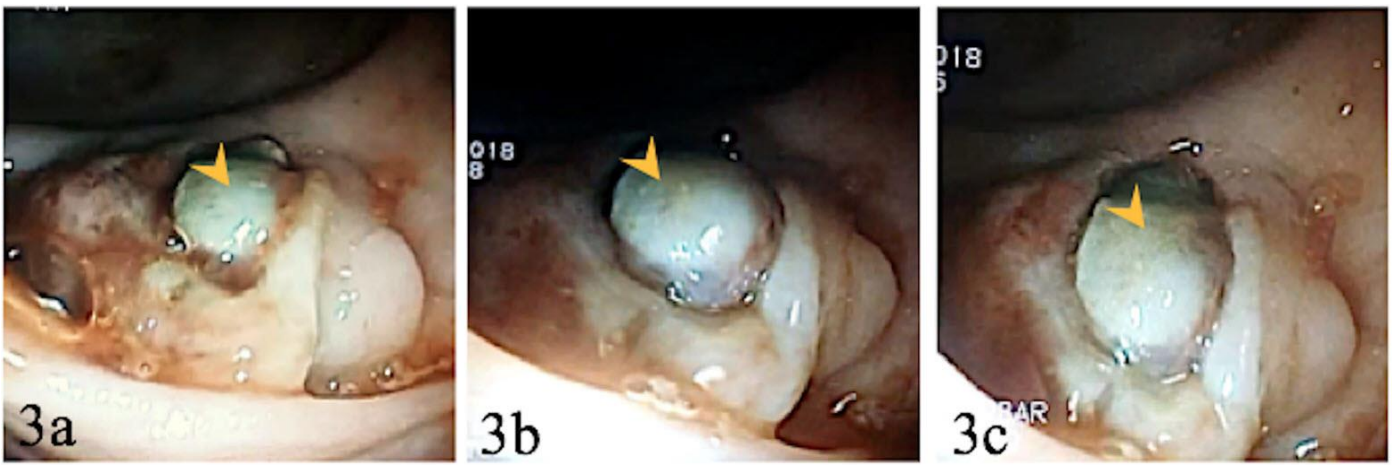

Figure 3: 80-year-old male with fistula between the left ventricle and the transverse colon as the cause of digestive bleeding.

TECHNIQUE: Screenshots from the colonoscopy video.

FINDINGS: Described pulsatile mass (arrowheads in a, b and c), sized 15 x 15 x 4 mm, found at the junction of middle and distal transverse colon, with adhered fibrin clot and without active bleeding.

Etiology	• Malignant infiltration of neoplasias • Traumatic • Secondary to serious infections of pleura or abdomen • Foreign objects from pathologic conditions, prior procedures or from ingestion. • Perforated peptic ulcers • Colon interposition after esophageal replacement.
Incidence	They are extremely rare, and its incidence has not been determined.
Gender ratio	No determinant.
Age predilection	The age group of occurrence is broad. Average 54 years, range: 1 to 82 years.
Risk factors	Previous surgery (foreign elements may develop infection, migration or fistula when are located next to gastrointestinal viscera).
Treatment	The surgical strategy must adapt to each patient in accordance to clinical condition. Surgery is based in principles of gastrointestinal tract defunctioning or the transposition of healthy tissue. Conservative treatment is chosen in some cases.
Prognosis	Colopericardial fistulae are lethal in 50 % of the cases.
Findings on imaging	• A chest radiograph demonstrates pneumopericardium and pleural thickening or effusion. • A diagnosis of acute pericarditis can be made on the basis of a pericardial effusion present on echocardiogram. CT reveals pneumopericardium, pericardial effusion and no plane of separation between a loop of bowel and pericardium. Water-soluble contrast swallow studies could show contrast extravasation from the gastrointestinal tract into the pericardial sac. • Arteriography and gastrointestinal endoscopy show signs of active bleeding.

Table 1: Summary table of key aspects of colopericardial fistulae.

	X-Ray	CT
Colopericardial fistulae	Pneumopericardium with or without cardiomegaly and pleural thickening or effusion.	Pneumopericardium, pericardial effusion and no plane of separation between a loop of bowel and pericardium. Extravasation of contrast on the contrasted phases.
Infectious pericarditis with gas-producing organisms	Pneumopericardium with or without cardiomegaly and pleural thickening or effusion.	Pneumopericardium and pericardial effusion. No adjacent bowel loop seen.
Diverticular hemorrhage	Abdomen radiograph is usually normal.	Extravasation of contrast within the colon, with pooling on the venous phases.
GI carcinomas	Abdomen radiograph could be normal or show obstruction and pneumoperitoneum signs when these complications are present.	Soft tissue density that narrows the bowel lumen with or without ulceration. Adenopathies. Complications may be evident: bleeding, obstruction or perforation.

Table 2: Differential diagnosis table for colopericardial fistulae.

ABBREVIATIONS

CT = computed tomography
VSD = ventricular septal defect

KEYWORDS

Gastrointestinal hemorrhage; Digestive system fistula; Pneumopericardium; Heart injuries; Thoracic Surgery