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Research review

Gastropericardial fistula: radiologic findings and literature review

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ABSTRACT

Background: Gastropericardial fistula, a rare condition characterized by an abnormal communication between the stomach and the pericardium, is an emergency as sequelae such as cardiac tamponade and sepsis may lead to hemodynamic instability and death. We aimed to summarize the surgical and radiologic findings of the reported cases published to date, describe their pertinent surgical history, and present an algorithm for diagnosis.

Methods: The Pubmed database was searched using the terms: gastropericardial, pericardiogastric, pneumopericardium, pericardial, and pneumopericardium with the term "fistula" added to each term. The search was limited to January 2000–October 2015 and English language publications.

Results: Thirty five cases were identified. The most common etiology was prior esophageal and/or gastric surgery (80% of cases; esophagectomy = 26%/gastrointestinal reflux disease associated surgery = 23%/bariatric surgery = 11%/partial gastrectomy = 6%/other = 20%). The average duration between presentation and surgery was 7.3 ± 6.2 years (SD). Radiology typically played a crucial role in diagnosis with computed tomography most commonly demonstrated to be the most appropriate modality to demonstrate the fistula and assist in surgical planning. Contrast studies were frequently helpful to confirm the diagnosis. Chest x-ray findings including pneumopericardium and pericardial thickening were contributory but nonspecific. Esophagoduodenoscopy characterized the fistula in cases where imaging was equivocal and may provide therapeutic options.

Conclusions: We present the clinical radiologic findings of the 35 cases of gastropericardial fistula reported. This is the first literature review of gastropericardial fistula to focus on the effectiveness of these various diagnostic modalities and to present an algorithm for diagnosis.

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Introduction

Gastropericardial fistula is a rare condition characterized by an abnormal communication between the stomach and the pericardium. A wide variety of etiologies have been described including prior surgery, malignancy, trauma, infection, refractory gastric ulcers, the presence of a foreign body, and caustic agent ingestion. The most common presentation is that of a delayed complication related to prior surgery involving the esophagus and/or stomach. Although the presenting symptoms vary greatly, it is common for patients to have prodromal symptoms before the presentation.[1] On presentation, signs and symptoms of sepsis are often present. Electrocardiogram findings representative of pericarditis are typical. Cardiac tamponade requiring emergent intervention may also be found.

Many case reports have been published on gastropericardial fistula. However, no literature review focusing on the recently published cases has been performed. We present the first literature review to focus on the effectiveness of the various diagnostic modalities performed in these cases. We also provide a review of the common imaging findings. In addition, we describe the pertinent surgical history of the reported cases and present an algorithm for diagnosis.

Methods

The Pubmed database was searched for all cases of gastropericardial fistula between the January 1, 2000 and October 1, 2015 using the following search terms: gastropericardial, pericardiogastric, pneumopericardium, pericardial, and pneumopericardium with the term "fistula" added to each of these search terms. The search was limited to English language publications. Cases involving fistula formation between the pericardium and the esophagus or other viscera were excluded. The following data were extracted from the reported cases: etiology of the fistula, time to presentation after surgery, patient demographics, survival, and findings on the various diagnostic modalities.

Results

A total of 35 cases of gastropericardial fistula met inclusion criteria (Tables 1 and 2). Hamid *et al.* reported a case series of enteropericardial fistula; however, only one of the three cases was a gastropericardial fistula.[1] The remainder of the cases that met the criteria of our review were single case reports. Eighty percent of patients had undergone prior upper gastrointestinal tract surgery with a mean duration of 7.3 ± 6.2 years (standard deviation, SD) from primary surgery to fistula diagnosis. A surgical history attributable as the likely cause of the gastropericardial fistula was present in 80% of the cases. The most commonly implicated surgeries were esophagectomy, gastroesophageal reflux associated, and bariatric surgeries found in 26%, 23%, and 11% of patients with a surgical history, respectively. The other cases were of various medical causes including ulcers, trauma, malignancy, foreign body ingestion, and caustic substance ingestion. Although some cases presented in the perioperative period, the vast majority occurred as a delayed complication. The duration to presentation ranged from zero to 22 years. Outcome was reported for 34 cases. Of these 34 cases, the mortality rate was 11.8%.

Table 1 – Summary of cases and radiologic imaging.

Total number of cases	35
Average duration from surgery to presentation (years, standard deviation)	7.3 ± 6.2
Surgical history*	None ($n = 7$, 20%) Esophagectomy ($n = 9$, 26%) Gastroesophageal reflux disease surgery ($n = 8$, 23%) Bariatric surgery ($n = 4$, 11%) Partial gastrectomy ($n = 2$, 6%) Other ($n = 7$, 20%)
Fluoroscopy	7 cases (3 = positive for fistula formation; however, the fistulous tract was only defined in 1 case)
Esophagogastroduodenoscopy	22 cases (19 = positive for gastropericardial fistula/86% sensitivity)
Mortality rate	4 of 34 cases (11.8%); Outcome unknown in one case

*Sum of numbers does not total 35 as multiple procedures were performed in >1 patient.

Positive computed tomography (CT) findings were present in all cases when performed; however, the fistulous tract itself was defined in only a minority of cases with CT.[2,3] The most common conclusion with CT imaging in the reviewed cases was that the findings were "suggestive" of gastropericardial fistula. Esophagogastroduodenoscopy (EGD) was performed in 21 of the review cases, and the source of the fistula was identified in 86% of those cases.

Discussion

Most patients with reported gastropericardial fistula have previously undergone gastric and/or esophageal surgery. Time to from surgery to fistula was varied with one case presenting 22 years later, demonstrating that an appropriate surgical history, even if performed several years before presentation, in combination with pneumopericardium and/or hydropneumopericardium should raise suspicion for gastropericardial fistula. Various diagnostic modalities have been used in the above described cases to confirm the presence of gastropericardial fistula.

Diagnosis and imaging findings

Chest radiography

Chest radiography is often the first imaging modality for patients presenting with suspected cardiopulmonary pathology. The most common finding is pneumopericardium. However, pneumopericardium is a nonspecific finding as the vast majority of cases of pneumomediastinum are not related to