Chirurgia (2026) 121: 586-592
No. 5, September - October
Copyright© Celsius
http://dx.doi.org/10.21614/chirurgia.3392

Gastropericardial Fistula and Thromboembolic Disease as a Rare Presentation of Gastric Adenocarcinoma: A Case Report

Mihaela-Mădălina Gavrilescu[1,2], Ionuț Huțanu[1,2]*, Viorel Scripcariu[1,2]

[1]Faculty of Medicine, Grigore T. Popa University of Medicine and Pharmacy, Iași, Romania
[2]First Oncological Surgery Unit, Regional Institute of Oncology, Iași, Romania

***Corresponding author:**
Ionuț Huțanu, MD
Faculty of Medicine, Grigore T. Popa University of Medicine and Pharmacy, Iași, Romania
E-mail: ionut.hutanu@umfiasi.ro
hionut65@gmail.com

Abbreviations:
NYHA: New York Heart Association;
INR: international normalized ratio;
NT-proBNP: N-terminal pro-brain natriuretic peptide;
aPTT: activated partial thromboplastin time;
CRP: C-reactive protein;
AST: aspartate aminotransferase;
ALT: alanine aminotransferase.

Rezumat

Fistula gastropericardică asociată cu boală tromboembolică în adenocarcinomul gastric: prezentare de caz

Introducere: Fistula gastropericardică este o complicație extrem de rară şi severă a cancerului gastric, cu potențial evolutiv fatal. Asocierea cu tromboze venoase portosplenice, infarct splenic şi tromboembolism pulmonar bilateral complică suplimentar tabloul clinic şi conduita terapeutică. Prezentăm cazul unui pacient vârstnic, cu multiple comorbidități, care evidențiază dificultățile diagnostice şi complexitatea deciziei chirurgicale în condiții de urgență.
Prezentarea cazului: Un pacient în vârstă de 82 de ani, cu antecedente de fibrilație atrială, insuficiență cardiacă cronică (NYHA III) şi hipertensiune arterială, a fost internat în şoc septic şi cu disfuncție multiplă de organ, în contextul suspiciunii unei neoplazii gastrice. Examinarea prin tomografie computerizată a evidențiat embolie pulmonară bilaterală, tromboză de venă portă cu extensie la nivelul venei splenice, infarct splenic, revărsate pleurale bilaterale şi o formațiune tumorală gastrică cu aspecte sugestive pentru fistulă gastropericardică. Laparotomia exploratorie efectuată în urgență a evidențiat o formațiune tumorală voluminoasă localizată la nivelul micii curburi gastrice, complicată cu o fistulă gastropericardică şi revărsat pericardic purulent. S-au practicat fereastră pericardică, gastrectomie totală cu splenectomie şi eso-jejunostomie pe ansă în Y à la Roux, precum şi drenaj abdominal şi pleural. Examenul histopatologic a confirmat un adenocarcinom gastric slab diferențiat, cu invazie limfo-vasculară extensivă. În ciuda terapiei intensive maximale, pacientul a decedat în ziua a 8-a postoperator prin insuficiență cardiorespiratorie ireversibilă.
Concluzii: Acest caz ilustrează evoluția clinică severă a unui adenocarcinom gastric avansat complicat prin evenimente fistuloase şi tromboembolice. Chiar şi în condițiile unei intervenții chirurgicale prompte, prognosticul este extrem de nefavorabil odată cu instalarea disfuncției multiple de organ.

Cuvinte cheie: adenocarcinom gastric, fistulă gastropericardică, tromboză de venă portă, tromboembolism pulmonar

Received: 25.06.2026
Accepted: 24.09.2026

Abstract

Introduction: Gastropericardial fistula is an exceptionally rare and life-threatening

complication of gastric malignancy. Its association with extensive thromboembolic disease, including portal and splenic vein thrombosis, splenic infarction, and bilateral pulmonary embolism, further complicates diagnosis and management. We report a case highlighting the diagnostic challenges and emergency surgical decision-making in an elderly patient with significant comorbidities.

Case Presentation: An 82-year-old male with a history of atrial fibrillation, NYHA class III chronic heart failure and hypertension was admitted with septic shock and multi-organ dysfunction in the context of a suspected gastric malignancy. Computed tomography revealed bilateral pulmonary embolism, portal vein thrombosis extending into the splenic vein, splenic infarction, bilateral pleural effusions, and a gastric mass with findings highly suggestive of gastropericardial fistulization. Emergency exploratory laparotomy identified a large tumor along the lesser curvature, complicated by a gastropericardial fistula with purulent pericardial effusion. Pericardial window, total gastrectomy with splenectomy and Roux-en-Y esophagojejunostomy, along with abdominal and pleural drainage, was performed. Histopathological examination confirmed poorly differentiated gastric adenocarcinoma with extensive lymphovascular invasion. Despite maximal intensive care support, the patient died from irreversible cardiorespiratory failure on the 8th postoperative day.

Conclusions: This case illustrates the devastating clinical course of advanced gastric adenocarcinoma complicated by fistulous and thromboembolic events. Even with timely surgical intervention, prognosis is exceedingly poor once multi-organ failure has developed.

Keywords: gastric adenocarcinoma, gastropericardial fistula, portal vein thrombosis, pulmonary thromboembolism

Introduction

Gastric cancer remains one of the leading causes of cancer-related mortality worldwide, ranking fifth in incidence and fourth in cancer-related deaths globally (1). While locally advanced gastric tumors can invade adjacent structures including the pancreas, liver and transverse colon, fistulous communication between the stomach and the pericardial space represents an exceedingly rare and life-threatening complication (2).

Portal vein thrombosis and splenic vein thrombosis in the context of gastric malignancy are recognized but uncommon complications, occurring typically through direct venous invasion or a hypercoagulable paraneoplastic state (3).

The additional presence of bilateral pulmonary thromboembolism further aggravates the clinical picture and is associated with an unfavorable prognosis. In the present case, gastropericardial fistulization occurred in association with portal and splenic vein thrombosis, splenic infarction, bilateral pulmonary embolism, and septic shock, resulting in an exceptionally complex clinical presentation. Herein, we describe the diagnostic findings, emergency surgical management, and clinical outcome, with particular emphasis on the challenges of achieving adequate source control in a critically ill patient with advanced gastric malignancy.

Case Presentation

An 82-year-old male was admitted to the First Oncological Surgery Department, Regional Institute of Oncology Iaşi. Relevant past medical history included paroxysmal atrial fibrillation and flutter, ventricular tachycardia, NYHA class III chronic heart failure, grade I hypertension, secondary anemia. The patient was receiving chronic antiarrhythmic and cardiovascular therapy. The patient was transferred from a regional hospital with a primary diagnosis of septic shock and suspected gastric cancer. On admission, the patient was critically ill, presenting with altered consciousness, dyspnea, tachypnea, hypotension and tachycardia. He was immediately intubated and placed on mechanical ventilation with continuous sedation. Laboratory values revealed a severe systemic inflammatory response and organ dysfunction (*Table 1*).

Table 1. Laboratory findings

Parameter	Value	Unit
Serum creatinine	1.13	mg/dL
Hemoglobin	10.2	g/dL
White blood cell count	20,900	cells/ L
Platelet count	285,000	cells/ L
INR	1.44	-
Troponin I	0.49	ng/mL
Serum urea	47.73	mg/dL
NT-proBNP	17,101	pg/mL
Total bilirubin	1.44	mg/dL
Direct bilirubin	0.98	mg/dL
D-dimer	5.04	mg/L
aPTT	21.60	s
Albumin	1.91	g/dL
CRP	109.6	mg/L
AST	485.44	U/L
ALT	144.75	U/L

Computed tomography (CT) revealed acute bilateral pulmonary thromboembolism, involving the distal intermediate artery with extension into the inferior segmental branches bilaterally, with complete occlusion of the right inferior lobar branch and near-complete occlusion of the main segmental branch of the right lower lobe. In addition, portal vein thrombosis extending into the splenic vein, associated with acute splenic vein thrombosis and splenic infarction. A gastric mass measuring approximately 30 × 35 × 35 mm was noted along the lesser curvature, characterized by irregular margins and extraluminal extension, consistent with a neoplastic process. In close anatomical relationship to this lesion, there was loss of the normal fat plane between the gastric wall and the adjacent pericardium, along with the presence of a hypodense tract-like structure extending between the stomach and the pericardial space, highly suggestive of a gastropericardial fistula. These findings, together with the associated pericardial effusion, strongly suggested a tumor-associated gastropericardial fistula (*Fig. 1*). Bilateral pleural effusions were also present; however, no gastropleural fistula tract was identified on CT. The patient was receiving chronic oral anticoagulation for atrial fibrillation before admission. Following hospitalization, anticoagulation was switched to low-molecular-weight heparin in the context of the newly diagnosed bilateral pulmonary embolism and splanchnic venous thrombosis. The need for emergency major surgery required careful perioperative balancing of the substantial thromboembolic risk against the risk of surgical bleeding.

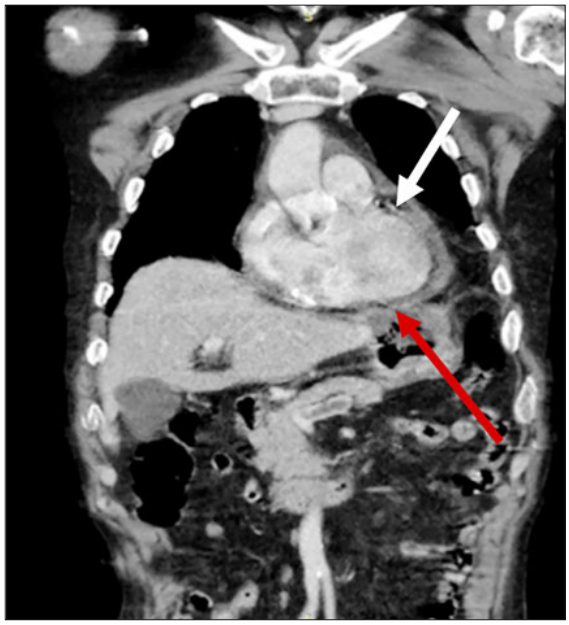


Figure 1. Contrast-enhanced CT demonstrating an irregular gastric mass along the lesser curvature with loss of the fat plane and a suspected fistulous tract extending toward the pericardium (red arrow), associated with pneumopericardium (white arrow) and bilateral pleural effusions.

Because the patient presented in septic shock requiring emergency surgery, there was no opportunity for preoperative multidisciplinary tumor board discussion.

The decision to proceed with emergency exploratory laparotomy was prompted by refractory septic shock and imaging findings strongly suggestive of an ongoing source of contamination related to a gastropericardial fistula. Intraoperatively, a 6–7 cm defect was identified on the anterior gastric wall, with its superior margin located approximately 2 cm below the cardia. A gastropericardial fistula measuring 1 cm was present, with drainage of 300–400 mL of purulent fluid from the pericardial cavity.

Given the patient's advanced age, severe cardiovascular comorbidities, bilateral pulmonary embolism and septic shock, several less invasive and staged therapeutic options were considered by the surgical team. However, conservative management, isolated drainage, or a damage-control approach were considered less likely to achieve adequate and sustained source control. In this setting, definitive resection was considered the most reliable means of achieving adequate source control. Total gastrectomy was required because the extent and location of the gastric involvement did not allow a limited resection with adequate control of the perforated malignant tissue, while splenectomy was performed in the setting of splenic vein thrombosis and splenic infarction. Although immediate reconstruction increased the complexity of the procedure, it was considered technically feasible following intraoperative assessment and was favored to avoid the need for a second major operation. Thus, after weighing the substantial operative risk against the limited likelihood of controlling the septic source by conservative or staged measures, the surgical team considered definitive resection with immediate Roux-en-Y reconstruction the most appropriate strategy.

The surgical procedure consisted of a total gastrectomy with splenectomy, Roux-en-Y esophagojejunostomy, Witzel feeding jejunostomy. A pericardial window of approximately 2 cm was created to facilitate adequate drainage and source control, pleural drainage and abdominal drainage.

Postoperative Course and ICU Management

Postoperatively, the patient was transferred to the intensive care unit in a critical condition, requiring

invasive mechanical ventilation, continuous sedation and vasopressor support. During the first 48 hours, partial hemodynamic stabilization was achieved under intensive supportive therapy; however, persistent systemic inflammatory response and progressive hepatic dysfunction with marked cytolysis became evident. Over the following days, the patient's condition progressively deteriorated, with worsening metabolic and lactic acidosis, acute kidney injury progressing to anuria, refractory atrial fibrillation with severe hemodynamic instability and increasing vasopressor requirements. Despite broad-spectrum antimicrobial therapy, advanced organ support, multiple organ dysfunction syndrome became irreversible. On postoperative day 8, the patient suffered refractory cardiorespiratory arrest and died despite maximal intensive care management.

Histopathological Results

Macroscopy

Total gastrectomy specimen, 19 cm along the large curvature and 7 cm at the small curvature. Esophageal fragment 0.2 cm. At the level of the anterior wall near the gastric corpus, a perforated area was identified, corresponding to an area of interrupted seroserosal continuity, with loss of approximately 7/5 cm substance and irregular margins (*Fig. 2*). The adipose hilar tissue presented a compact, whitish-yellow appearance with firm-elastic consistency.

Microscopy

Poorly differentiated high-grade gastric tubular adenocarcinoma, with ulcerative infiltrating pattern throughout the gastric wall, penetrating the serosa with wide invasion into the perigastric adipose tissue. Numerous intravascular tumor emboli identified. Of the 11 regional lymph nodes examined, two contained metastases. Histopathological examination of the splenic tissue demonstrated extrinsic tumor infiltration with invasion of the splenic parenchyma and intravascular tumor emboli. The final pathological stage was pT4b N1 L1 V1 Pn1.

Discussion

This case illustrates a rare and severe presentation of advanced gastric adenocarcinoma complicated by gastropericardial fistula, septic shock and extensive thromboembolic disease in an elderly patient with significant cardiovascular comorbidities.

Gastropericardial fistula is an uncommon complication of gastric pathology and is particularly rare in association with gastric malignancy. Its clinical presentation may be nonspecific, with chest pain, dyspnea, fever, or hemodynamic instability mimicking more common cardiopulmonary conditions and potentially delaying diagnosis (4). Although usually acute, smaller fistulas may have a more indolent course. Risk factors include hiatal hernia, malignancy and

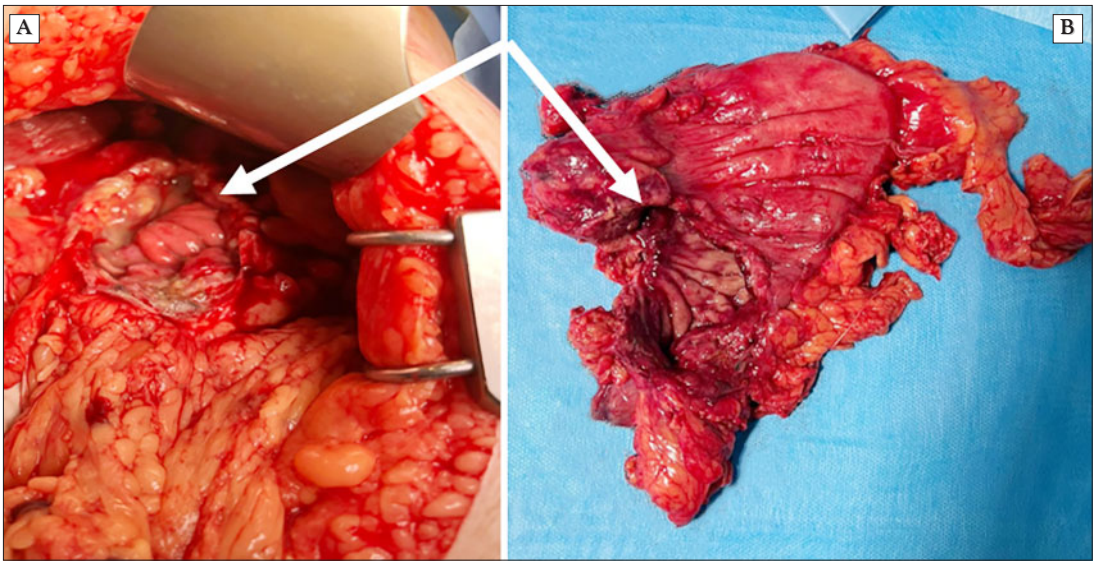


Figure 2. Intraoperative and gross pathological findings. **(A)** Site of gastric perforation visualized after opening the pericardium (arrow). **(B)** Corresponding perforation site identified on the total gastrectomy specimen (arrow).

prior chemotherapy or radiotherapy (5).

Gastropericardial fistula is most commonly associated with benign gastric pathology, while representing a rare complication of gastric malignancy. However, it may also occur in the setting of gastric ulceration, particularly in patients receiving VEGF inhibitors such as bevacizumab for specific malignancies. These fistulas often present with nonspecific symptoms, including chest pain, mimicking more common cardiopulmonary conditions and potentially delaying diagnosis (6). In this context, early recognition remains crucial, as delayed diagnosis may contribute to rapid clinical deterioration and a fatal outcome, as observed in our case. A review of reported cases highlights the pivotal role of imaging in diagnosis, with computed tomography representing the most reliable modality for detecting the fistulous tract and guiding management, while contrast studies and endoscopy may provide additional diagnostic and therapeutic value. Despite these advances, diagnosis may remain challenging, contributing to delays in management and poor clinical outcomes (7).

Carrasco Aguilera et al. described an 81-year-old patient with gastropericardial fistula presenting with symptoms suggestive of acute coronary syndrome. Following CT diagnosis, the patient underwent surgical treatment including a pericardial window and repair of the fistulous communication, with a favorable postoperative outcome (8).

Ahmed et al. described a patient with metastatic gastric cancer previously treated with chemotherapy and radiotherapy, who presented with severe chest pain, hypotension and inferior ST-segment elevation, initially mimicking acute myocardial infarction. CT subsequently revealed a large pneumopericardium and gastropericardial fistula. Emergency pericardiocentesis achieved hemodynamic stabilization; however, given the advanced unresectable malignancy, definitive surgical treatment was not pursued and palliative care was chosen (9).

The underlying mechanism typically involves transmural extension of the gastric lesion through the diaphragm into the pericardial space, leading to severe complications such as purulent pericarditis and cardiac tamponade, both associated with high mortality (10). In our case, the fistula was approximately 1 cm in diameter, externalizing purulent fluid, consistent with suppurative pericarditis secondary to fistulous gastrointestinal communication.

The patient's clinical status is a major determinant of the therapeutic strategy. In their systematic review of intrathoracic gastric fistulae, Shoar et al. emphasized the need for urgent intervention in septic or hemodynamically unstable patients, whereas clinically stable patients may benefit from a step-up approach incorporating endoscopic or other nonoperative strategies (11). These findings support an individualized approach based on the patient's physiological condition and the feasibility of achieving adequate source control.

Prognosis is strongly influenced by patient factors and etiology, with advanced age and malignant origin associated with poorer outcomes. Although available evidence suggests that definitive surgical management may improve outcomes in selected patients (12), the unfavorable evolution observed in our patient underscores the severe prognosis when multi-organ dysfunction is already established.

Beyond conventional surgical or conservative strategies, recent reports have highlighted the potential role of a multidisciplinary, staged approach in selected patients. Sypniewski et al. reported successful management of a gastropericardial fistula using initial pericardial drainage and temporary endoscopic stenting to control ongoing contamination, followed by definitive robotic video-assisted thoracoscopic intervention with pericardial washout, fistula repair, and drainage (4). This approach illustrates how endoscopic and minimally invasive surgical techniques may complement each other when the patient's clinical condition allows staged management.

In recurrent or complex fistulae, more extensive surgical strategies may be required; Pong et al. reported successful treatment combining fistula takedown and gastric resection with omental flap interposition, emphasizing the importance of definitive source control and reinforcement of the repair (13).

Published experience also illustrates the importance of the patient's clinical status at diagnosis in determining the feasibility of definitive treatment. Dhillon et al. reported successful management of a post-Roux-en-Y gastropericardial fistula by total gastrectomy through a thoracoabdominal approach, achieving definitive control of the gastrointestinal source and subsequent recovery (14). In contrast, Bing et al. described a late gastropericardial fistula occurring 15 years after Roux-en-Y gastric bypass, confirmed by CT with oral contrast demonstrating communication with the pericardial space. Progressive hemodynamic and respiratory deterioration precluded definitive surgical intervention, and the patient subsequently died (15). These contrasting outcomes highlight the importance of early diagnosis and timely source control before severe physiological deterioration limits therapeutic options.

Katouzi et al. reported a gastropericardial fistula 30 years after partial gastrectomy, diagnosed by CT showing pneumopericardium with an air-fluid level and communication between the gastric remnant and

pericardial space. Despite pericardial drainage and antimicrobial therapy, definitive source control was not pursued because the patient declined further invasive intervention, and the patient subsequently died from septic shock (16). This case further emphasizes that pericardial drainage and antimicrobial therapy alone may be insufficient when persistent gastrointestinal contamination remains uncontrolled, highlighting the importance of definitive source control whenever feasible.

In contrast, the severe clinical condition of our patient, characterized by septic shock, active purulent pericardial contamination, and established multiple organ dysfunction, precluded a staged approach and required immediate surgical source control. Because the malignant gastric perforation represented an ongoing source of contamination, isolated pericardial drainage was considered unlikely to provide adequate source control. Therefore, evacuation of the infected pericardial contents and creation of a pericardial window were combined with total gastrectomy and splenectomy during the same emergency procedure. The decision aligned with the principle that source control is paramount in septic shock management, even in high-risk surgical candidates (17). The histopathological findings confirmed poorly differentiated gastric adenocarcinoma (pT4b N1 L1 V1 Pn1) with splenic involvement.

The thromboembolic component further increased the complexity of the present case. Cancer is a major risk factor for thrombosis through multiple mechanisms, including tumor-related procoagulant activity, inflammatory cytokine release, endothelial injury, venous stasis and direct vascular invasion (18). In our patient, splenic vein thrombosis was associated with splenic infarction, while histopathological examination demonstrated extensive lymphovascular invasion, supporting the aggressive biological behavior of the malignancy.

Venous thromboembolism is a recognized complication of advanced gastric cancer and has been associated with poorer survival, particularly when diagnosed concurrently with the underlying malignancy (19,20). In our patient, portal vein thrombosis extended into the splenic vein and was associated with splenic infarction, while bilateral pulmonary thromboembolism was simultaneously present.

Despite emergency surgical source control, the postoperative course was characterized by progressive multiple organ dysfunction. Following an initial period of partial hemodynamic stabilization, persistent systemic inflammation was accompanied by progressive hepatic, renal, cardiovascular, and metabolic dysfunction, ultimately resulting in irreversible multi-organ failure and cardiorespiratory arrest on postoperative day 8.

The extensive thromboembolic involvement further increased the complexity of the present case. Although gastropericardial fistula associated with gastric adenocarcinoma has previously been reported, its occurrence in a patient simultaneously presenting with splenic vein thrombosis, splenic infarction, bilateral pulmonary thromboembolism, septic shock and severe cardiovascular comorbidities created an exceptionally challenging therapeutic scenario.

Conclusions

We report a rare and fatal presentation of advanced gastric adenocarcinoma complicated by gastropericardial fistula, splenic vein thrombosis with splenic infarction, and bilateral pulmonary thromboembolism. In the presence of septic shock and ongoing pericardial contamination, emergency surgery was undertaken to achieve definitive source control. Despite radical surgical treatment and intensive care support, the patient's advanced malignancy, severe cardiovascular comorbidities, and established organ dysfunction contributed to the fatal outcome. This case highlights the importance of early recognition of gastropericardial fistulization and the challenges of surgical decision-making in critically ill patients with advanced gastric malignancy.

Conflicts of Interest

The authors declare no conflicts of interest

Funding

This research received no external funding

Institutional Review Board Statement

The publication of this case report was approved by the Clinical Research Ethics Committee of the Regional Institute of Oncology Iaşi, Romania (Approval No. 417, 8 October 2026).

References

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, et al. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA Cancer J Clin. 2021;71(3):209-49.
2. Grandhi TM, Rawlings D, Morran CG. Gastropericardial fistula: a case report and review of literature. Emerg Med J. 2004;21(5):644-5.
3. Valla DC, Condat B. Portal vein thrombosis in adults: pathophysiology, pathogenesis and management. J Hepatol. 2000;32(5):865-71.
4. Sypniewski J, Kelley JK, Fritz GD, Lam G, Zolotarevsky E. Heartburn Takes a Whole New Meaning: Multidisciplinary Management of a Gastropericardial Fistula. Case Rep Surg.

2026;2026:5597348.
5. Baka N, Batra V, Yeung V, Lin S. Diagnosis and Management of Gastro-pleural Fistula in Metastatic Malignancy. Cureus. 2019;11(4):e4455.
6. Rathur A, Al-Mohamad H, Steinhoff J, Walsh R. Chest Pain from Pneumopericardium with Gastropericardial Fistula. Case Rep Cardiol. 2021;2021:5143608.
7. Davidson JP, Connelly TM, Libove E, Tappouni R. Gastropericardial fistula: radiologic findings and literature review. J Surg Res. 2016;203(1):174-82.
8. Carrasco Aguilera B, Del Val Ruiz P, Sanz Álvarez L, Cadenas Fernández F, Martínez-Cachero García M. Gastropericardial fistula: A successfully operated heart code. Radiologia (Engl Ed). 2024;66(3):278-81.
9. Ahmed A, Neupane N, Rai D, Hall C. An Unusual Case of ST-Elevation Myocardial Infarction (STEMI) Mimicker: Pneumopericardium Secondary to Gastro-Pericardial Fistula. Cureus. 2023;15(5):e39358.
10. Tang CP, Wang YW, Shiau YT, Lee RC, Lan KH, Chao Y. Gastropericardial fistula and Candida albicans pericarditis: a rare complication of gastric adenocarcinoma treated with radiation and chemotherapy. J Chin Med Assoc. 2009;72(7):374-8.
11. Shoar S, Hosseini FS, Gulraiz A, Ikram W, Javed M, Naderan M, et al. Intrathoracic gastric fistula after bariatric surgery: a systematic review and pooled analysis. Surg Obes Relat Dis. 2021;17(3):630-43.
12. Azzu V. Gastropericardial fistula: getting to the heart of the matter. BMC Gastroenterol. 2016;16(1):96.
13. Pong S, Downton Ramos H, Van Backer J. Recurrent Gastropericardial Fistula: A Case Report. Cureus. 2025;17(4):e82507.
14. Dhillon A, Eltweri AM, Shah V, Bowrey DJ. Gastropericardial fistula after Roux-en-Y bypass for reflux disease. BMJ Case Rep. 2015;2015.
15. Bing EM, Skogsburg A, Hayes D. Gastropericardial fistula as a late complication of Roux-en-Y procedure. J Surg Case Rep. 2024;2024(8):rjae491.
16. Katouzi P, Akbarian Khorasgani M, Khalifeh Hadi M, Taha Burhanpurwala A, Li C, Ma J. Purulent Pneumopericardium From a Gastropericardial Fistula 30 Years After Gastrectomy. JACC Case Rep. 2026;31(17):107348.
17. Evans L, Rhodes A, Alhazzani W, Antonelli M, Coopersmith CM, French C, et al. Surviving sepsis campaign: international guidelines for management of sepsis and septic shock 2021. Intensive Care Med. 2021;47(11):1181-247.
18. Regnault H, Emambux S, Lecomte T, Doat S, Dhooge M, Besson M, et al. Clinical outcome of portal vein thrombosis in patients with digestive cancers: A large AGEO multicenter study. Dig Liver Dis. 2018;50(3):285-90.
19. Kang MJ, Ryoo BY, Ryu MH, Koo DH, Chang HM, Lee JL, et al. Venous thromboembolism (VTE) in patients with advanced gastric cancer: an Asian experience. Eur J Cancer. 2012;48(4):492-500.
20. Eom BW, Lee JH, Lee JS, Kim MJ, Ryu KW, Choi IJ, et al. Survival analysis of gastric cancer patients with tumor thrombus in the portal vein. J Surg Oncol. 2012;105(3):310-5.