KLİNİKİ MÜŞAHİDƏ AÇIQ GİRİŞ (OPEN ACCESS)

EXUDATIVE-CONSTRICTIVE PERICARDITIS ASSOCIATED WITH ESOPHAGEAL CARCINOMA: A RARE CAUSE OF DYSPNEA WITH PNEUMOPERICARDIUM

Anar Karimkhanov [1]; Shahana Alasgarli[1]; Matin Hadizada[2], Gulay Mammadova[1]

1 Yeni Klinika, Cardiology Department, 2 Cardiovascular surgery department
anarkerimxanov7000@gmail.com

ABSTRACT

Exudative-constrictive pericarditis is an uncommon pericardial syndrome in which pericardial effusion coexists with a non-compliant, thickened pericardium, producing a hybrid hemodynamic picture that combines features of tamponade and constriction. Malignancy-related pericardial disease is well recognized, but an exudative-constrictive process arising in association with esophageal carcinoma, together with radiologic evidence of pneumopericardium, is exceedingly rare and raises the possibility of direct tumor invasion or an esophago-pericardial fistula. We report the case of a 73-year-old woman with a two-year history of esophageal carcinoma treated with esophageal stenting who presented with progressive exertional dyspnea and clinical signs of pericardial constriction. Physical examination, laboratory testing, echocardiography, and cardiac magnetic resonance imaging established the diagnosis of exudative-constrictive pericarditis with an associated septal bounce, while chest computed tomography additionally demonstrated intrapericardial air. The patient was managed with a multidisciplinary medical and surgical approach, including pericardiectomy, coordinated with the oncology team. The case highlights the diagnostic value of multimodality imaging and a systematic clinical work-up in unmasking a rare, potentially life-threatening cause of dyspnea in a patient with known esophageal malignancy.

Keywords: exudative-constrictive pericarditis, esophageal carcinoma, pneumopericardium, septal bounce, pulsus paradoxus, pericardiectomy

Introduction

Pericardial disease encompasses a broad spectrum of conditions with heterogeneous etiologies, and it can occasionally present with unusual or overlapping phenotypes. Exudative-constrictive pericarditis is one such hybrid entity, characterized simultaneously by pericardial fluid accumulation and by a stiffened, poorly compliant pericardium that impairs diastolic filling [1,2]. This combination poses particular diagnostic and therapeutic challenges, since the coexistence of effusive and constrictive physiology can mask or mimic other cardiac and non-cardiac conditions [3].

When exudative-constrictive pericarditis develops in the setting of malignancy, it is even less common, and its occurrence in association with esophageal carcinoma is rarely reported [4]. Esophageal cancer may involve the pericardium either through direct local invasion or through the formation of an esophago-pericardial fistula, both of which can result in constrictive remodeling of the pericardium [6-9]. The additional finding of intrapericardial air is highly atypical and should prompt consideration of a communicating tract between the esophagus and the pericardial space or of another superimposed pathological process [6,7,10]. We present a case that is notable both for its rare oncologic etiology and for the unusual clinical

Azərbaycan Kardiologiya Cəmiyyəti

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and imaging findings that guided its diagnosis and management.

Case report

A 73-year-old woman with a two-year history of esophageal carcinoma, previously managed with endoscopic esophageal stent placement and maintained under regular oncologic follow-up, presented to the cardiology outpatient clinic with progressively worsening dyspnea and a sensation of choking. Symptoms were most pronounced during physical exertion, although they were also reported at rest in some episodes.

Physical examination

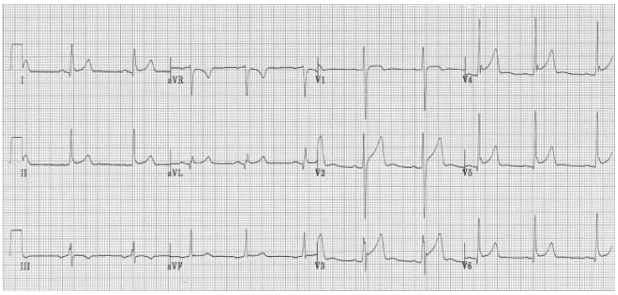
On presentation, the patient was hypotensive (blood pressure 90/70 mmHg), with a regular pulse of 93 beats per minute, oxygen saturation of 94% on room air, a temperature of 37.0 °C, and a respiratory rate of 19 breaths per minute. General inspection revealed jugular venous distension, peripheral edema, and pallor with generalized weakness. Palpation demonstrated hepatomegaly and epigastric tenderness. Percussion disclosed widened cardiac dullness together with findings suggestive of pleural effusion. On auscultation, heart sounds were muffled without a pericardial friction rub, and bilateral basal crackles were present.

The clinical picture was notable for Beck's triad — hypotension, jugular venous distension, and muffled heart sounds — together with a positive Kussmaul's sign (a paradoxical rise in jugular venous pressure on inspiration, characteristic of constrictive pericarditis) and pulsus paradoxus exceeding 10 mmHg [11]. These findings, taken together, were highly suggestive of a pericardial process with a constrictive component and prompted urgent further cardiac evaluation.

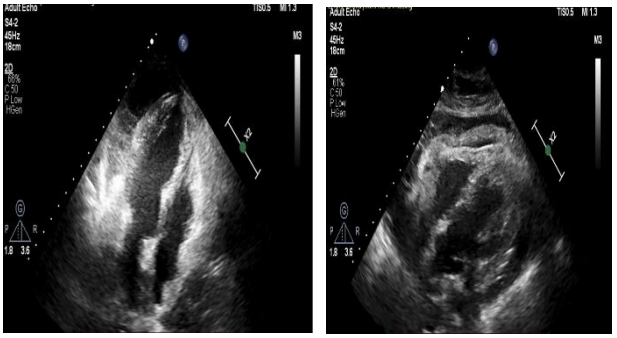
Initial electrocardiographic and laboratory evaluation

The initial electrocardiogram demonstrated ST-segment elevation in several leads, which initially raised concern for an acute coronary syndrome. However, the overall clinical picture and subsequent investigations, including a negative troponin, were not consistent with acute myocardial ischemia, and coronary angiography was undertaken to exclude significant obstructive coronary artery disease as the driver of the presentation.

Picture 1: ST-segment elevation in several leads on the ECG



Picture 2: Transthoracic echocardiography demonstrating pericardial effusion and septal bounce.



Laboratory investigations are summarized in Table 1. Leukocytosis and a markedly elevated C-reactive protein indicated an active inflammatory process involving the pericardium, while a negative troponin argued against acute myocardial infarction and supported a pericardial origin for the electrocardiographic changes. NT-proBNP was substantially elevated, consistent with the hemodynamic burden imposed by pericardial constriction, and normocytic anemia was attributed to anemia of chronic disease in the context of the underlying malignancy.

Table 1. Laboratory findings on admission.

Parameter	Result	Reference range
Leukocyte count	17.16 × 10^9/L ↑	4.5–11.0 × 10^9/L
Hemoglobin	9.3 g/dL ↓	12.0–16.0 g/dL
Platelet count	380 × 10^9/L	150–400 × 10^9/L

Parameter	Result	Reference range
C-reactive protein	193 mg/L ↑	< 5.0 mg/L
Creatinine	1.1 mg/dL	0.6–1.2 mg/dL
AST / ALT	38 / 41 U/L	< 40 / < 56 U/L
INR	1.09	0.8–1.2
Troponin	Negative	Negative
NT-proBNP	1623 pg/mL ↑	< 125 pg/mL

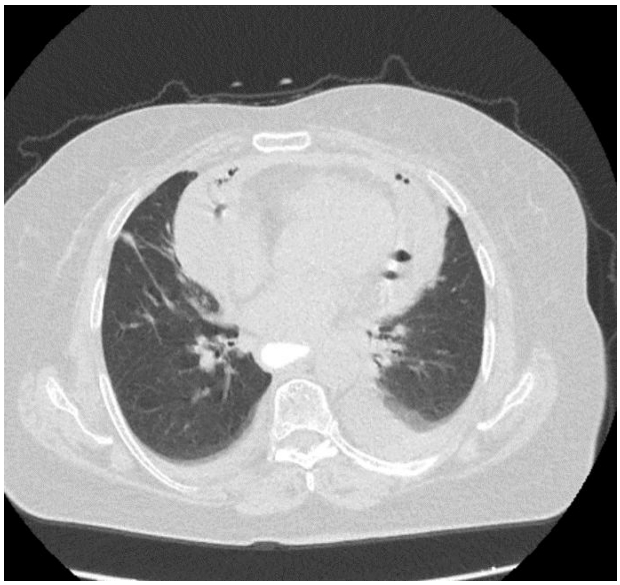
Diagnostic workup

Transthoracic echocardiography identified an exudative-type pericardial effusion surrounding the posterior and lateral walls of the heart, together with paradoxical interventricular septal motion — a septal bounce — a finding that increased suspicion for an underlying constrictive pericardial process.

To further characterize the pericardial pathology, cardiac magnetic resonance imaging was performed, which confirmed the diagnosis of constrictive pericardial disease, demonstrating pericardial thickening together with concomitant effusion and fibrotic change. Chest computed tomography, obtained earlier in the diagnostic pathway, had already revealed the presence of air within the pericardial space. This finding of pneumopericardium was considered highly atypical and raised concern for a pathological communication between the esophagus and the pericardium, or for direct tumoral invasion of the pericardial space; other rare underlying mechanisms were also considered.

Integration of the clinical history, physical examination, laboratory results, echocardiographic findings, cardiac MRI, and CT imaging supported a diagnosis of exudative-constrictive pericarditis related to esophageal carcinoma. The case illustrated that no single imaging modality was sufficient in isolation, and that an accurate diagnosis was only reached through the combined, stepwise use of electrocardiography, echocardiography, CT, and cardiac MRI.

Picture 3: Chest computed tomography demonstrating intrapericardial air (pneumopericardium).



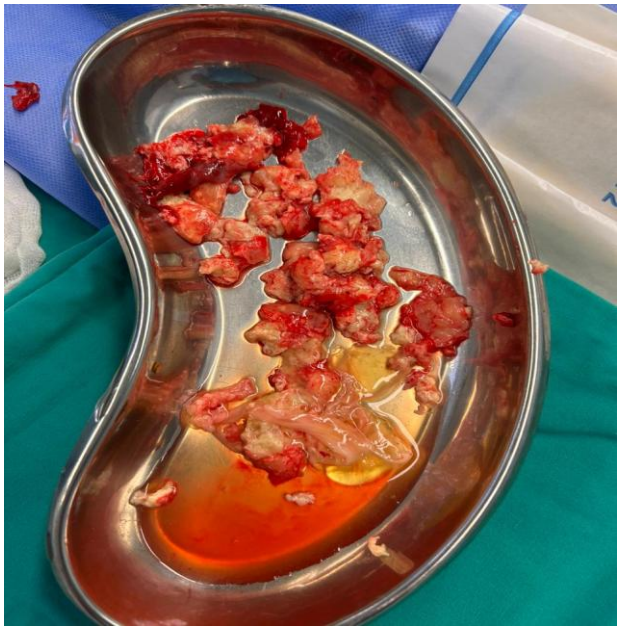
Diagnosis and management

The final diagnosis was exudative-constrictive pericarditis related to esophageal carcinoma. Initial medical management targeted the inflammatory pericardial process and its hemodynamic and infectious complications. This included colchicine (1 g once daily) and ibuprofen (400 mg three times daily) for anti-inflammatory control of the pericarditis, together with pantoprazole (40 mg once daily) for gastric protection. Empiric intravenous antibiotic therapy was started with vancomycin (1 g once daily) from day 1 to day 4, after which therapy was switched to teicoplanin (400 mg once daily) based on clinical assessment. Rate control was achieved with metoprolol (25 mg twice daily), and volume status was managed with furosemide (20 mg three times daily) and spironolactone (25 mg once daily), while enoxaparin (0.6 mL twice daily) was administered for thromboprophylaxis.

Given the constrictive component of the disease and the underlying malignant etiology, a multidisciplinary approach was adopted, including consultation with cardiothoracic surgery, coordinated with the patient's oncology team, in line with current recommendations for the management of pericardial disease [1]. Surgical

pericardiectomy (pericardial stripping) was performed as the definitive intervention to relieve pericardial constriction and restore hemodynamic function [1,5]. Postoperative echocardiography demonstrated resolution of the pericardial effusion and improvement in the patient's hemodynamic status, with corresponding clinical improvement in dyspnea.

Picture 4: Pericardial mass removed after pericardiectomy



Discussion

Exudative-constrictive pericarditis is a rare and diagnostically challenging pericardial syndrome [2,3]. Its occurrence in the setting of malignancy, and specifically in association with esophageal carcinoma, is even less frequently described in the literature [4,5]. In the present case, the simultaneous presence of pericardial fluid accumulation and constrictive physiology — supported by classic bedside findings including Beck's triad, Kussmaul's sign, and pulsus paradoxus — reflects the complexity of the underlying disease process and underscores the continued diagnostic value of careful physical examination even in the era of advanced imaging [11].

The detection of intrapericardial air constitutes one of the most unusual aspects of this case. Such a finding suggests either the presence of an esophago-pericardial fistula or invasive tumoral extension into the pericardial space, both of which have previously been reported as rare complications of esophageal and gastroesophageal junction malignancy, including in association with esophageal stenting [6-10]. In scenarios such as this, an accurate diagnosis is rarely achievable with a single imaging modality; rather, it requires the combined use of several complementary techniques, including echocardiography, cardiac MRI, and CT, alongside a systematic laboratory work-up to exclude alternative or concurrent processes such as acute coronary syndrome or infection.

This case illustrates that nonspecific symptoms such as dyspnea and chest discomfort may conceal rare but potentially life-threatening pathology, particularly in oncologic patients. In this population, such symptoms warrant broad diagnostic consideration rather than attribution to more common causes alone. Surgical management, specifically pericardiectomy, plays a central therapeutic role in relieving constrictive physiology and improving hemodynamic status in affected patients, and outcomes are optimized when medical therapy, surgical intervention, and oncologic care are coordinated within a multidisciplinary framework [1,5].

Conclusions

This case underscores the importance of considering exudative-constrictive pericarditis as a rare but serious complication of malignancy, including esophageal carcinoma. The identification of pneumopericardium in this context should prompt evaluation for an esophago-pericardial fistula or direct tumor invasion. A systematic clinical evaluation — combining careful bedside examination for signs of pericardial constriction, targeted laboratory testing, and multimodality cardiac imaging — is essential for establishing an accurate diagnosis in such complex presentations, and early multidisciplinary involvement, including cardiothoracic surgery and oncology, is important for guiding definitive management.

Figure Legend

Figure Figure 2: Chest computed tomography demonstrating intrapericardial air (pneumopericardium).

Figure 3: Cardiac magnetic resonance imaging confirming exudative-constrictive pericarditis.

Learning points

- In oncology patients, nonspecific symptoms such as dyspnea and chest discomfort should be evaluated broadly, since they may conceal rare but life-threatening pericardial pathology such as exudative-constrictive pericarditis.
- Classic bedside signs of pericardial constriction — Beck's triad, Kussmaul's sign, and pulsus paradoxus — retain important diagnostic value and should prompt urgent further cardiac evaluation.
- Intrapericardial air is an unusual finding that should raise suspicion for an esophago-pericardial fistula or direct tumor invasion, and warrants prompt further evaluation.
- Multimodality imaging — echocardiography, cardiac MRI, and CT — together with laboratory work-up, plays a central role in establishing the diagnosis in complex pericardial presentations of this kind.
- Management is optimized through a multidisciplinary approach combining targeted medical therapy, pericardiectomy, and coordinated oncologic care.

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