

Effusion and coin shadow: is there a relation?

A case report

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Background

Malignant pericardial effusion is a common consequence of various types of cancer. The diagnosis of cardiac tamponade in malignant effusion may be challenging, as the typical echocardiographic signs are not met. Patients with cancer can present with cardiac tamponade in form of tachycardia (rather than hypotension) that improves after pericardiocentesis.

Case summary

A 70-year-old female patient presented to the emergency department with rapid development of shortness of breath over a week. Her past medical history included oesophageal carcinoma 1 year before presentation. This was complicated by dysphagia for which the patient underwent oesophageal stenting 5 months before admission. On admission, the patient was in respiratory distress, tachycardia; however, she was normotensive. Echocardiography revealed massive circumferential pericardial effusion. Apart from significant respiratory variation in mitral and tricuspid inflow, the echocardiographic features of tamponade were absent. We discuss on how we applied European Society of Cardiology guidelines in order to calculate the pericardiocentesis score and make a firm management plan. Despite that the patient was normotensive, the pericardiocentesis score was 13.5, so urgent pericardiocentesis was done followed by immediate improvement.

Discussion

This case demonstrates that oncology patients can present with tamponade in the form of tachycardia rather than hypotension as the slow course of effusion formation allows the body to compensate by increasing the heart rate and peripheral vascular resistance, thus maintaining the blood pressure. The application of 'pericardiocentesis score' is very helpful in such patients. Score equal or greater than 6 necessitates urgent pericardiocentesis even if the blood pressure is normal.

Keywords

Pericardial effusion • Malignant • Tamponade • Case report

Learning points

- Malignant pericardial effusion can present with normotensive tamponade.
- Pericardiocentesis score can help to select the appropriate therapy in such cases.
- Oesophageal stent is one of differential diagnosis of mass behind left atrium.

Introduction

Cardiac tamponade is a life-threatening medical scenario that necessitates urgent treatment. The diagnosis of tamponade is mainly a clinical diagnosis using the classic Beck's triad of hypotension, distended neck veins, and distant heart sounds.¹ However, in chronic pericardial effusion, reviews demonstrate that hypotension is only present in 14–36% of patients with proven tamponade.²

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Timeline

September 2017	Complaints of progressive dysphagia associated with anorexia and weight loss, diagnosed as oesophageal carcinoma
April 2018	Oesophageal stenting as a palliative treatment for dysphagia
September 2018	Progressive shortness of breath over a week Transthoracic echocardiography showed massive pericardial effusion without evidence of either clinical or echocardiographic tamponade

Case presentation

A 70-year-old female patient presented to the emergency department with rapidly progressive shortness of breath over a week. Her past medical history included significant weight loss, dysphagia, and anorexia 1 year prior to admission which was diagnosed as oesophageal carcinoma which was treated by oesophageal stenting 5 months prior to admission. On admission, the patient was in moderate distress with the following vital signs: blood pressure 130/80 mmHg, pulse: 130 b.p.m., temperature 37°C, and respiratory rate 25 b.p.m. Precordial examination revealed distant heart sounds. Chest examination revealed bilateral diminished air entry over both lung bases. Electrocardiogram

demonstrated sinus tachycardia with premature atrial contractions (PACs), low voltage, and subtle electrical alternans (Figure 1).

As a first line imaging modality, we selected a transthoracic echocardiogram which demonstrated a metallic shadow behind the left atrium (oesophageal stent) (Figure 2, [Supplementary material online, Movie S1](#), Figure 3, [Supplementary material online, Movie S2](#)). It also revealed a massive circumferential pericardial effusion (that was mainly posterior and lateral and measured 3 cm and 2.8 cm, respectively) as well as large left pleural effusion (Figure 2, [Supplementary material online, Movie S1](#)). The inferior vena cava (IVC) was dilated (2.6 cm) and it did not show adequate inspiratory collapse (Figure 4). Apart from significant respiratory variation in mitral and tricuspid inflow (Figures 5 and 6), the echocardiographic features of tamponade were absent. We decided to apply the triage chart proposed by the European Society of Cardiology Working Group on myocardial and pericardial diseases to calculate the pericardiocentesis score. Despite that the patient was normotensive, the pericardiocentesis score was 13.5 (Table 1).

So urgent pericardiocentesis was performed with tapping of about 500 mL haemorrhagic fluid followed by immediate and marked improvement of symptoms and tachycardia (heart rate dropped to 100). Then, the patient was referred for pleuropericardial window.

Discussion

The diagnosis of tamponade is mainly a clinical diagnosis using the classic Beck's triad of hypotension, distended neck veins, and distant heart sounds.¹ However, in chronic pericardial effusion, reviews



Figure 1 Electrocardiogram showing sinus tachycardia with premature atrial contractions (PACs), low voltage, and subtle electrical alternans.

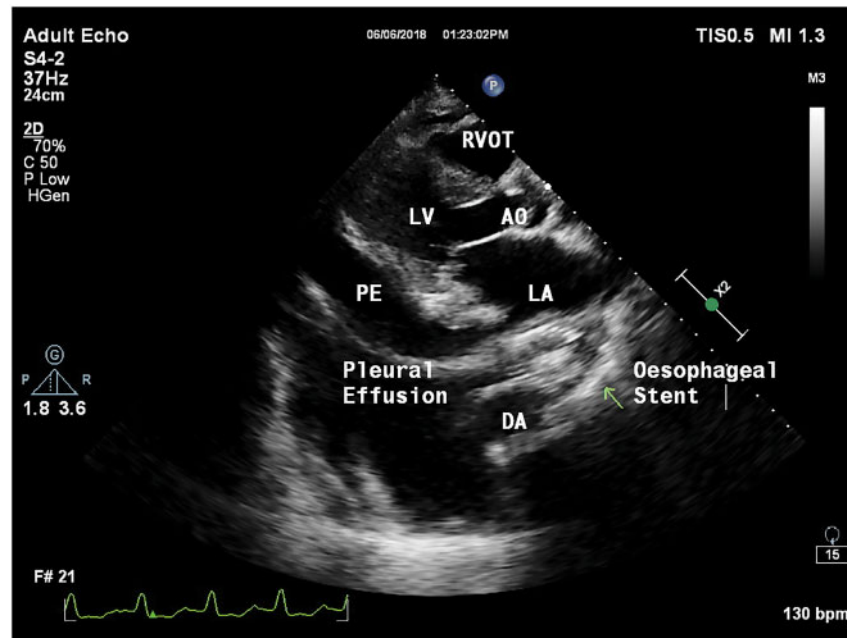


Figure 2 Parasternal long-axis view showing both pleural and pericardial effusion with metallic shadow behind the left atrium (oesophageal stent).

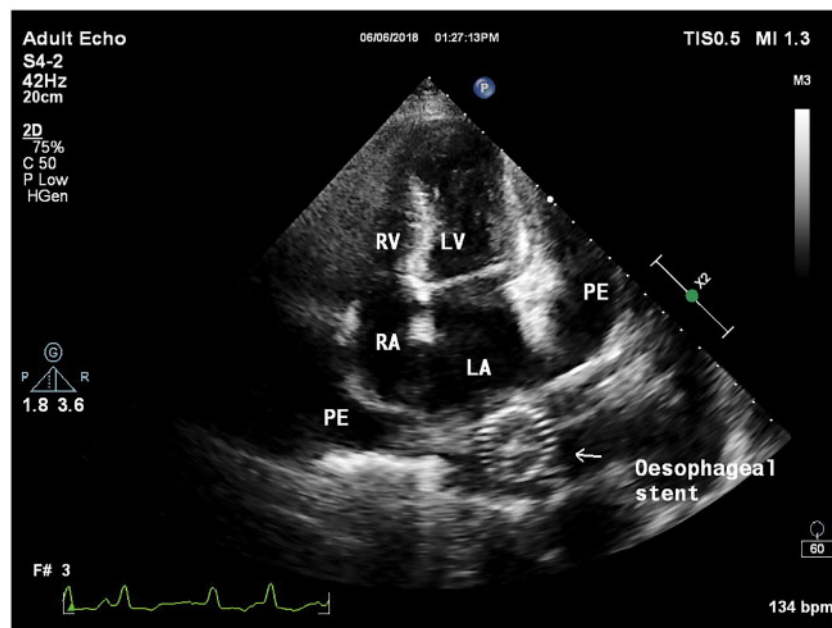


Figure 3 Apical four-chamber view showing oesophageal stent behind the left atrium.

show that hypotension is only present in 14–36% of patients with proven tamponade.² The relatively slow accumulation of pericardial fluid in such cases allows the compensatory mechanisms to maintain a stable blood pressure during the early stages. The body compensates for elevated intrapericardial pressure with pericardial

stretching, tachycardia, increased systolic emptying, and peripheral vascular resistance.³ This balance can maintain the patient's blood pressure until the tamponade reaches a critical point when the patient can acutely decompensate into haemodynamic instability. This scenario is especially common in malignant pericardial effusion, since

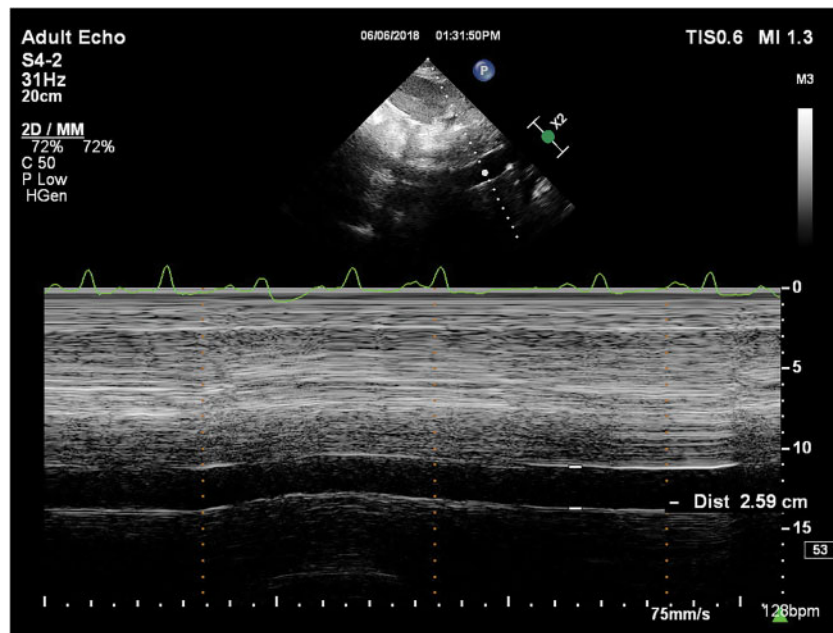


Figure 4 Subcostal view showing dilated inferior vena cava with inadequate inspiratory collapse.

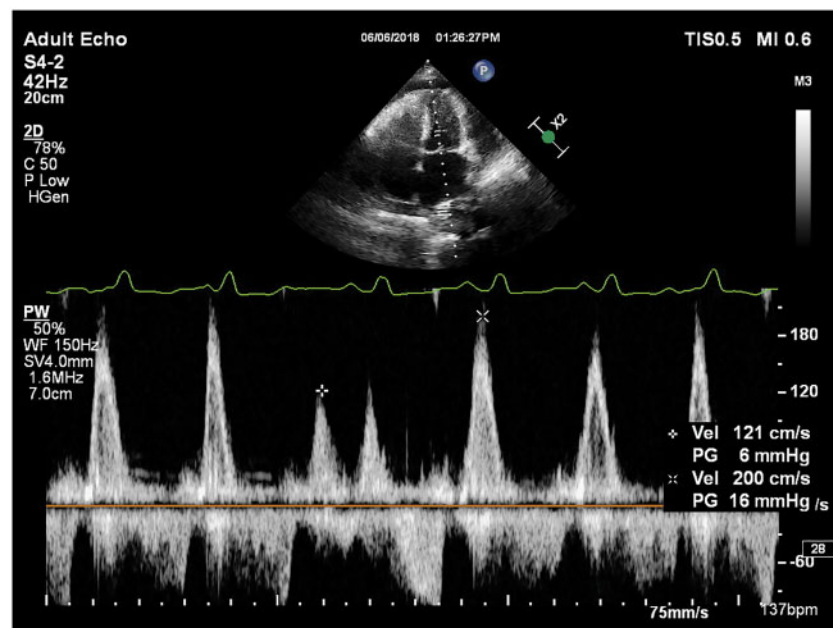


Figure 5 Doppler mitral inflow showing significant respiratory variations.

cancer is one of the leading causes of chronic pericardial effusion with high mortality.^{1,2,4-6} The effusion can result from direct extension of the tumour, metastatic spread, or even secondary to cancer treatment.⁴ Therefore, it is important to be aware that normotension

does not exclude tamponade. Echocardiography can provide more sensitive ultrasound findings, including right-sided chambers collapse, full IVC, and respiratory variation of cardiac output (sonographic 'pulsus paradoxus').⁵ The application of 'pericardiocentesis score' will

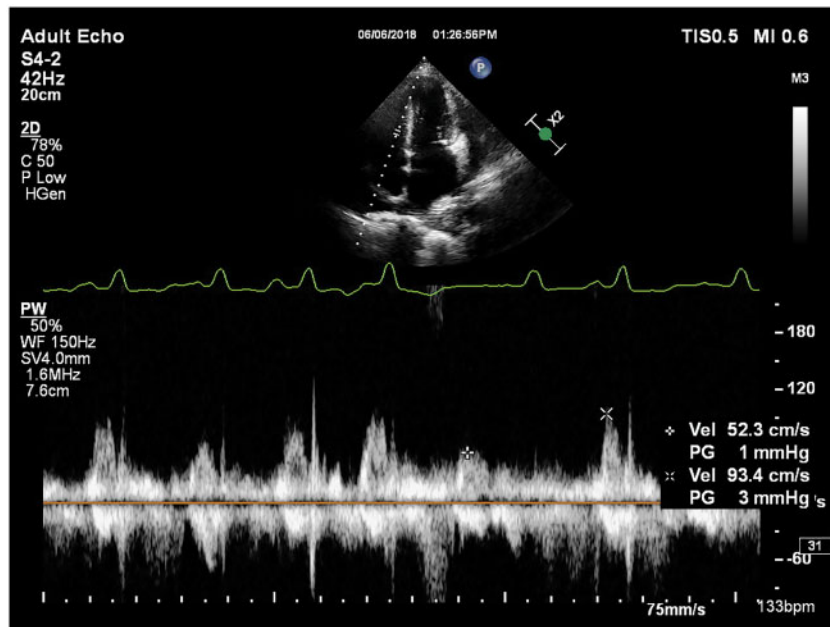


Figure 6 Doppler tricuspid inflow showing significant respiratory variations.

Table 1 Pericardiocentesis score

Item	Score
Malignant disease	2
Dyspnoea/tachypnoea	1
Progressive sinus tachycardia	1
Progressive worsening of symptoms	2
Cardiomegaly in chest X-ray	1
Microvoltage in electrocardiogram	1
Circumferential effusion more than 2 cm in diastole	3
Mitral/tricuspid respiratory flow variation	1
Inferior vena cava more than 2.5 cm and less than 50% inspiratory collapse	1.5
Total score	13.5

also help in decision making especially for the normotensive patients who do not fulfil the classic Beck's triad.⁷

The classic differential diagnosis for mass behind left atrium includes descending aortic aneurysm, hiatus hernia, hydatid cyst, and dilated coronary sinus. The clinical context of this case added a new differential diagnosis which is oesophageal stent.

Conclusion

Oncology patients can present with tamponade in form of tachycardia rather than hypotension as the slow fluid accumulation allows the body to compensate by increasing the heart rate and peripheral vascular

resistance, so they are presenting with tachycardia and preserved blood pressure. The application of 'pericardiocentesis score' is very helpful in such patients. Score equal to or more than 6 necessitates urgent pericardiocentesis even if the blood pressure is normal. Increasing the awareness about the 'normotensive tamponade' and the pericardiocentesis score especially for the young doctors will help in saving more lives.

Lead author biography



Ahmed Mohsen Mohamed was born in Cairo, Egypt in 1985. He graduated from Faculty of Medicine, Cairo University in 2008. He worked as cardiology resident from 2010 to 2013 in Department of Cardiovascular Medicine, Kasr Al Ainy Hospital. He got master's degree in Cardiology in 2014. Currently, he is working as assistant lecturer

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Supplementary material

[Supplementary material](#) is available at *European Heart Journal - Case Reports* online.

Slide sets: A fully edited slide set detailing this case and suitable for local presentation is available online as [Supplementary data](#).

Consent: The author/s confirm that written consent for submission and publication of this case report including image(s) and associated text has been obtained from the patient in line with COPE guidance.

Conflict of interest: none declared.

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