

A very rare complication of subacute pericarditis: a case report of spontaneous coronary artery rupture

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Background

Spontaneous coronary artery rupture (SCAR) is an extremely rare and highly lethal disease.

Case summary

A 74-year-old man who had undergone respiratory surgery (robot-assisted thoracoscopic surgery) presented with exertional dyspnoea since postoperative day (POD) 6. Echocardiography and contrast-enhanced computed tomography showed diffuse pericardial effusion, and a 12-lead electrocardiogram showed widespread concave ST-segment elevation. The diagnosis of acute pericarditis was made based on the absence of significant elevation of cardiac enzymes and the presence of elevated C-reactive peptide levels. The patient was started on anti-inflammatory medication, including steroids; however, on POD 11, the patient developed a sudden cardiopulmonary arrest due to cardiac tamponade. Extracorporeal cardiopulmonary resuscitation was performed, and an emergency coronary angiography showed contrast extravasation from the left anterior descending artery to the epicardium. He was diagnosed with SCAR and underwent transcatheter arterial embolization (TAE) and pericardial drainage.

Discussion

In this case, SCAR occurred during the course of acute pericarditis. We speculated that the cause of SCAR was more affected with pericarditis than injury by the respiratory surgery. The clinical course of acute pericarditis generally has a good prognosis, but the rare occurrence of fatal complications should be considered, suggesting the need for careful follow-up. In addition, TAE was a less invasive and feasible treatment for SCAR.

Keywords

Case report • Spontaneous coronary artery rupture • Transcatheter arterial embolization • Pericardial effusion • Tamponade • Cardiac arrest • Subacute pericarditis

ESC Curriculum

3.1 Coronary artery disease • 7.2 Post-cardiac arrest

Learning points

- Although acute pericarditis generally has a good clinical course, careful follow-up is required for cases that emerge after invasive procedures, such as thoracoscopic surgery.
- Spontaneous coronary artery rupture (SCAR) is an extremely rare disease with a variable clinical course. In cases of sudden cardiac tamponade or cardiac arrest, SCAR should be considered as a differential diagnosis.
- Transcatheter arterial embolization for SCAR is less invasive and feasible.

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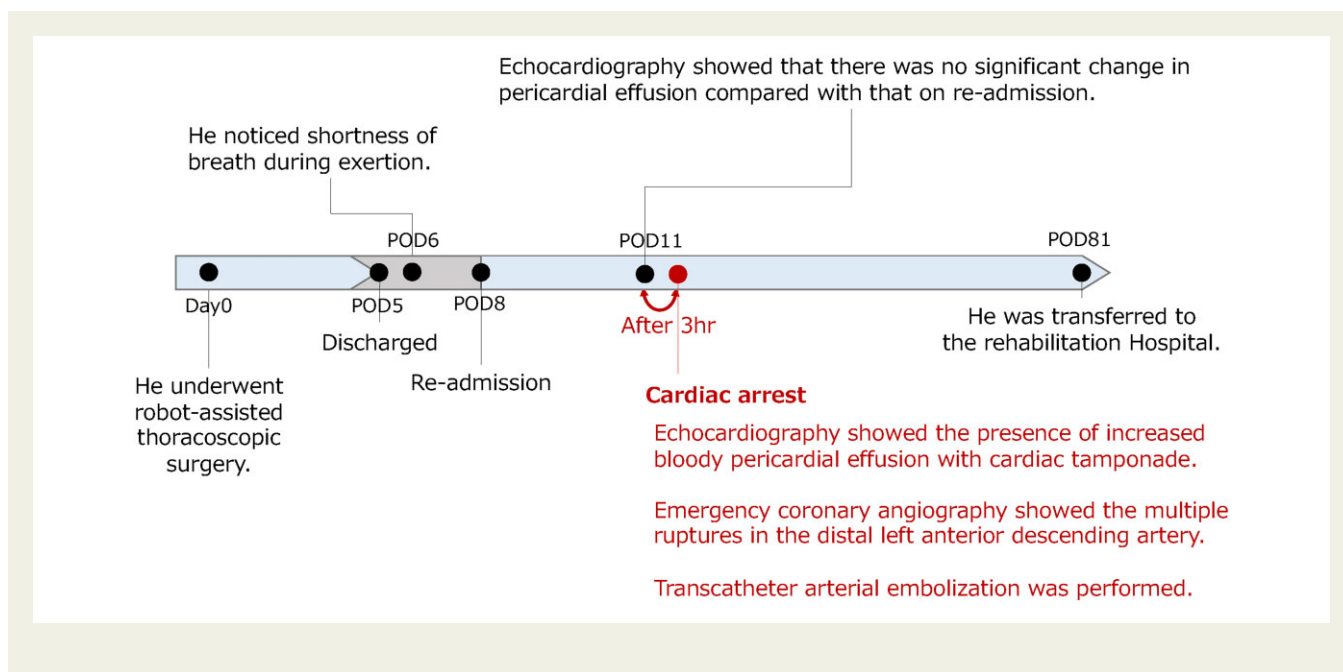
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Introduction

Spontaneous coronary artery rupture (SCAR) is extremely rare, and its aetiology is still not fully understood.^{1–7} Moreover, acute pericarditis is an inflammatory condition of the pericardium and its aetiology is considered idiopathic in developed countries, but most cases are caused by viral infections. In most cases, remission is achieved with a combination of non-steroidal anti-inflammatory drugs and colchicine.^{8,9} We herein report a case of cardiac tamponade and cardiac arrest due to SCAR in the subacute phase of acute pericarditis.

Timeline



Case presentation

A 74-year-old man underwent a robot-assisted thoracoscopic surgery for suspected left lung cancer and was discharged without clinical symptoms on postoperative day (POD) 5. However, he experienced dyspnoea the next day. Contrast-enhanced computed tomography (CT) on POD 7 showed pericardial effusion (Figure 1A), and he was admitted to the respiratory surgery unit on POD 8. His vital signs were the following: blood pressure, 153/73 mmHg; pulse rate, 111 b.p.m.; SpO₂, 97% (room air); and body temperature, 36.4°C. Laboratory examinations showed the following results: C-reactive protein level, 12.5 mg/dL (normal value, 0.3 < mg/dL); white blood cell count, 11 700/μL (normal value, 3300–8600/μL); creatine kinase-MB, 1.0 U/L (normal value, <12.0 U/L); high-sensitivity troponin I, 19.8 pg/mL (normal value, <26.2 pg/mL). A 12-lead electrocardiogram (ECG) showed widespread concave ST-segment elevation (Figure 1B). Transthoracic echocardiography (TTE) showed that the left ventricular wall motion was within the normal range. Mild pericardial effusion with diffuse low-echoic mass was observed (Figure 1C). However, there were no findings suggestive of cardiac

tamponade. Based on these results, we concluded that he had an acute pericarditis. So, we started oral medication with loxoprofen 180 mg/day and colchicine 1.0 mg/day on admission, and we added 20 mg/day of hydrocortisone 1 day after admission because he had strong inflammation. No elevation of creatine kinase or troponin I was observed during the clinical course (Figure 2). Transthoracic echocardiography on POD 11 showed that the left ventricular wall motion was within normal range, and there was no significant change in pericardial effusion (Figure 1E) compared with that on admission; the 12-lead ECG also showed slight improvement (Figure 1D). However, he experienced increased respiratory distress and cardiac

arrest after 3 h. Cardiopulmonary resuscitation was performed, but spontaneous circulation did not resume, and veno-arterial extracorporeal membrane oxygenation was initiated because of the presence of increased bloody pericardial effusion by portable echocardiography. An emergency coronary angiography was performed (Figure 3A), and multiple rupture sites were found in the distal left anterior descending artery (LAD) (Figure 3B). Because of the presence of pooling in the pericardial cavity, we concluded that he had experienced cardiac arrest due to cardiac tamponade caused by SCAR. Transcatheter arterial embolization (TAE) was performed via the left femoral artery, and a 7-Fr guiding catheter was inserted into the left coronary artery. Coil embolization (2.0/15 mm × 2 + 2.0/20 mm × 2) was performed in the distal LAD using a microcatheter. After 5 min, the blood oozing decreased but persisted; hence, we used a 2.6-Fr microcatheter and added gelatine sponge (Spongel[®]; Astellas Pharma Inc., Tokyo, Japan) for embolization (Figure 3C). After TAE, the lumen of the vessel in the LAD was observed by optical coherence tomography, but there were no findings suggestive of acute coronary syndrome such as plaque rupture or erosion (Figure 3D–F). Pericardial drainage presented with ~280 mL of haemorrhagic

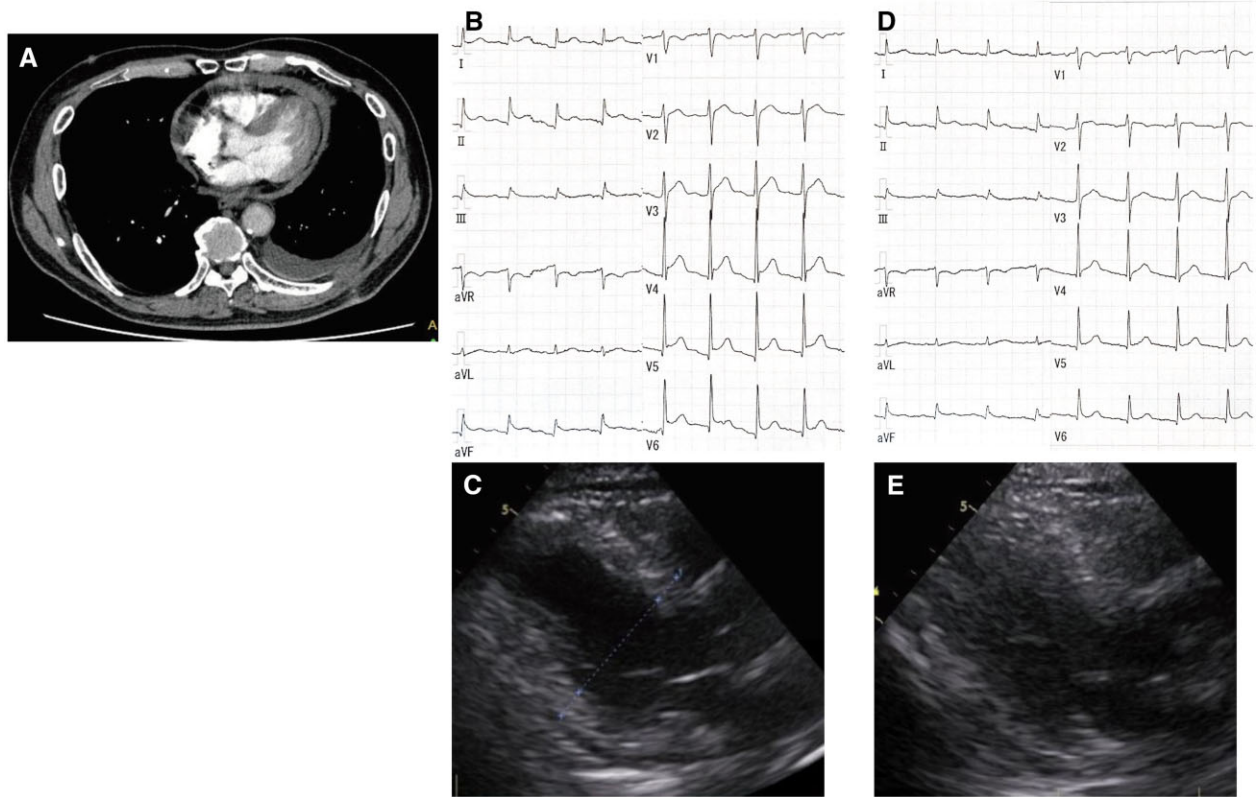


Figure 1 (A) Contrast-enhanced computed tomography on postoperative Day 7 showing a diffuse pericardial effusion. (B) Twelve-lead electrocardiogram on admission showing widespread concave ST-segment elevation with sinus rhythm. (C) Transthoracic echocardiography on admission (postoperative Day 8) showing pericardial effusion with diffuse low-echoic mass. (D) Twelve-lead electrocardiogram on postoperative Day 11 showing slight improvement of ST-elevation compared with that on admission. (E) Transthoracic echocardiography on postoperative Day 11 showing no significant change in pericardial effusion compared with that on admission. Yellow arrows in panels C and E show the pericardial effusion around the left and right ventricular walls, respectively.

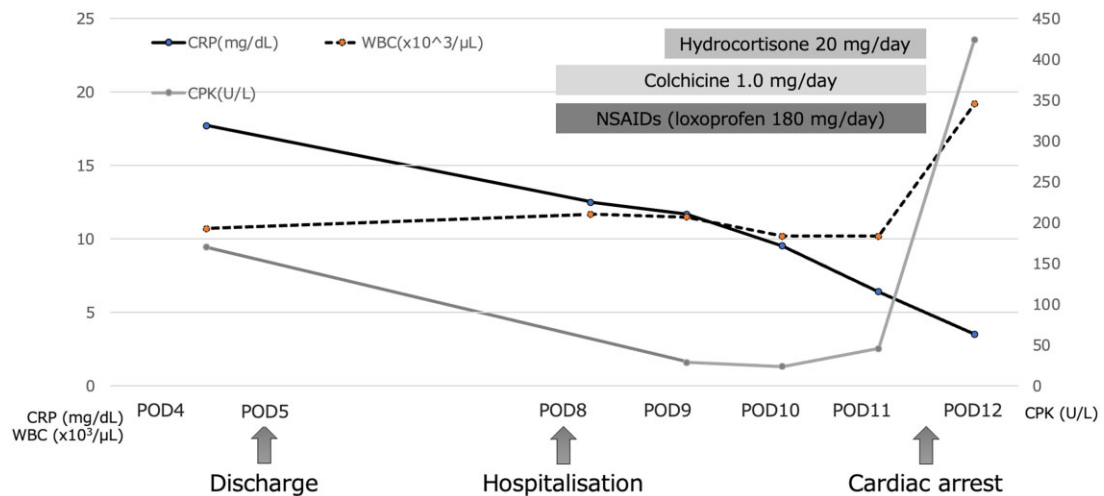


Figure 2 Clinical course of the patient with spontaneous coronary artery rupture associated with acute pericarditis after respiratory surgery. CPK, creatine phosphokinase; CRP, C-reactive protein; NSAIDs, non-steroidal anti-inflammatory drugs; POD, postoperative day; WBC, white blood cell.

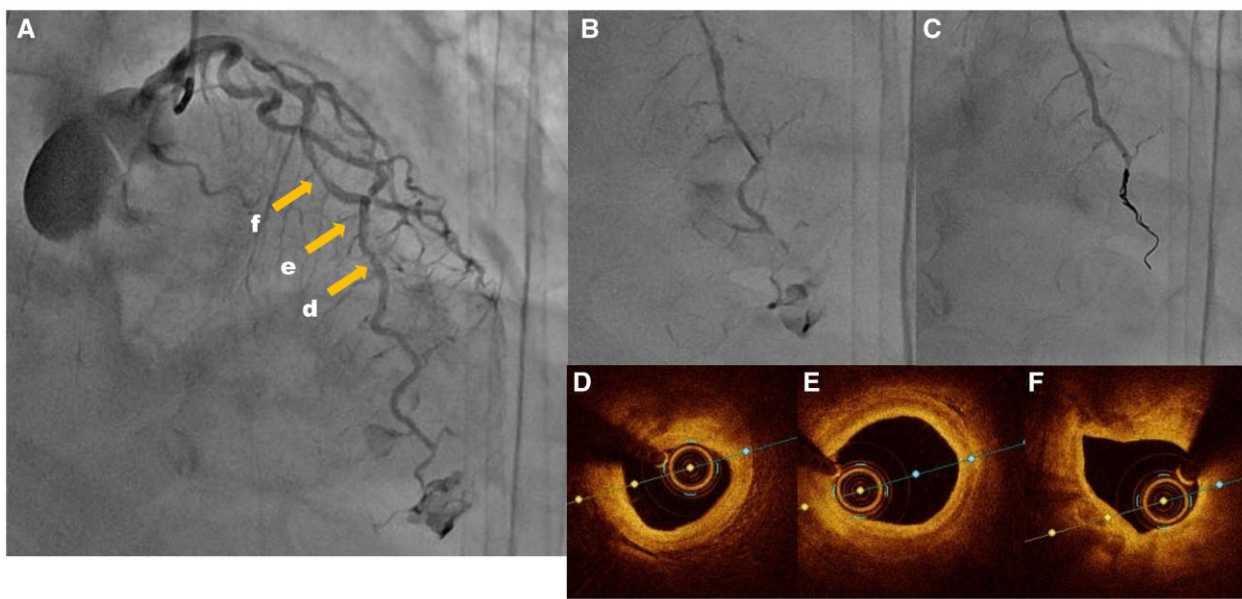


Figure 3 Emergency coronary angiography (A) showing multiple ruptures from the distal part of the left anterior descending artery (B). We performed the transcatheter arterial embolization using coil embolization and gelatine sponge (C). The lumen of the vessel in the left anterior descending artery was observed by optical coherence tomography. The optical coherence tomography sections of panels D–F correspond to the arrows in panel A. There were no findings suggestive of acute coronary syndrome (D–F).

pericardial effusion. The pericardial effusion from the drainage tube gradually decreased and the effusate was pale and bloody. The infarction area was limited to the apex, and there were no signs of heart failure after TAE. He was weaned from veno-arterial extracorporeal membrane oxygenation after ~36 h because his circulation was stable. There was no increase in pericardial fluid. He was transferred to the general ward for rehabilitation on POD 81.

Discussion

Coronary artery rupture is often associated with underlying diseases such as aneurysms and dissections, and previous case reports of Kawasaki disease, Behçet's disease, and vascular Ehlers–Danlos syndrome are scattered.^{1–4} It has also been reported in patients sustaining mechanical injuries such as intervention, traumatic injury, and surgical treatment.^{5–7} However, SCAR without a cause is extremely rare.² In contrast, acute pericarditis often occurs spontaneously in developed countries, and most cases are caused by viral infections. In most cases, remission can be achieved with a combination of non-steroidal anti-inflammatory drugs and colchicine. The prognosis of spontaneous acute pericarditis is generally good, with a very low long-term risk of sequelae such as constriction.^{8,9}

The clinical course in this case was consistent with that of acute pericarditis. The rationale is the presence of widespread concave ST-segment elevation, high levels of inflammatory markers, diffuse exudative pericardial effusion, and no significant elevation of cardiac enzymes. The TTE showed low-echoic pericardial effusion, and the CT value of pericardial effusion on contrast-enhanced CT was about 45 Hounsfield Unit, which was not high enough to suspect the bloody

fluid. Furthermore, no antithrombotic or anticoagulant therapy was administered. Thus, the possibility of re-bleeding after haemostasis was low. So, we suggested that SCAR had not occurred initially on admission. Although corticosteroids are not recommended as a first-line treatment for acute pericarditis in the European Society of Cardiology guidelines,⁸ we decided to administrate of corticosteroids the day after admission because of the possibility of strong inflammation associated with an iatrogenic aetiology (surgical invasion). However, there was no contact with the pericardium during the surgery, and the electrocautery counter-electrode plate was placed on the lateral side of the left lower leg; therefore, the relevance of the respiratory surgery on SCAR could not be explained. In addition, there was no report that drugs such as corticosteroids or colchicine induced the SCAR. So, we speculated that the cause of SCAR was more affected with pericarditis than injury by the respiratory surgery.

The treatment of SCAR is usually emergency open-heart surgery in previous reports, and coil embolization has been reported in one case.² Transcatheter arterial embolization is used as a bail-out method for complications during percutaneous coronary intervention and can be performed more quickly and less invasively than open-heart surgery, especially when the source vessel is small, as in this case. The important disadvantage is that the use of embolic materials results in permanent loss of the vessel lumen beyond the site of deployment and subsequent infarction.¹⁰ In this case, TAE was chosen because of its unstable circulatory system. Furthermore, we thought that pericardial drainage would decrease the pressure in the pericardial cavity and increase the amount of bleeding; therefore, we decided to perform TAE first. We suggested that TAE was a less invasive and feasible treatment for SCAR.

We report a case of SCAR with cardiac arrest in the subacute phase of acute pericarditis, an extremely rare event. Although acute pericarditis generally has a good clinical course, it may result in fatal complications such as sudden cardiac rupture, suggesting the need for careful follow-up.

Lead author biography



Dr Fujimoto Tomotaka belong to Cardiovascular Medicine of Kyoto Prefectural University of Medicine, Kyoto, Japan.

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 authors confirm that written consent for submission and publication of this case report including images and associated text has been obtained from the patient in line with COPE guidance.

Conflict of interest: None declared.

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