American Journal of Case Reports

e-ISSN 1941-5923
© Am J Case Rep, 2019; 20: 1155-1158
DOI: 10.12659/AJCR.917217

Received: 2019.04.26
Accepted: 2019.05.30
Published: 2019.08.07

Fatal Right Ventricular Free Wall Rupture During Percutaneous Coronary Intervention for Inferior Acute Myocardial Infarction

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Data Collection B
Statistical Analysis C
Data Interpretation D
Manuscript Preparation E
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Conflict of interest: None declared

Patient: Female, 76
Final Diagnosis: Right ventricular free wall rupture
Symptoms: Chest pain
Medication: —
Clinical Procedure: Echocardiography
Specialty: Cardiology

Objective: Rare disease

Background: Ventricular rupture is a complication of acute myocardial infarction (AMI) that results in hemopericardium and cardiac tamponade and has a high mortality rate. Most cases involve the left ventricular free wall, and there have been few previous reports of solitary right ventricular free wall rupture. This report is of a case of fatal right ventricular free wall rupture during percutaneous coronary intervention (PCI) for inferior acute myocardial infarction (AMI).

Case Report: A 76-year-old woman underwent emergency coronary angiography following inferior AMI. During angiography and attempted percutaneous coronary intervention (PCI), sudden onset of cardiac arrest occurred due to cardiac tamponade. Blood was drained from the pericardium by pericardiocentesis. Despite of advanced cardiac support, the patient died. The post mortem findings showed a solitary right ventricular free wall rupture due to inferior myocardial infarction.

Conclusions: A rare case is presented of right ventricular free wall rupture following AMI that occurred during PCI. This case demonstrates that early diagnosis and management are required to prevent patient mortality.

MeSH Keywords: Cardiovascular Diseases • Case Reports • Heart Rupture • Myocardial Infarction

Full-text PDF: https://www.amjcaserep.com/abstract/index/idArt/917217

Indexed in: [PMC] [PubMed] [Emerging Sources Citation Index (ESCI)] [Web of Science by Clarivate]

Background

Ventricular free wall rupture is one of the complications with poor prognoses of acute myocardial infarction (AMI) [1]. Rupture of the ventricular wall resulting in hemopericardium occur in between 2–4% of cases of AMI [2], and most cases involve the left ventricular free wall. Mechanical circulatory support is essential for hemodynamic stability in rupture of the left ventricle, but it is often difficult to accurately diagnose this condition in time to prevent death from cardiac tamponade.

Case Report

A 76-year-old woman had been attending our hospital for the management of type 2 diabetes mellitus (T2DM), hypertension, and dyslipidemia. She developed a sudden onset of shoulder pain that persisted from midday until she attended our hospital during the evening of the same day. While in the emergency department, she complained of sweating and chest pain. An electrocardiogram (ECG) showed an elevated ST-segment in leads II, III, and aVF. Laboratory data showed a positive troponin T test and an increased serum level of creatine phosphokinase (CPK). Echocardiography showed normal left ventricular wall motion and normal valve function, and a possible pericardial effusion was identified.

Acute myocardial infarction (AMI) was diagnosed, and emergency coronary artery angiography was performed. There were stenotic lesions present in the left coronary artery. Right coronary angiography was attempted, but her blood pressure suddenly fell (Figure 1), and injected contrast media remained at the aortic valve cusp (Figure 2A). When no cardiac output was present, we established veno-arterial extracorporeal membrane oxygenation (VA-ECMO). Further attempts at right coronary angiography failed to cannulate the right coronary artery (RCA) (Figure 2B). Further examination of the echocardiogram showed pooling of highly echogenic fluid in the pericardial cavity, consistent with hemopericardium, which was drained by pericardiocentesis. Despite subsequent advanced cardiac support, the patient died. A post mortem showed a solitary right ventricular free wall rupture due to inferior myocardial infarction (Figure 3).

Discussion

A rare case of solitary right ventricular free wall rupture following acute myocardial infarction (AMI) is presented. Ventricular free wall rupture is a complication of AMI that has a poor prognosis. Most cases of AMI involve the left ventricular free wall. However, the right ventricular wall rarely undergoes transmural myocardial infarction, which is the reason why right ventricular free wall rupture is much rarer than left ventricular rupture [3,4]. However, there have been several previously published reports of right ventricular free wall rupture [4]. In these previously reported cases, other factors, in addition to AMI of the right ventricle, are associated with the etiology of the right ventricular free wall rupture [4]. For example, volume overload due to large venous infusion may occur due to the treatment of an inferior AMI following occlusion of the dominant right coronary artery (RCA) [4]. Right ventricular rupture may also occur due to pressure overload in the right heart secondary to perforation of the interventricular septum in AMI of the left coronary artery domain. However, isolated right ventricular free wall rupture is rare.

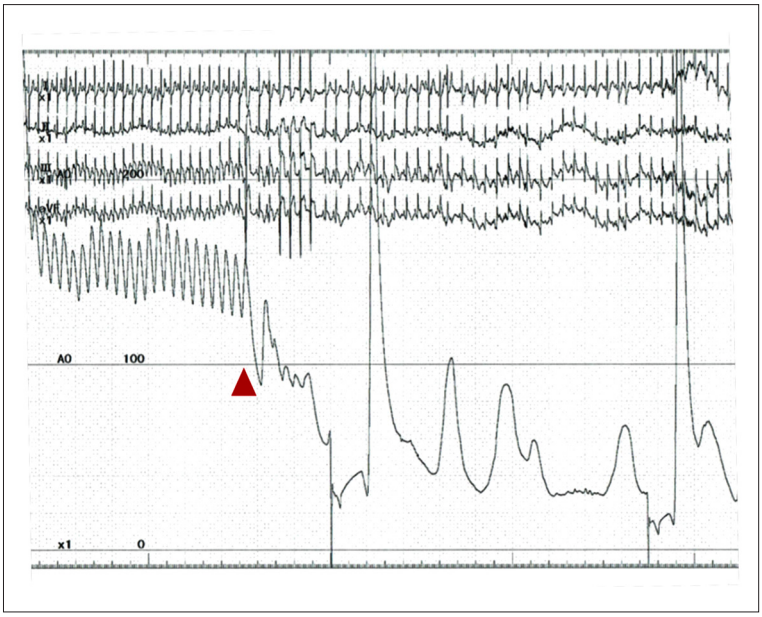

Figure 1. Blood pressure was lost during catheter measurement (triangle)

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Figure 2. Aortic and coronary angiography. (**A**) Injected contrast media remained at the aortic valve cusp (triangles). (**B**) Coronary angiography failed to cannulate the right coronary artery (RCA), and aortic angiography was performed.

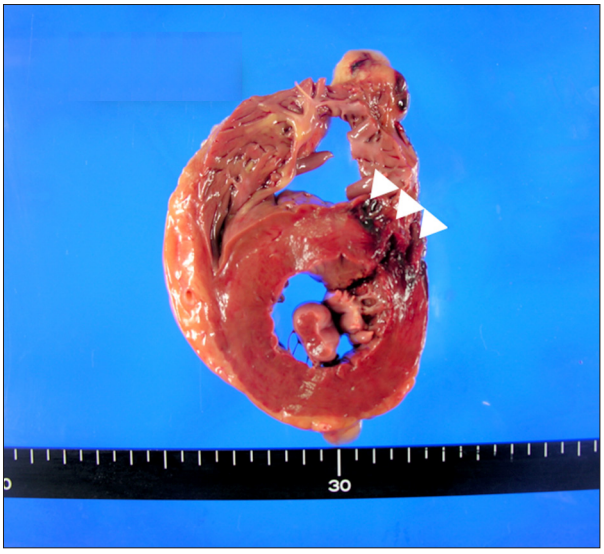

Figure 3. Post mortem showed a solitary right ventricular free wall rupture due to inferior myocardial infarction (triangles).

The treatment approach for right ventricular free wall rupture involves surgical repair and closure using a patch. However, bleeding into the pericardium is usually difficult to control unless the site of myocardial rupture can be quickly identified, and the patient is hemodynamically stabilized until cardiac surgery can be performed [3]. However, because the right ventricle is located under the sternum, early recognition rupture of the right ventricle can be difficult [4]. There are also patient characteristics that can affect the outcome, including older age, female gender, and diabetes mellitus, which were all present in this case [5].

Conclusions

A case is reported of right ventricular wall rupture, hemopericardium, and death due to cardiac tamponade following acute myocardial infarction (AMI). This case has demonstrated that early diagnosis, stabilization of hemodynamics, and a surgical approach to management are essential to reduce patient mortality.

Conflict of interest

None.

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