CASE REPORT

Spontaneous coronary artery rupture without a pericardial effusion: a diagnostic challenge

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Accepted 23 March 2016

SUMMARY

Spontaneous coronary artery rupture (CAR) is an extremely rare, life-threatening entity. It is a challenge to make a diagnosis of CAR in the absence of pericardial effusion. We describe a case of a spontaneous rupture of the right coronary artery (RCA) without pericardial effusion that emphasises the benefit of high clinical suspicion and early diagnosis. A 60-year-old man was admitted to the emergency department, with inferior myocardial infarction. Echocardiogram was negative for a pericardial effusion. Coronary angiography revealed complete occlusion of the RCA with intraluminal dissection and extravasation of contrast into the epicardium at the mid-portion of the RCA, which suggested rupture of the RCA. The patient underwent uneventful emergency coronary artery bypass grafting. CAR should be considered as a differential diagnosis in patients with acute chest pain, even in the absence of pericardial effusion, particularly in case of inferior wall involvement.

emphasises the benefit of high clinical suspicion and early diagnosis.

CASE PRESENTATION

A 60-year-old man was admitted to the emergency department, with a 1 h history of sudden-onset retrosternal chest pain radiating to the left shoulder, associated with diaphoresis, nausea and vomiting. He had a history of smoking, hypertension, type 2 diabetes mellitus and coronary artery disease. There was neither personal nor family history of connective tissue disorders. The patient had been taking clopidogrel for coronary artery disease.

INVESTIGATIONS

An ECG revealed a 3–4 mm ST segment elevation in leads V₂, V₃ and aVF, which suggested an inferior ST segment elevation myocardial infarction. A two-dimensional transthoracic echocardiogram showed normal left ventricular systolic function and was negative for a pericardial effusion. The patient was immediately transferred to the catheterisation laboratory. Coronary angiography revealed subtotal stenosis of the left anterior descending coronary artery ([figure 1](#); [video 1](#)), complete occlusion of the right coronary artery with intraluminal dissection and extravasation of contrast into the epicardium at the mid-portion of the right coronary artery, which suggested rupture of the right coronary artery ([figure 1](#); [video 2](#)). Percutaneous

BACKGROUND

Spontaneous coronary artery rupture is an extremely rare, life-threatening entity. In the English literature, only nine cases of spontaneous coronary artery rupture have been reported.^{1 2} It is a challenge to diagnose coronary artery rupture in the absence of a pericardial effusion. We describe a case of spontaneous rupture of the right coronary artery without a pericardial effusion, which

Figure 1 (A) Coronary angiogram image showing the stenosis of the left anterior descending artery (white arrow). (B) Coronary angiogram image showing right coronary artery (black arrow) with intraluminal dissection and extravasation of contrast into the epicardium (white arrow).

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To cite: Sevuk U, Ozyalcin S, Ayaz F, et al. *BMJ Case Rep* Published online: [please include Day Month Year] doi:10.1136/bcr-2016-214424

coronary intervention (PCI) was not attempted because of the intraluminal dissection.

DIFFERENTIAL DIAGNOSIS

- ▶ Acute coronary syndrome
- ▶ Aortic dissection

TREATMENT

The patient underwent uneventful emergency coronary artery bypass grafting under cardiopulmonary bypass. No continuous bleeding was found, although a subepicardial haematoma was observed around the right coronary artery (figure 2). The haematoma was evacuated and the bleeding portion of the coronary artery ligated. Saphenous vein grafts (SVGs) were anastomosed to the left anterior descending and right posterior descending coronary arteries. The emergency nature of the case encouraged us to perform SVG.

OUTCOME AND FOLLOW-UP

The patient had an uneventful postoperative course.

DISCUSSION

Coronary artery rupture usually occurs following PCI, as a result of traumatic dissection or perforation of a coronary artery.² Other causes include atherosclerosis, coronary artery aneurysm, inflammatory diseases such as Kawasaki's disease, trauma, infection and coronary artery dissection.²⁻⁵ In this case, we postulated that the coronary artery dissection and rupture resulted from rupture of a localised atheromatous plaque ulcer.

Coronary artery rupture may lead to acute coronary syndrome, acute bleeding into the pericardium and cardiac tamponade, pseudoaneurysm, ventricular fibrillation and/or sudden death. Occasionally, the rupture is limited to the subepicardial tissue, with an impending false aneurysm.² Most reported cases of coronary artery rupture have presented with clinical symptoms suggestive of acute coronary syndrome or acute aortic dissection. The clinical presentation may differ according to the site of the rupture. Proximal right coronary artery rupture usually presents with a subepicardial haematoma, rather than

Video 2 Right coronary angiogram showing complete occlusion of the right coronary artery with intraluminal dissection, and extravasation of contrast into the epicardium at the mid-portion of the right coronary artery.

pericardial haemorrhage, while rupture of the left and distal right coronary arteries commonly manifests as intrapericardial bleeding leading to pericardial tamponade and cardiogenic shock.² If coronary artery rupture is not detected at a sufficiently early stage, it may progress into life-threatening cardiac tamponade.²

The diagnosis of coronary artery dissection and rupture is frequently missed or delayed, as the condition may present with typical atherosclerotic acute coronary syndromes. When coronary artery rupture manifests as acute coronary syndrome and cardiac tamponade, the findings may suggest the diagnosis of coronary artery rupture. In the absence of a pericardial effusion, however, the diagnosis can be difficult. The diagnosis of coronary artery rupture requires a high level of suspicion and angiographic study. Coronary CT angiography (CCTA) is a useful non-invasive technique for assessing coronary artery dissection and myocardial haematoma, pseudoaneurysm formation and a pericardial effusion related to coronary artery rupture.

Video 1 Left coronary angiogram showing severe stenosis in the proximal portion of the left anterior descending coronary artery.

Figure 2 Intraoperative image showing a subepicardial haematoma in the right ventricle (black arrow).

However, smaller diameter arteries (<2.5 mm) are not clearly visualised with CCTA. Therefore, CCTA is not recommended as the first-line imaging technique in patients with coronary artery dissection and rupture.⁶ If the patient is managed with antithrombotic, antiplatelet, or thrombolytic agents in a manner similar to patients with acute coronary syndrome, the haematoma and pericardial haematoma may expand and worsen the patient's prognosis.⁵

Learning points

- ▶ Coronary artery rupture should be considered as a differential diagnosis in all patients with acute chest pain, even in the absence of pericardial effusion.
- ▶ Coronary artery rupture may lead to acute coronary syndrome, acute bleeding into the pericardium and cardiac tamponade, pseudoaneurysm, ventricular fibrillation and/or sudden death.
- ▶ The clinical presentation may differ according to the site of the rupture.
- ▶ Proximal right coronary artery rupture usually presents with a subepicardial haematoma, rather than pericardial haemorrhage, while rupture of the left and distal right coronary arteries commonly manifests as intrapericardial bleeding leading to pericardial tamponade and cardiogenic shock.
- ▶ The diagnosis of coronary artery rupture requires a high level of suspicion and angiographic study.

Coronary rupture can be treated with coated stents.^{2 3} In the presence of haemopericardium with cardiac tamponade, immediate pericardial drainage or surgical intervention is recommended.² Surgical treatment options include ligating the coronary artery with subsequent bypass grafting, venous patch repair and primary suture repair.² If it is impossible to identify the coronary artery, the bleeding site can be covered with pericardium. Glue can also be used to reinforce the patch over the defect.¹

Contributors KK and FA collected the clinical information as the patient's attending physicians. US and SO analysed and interpreted the patient's data and arranged the operation. US and SO wrote the manuscript. All the authors read and approved the final manuscript.

Competing interests None declared.

Patient consent Obtained.

Provenance and peer review Not commissioned; externally peer reviewed.

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