

Ruptured myocardial infarction

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Section: Cardiovascular

Area of Interest: Cardiac

Procedure: Diagnostic procedure

Imaging Technique: Echocardiography

Imaging Technique: CT

Imaging Technique: CT-Angiography

Imaging Technique: Catheter arteriography

Special Focus: Ischaemia / Infarction Arteriosclerosis

Case Type: Clinical Cases

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Patient: 78 years, male

Clinical History:

A 78-year-old patient with obesity and DM-II presented to the emergency room with a 24 hour history of chest pain. EKG showed STEMI (Fig. 1) and the patient presented with severe hypotension.

Imaging Findings:

Cardiac US was performed and pericardial separation in diastole was greater than 20 mm, demonstrating large pericardial effusion (corresponding to a fluid volume greater than 500 ml) [1].

Due to the patient's unstable medical condition chest CT angiography was performed to evaluate the aetiology of the pericardial effusion. Images showed high attenuation pericardial effusion (50-60 UH) suggesting haemopericardium (Fig. 2) and an hypoenhancing area on the posterolateral wall of the LV suggesting acute ischaemia (Fig. 3). There was also a small area of pooling within the hypoperfused area (Figs. 4a and 4b). Cardiac catheterisation was performed when the patient was stabilised showing coronary atherosclerosis, distal anterior descending artery significant stenosis (70%) and total marginal obtuse coronary artery occlusion (Fig. 5).

Discussion:

Cardiac free wall rupture after myocardial infarction is a life-threatening complication, which often results in sudden onset of cardiogenic shock caused by cardiac tamponade [2]. It has been reported to complicate approximately 2% of acute myocardial infarctions [3]. According to a SHOCK trial, in-hospital mortality rate was 60% [4].

Classic left ventricle free wall rupture (LVFWR) usually produces symptoms within 24 hour after acute myocardial infarction and clinical manifestations depend on the amount and rate of pericardial bleeding. Sometimes a blood clot will seal pericardial leaks and form a left ventricular pseudoaneurysm. There is also a subacute variant of LVFWR that consists of slow repetitive bleeding and represents one third of cases. This patients may survive until emergency surgery can be performed. [3]

Transthoracic echocardiography is essential in the diagnosis, considering that pericardial effusion is the most consistent finding. Other signs consistent with rupture are echogenic masses in the effusion and visible wall defects [5].

These two signs were not found in the transthoracic US, therefore CT was performed to evaluate the fluid effusion

density and the wall integrity. An advantage of CT is that it allows assessment of the entire chest and can detect associated abnormalities. Besides, it is a less operator-dependent technique. [2]

Haemopericardium was demonstrated considering the pericardial effusion high attenuation. Active extravasation of the contrast to the pericardium was not demonstrated because the effusion was probably “contained” by thrombotic components [3]. Besides, if active extravasation is seen, it should be considered as a life-threatening situation, because pericardial tamponade will be very likely.

Surgical repair of the rupture site is the definitive treatment, although there are temporising measures including pericardiocentesis, volume loading, inotropic support and afterload reduction prior to definitive surgical intervention. Surgical intervention may consist of simple sutures or application of a patch to the epicardial surface with biological glue. In-hospital mortality rates range from 50 to 60%. [5, 6]

In this case the CT was performed to confirm the aetiology of the pericardial effusion. Cardiac rupture was demonstrated and the patient was taken to the operating room where a 3 cm LV free-wall rupture was found and sutured.

Differential Diagnosis List: Ruptured myocardial infarction., Ruptured myocardial infarction, Left ventricular aneurism, Ruptured coronary artery aneurysm, Haemopericardium secondary to aortic dissection

Final Diagnosis: Ruptured myocardial infarction.

References:

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- Wehrens XH, Doevendans PA. (2004) Cardiac rupture complicating myocardial infarction. International journal of cardiology Jun;95(2-3):285-92 (PMID: [15193834](#))

Figure 1

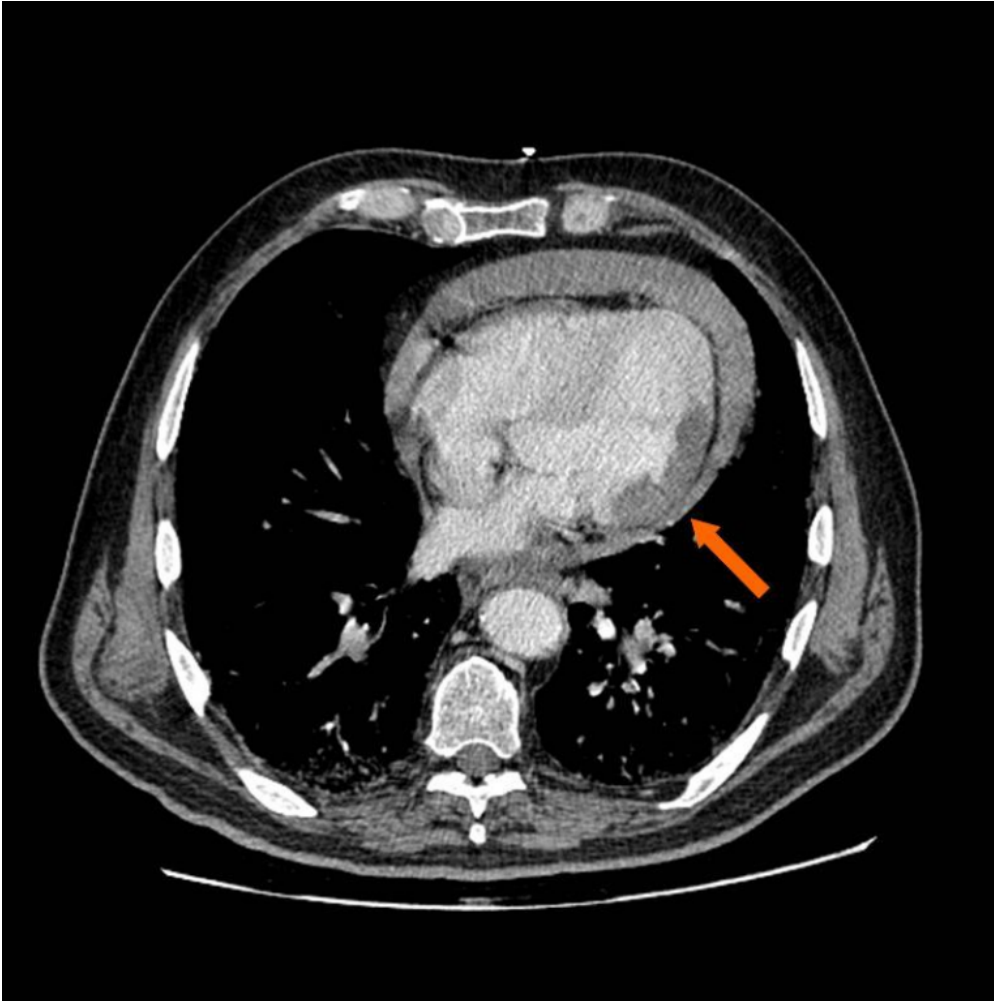
a



Description: Axial CT Chest angiography in portal venous phase. Pericardial high attenuation effusion is demonstrated. **Origin:** Lloret J, Department of Radiology, Hospital Clínico Universitario San Carlos, Madrid, Spain.

Figure 2

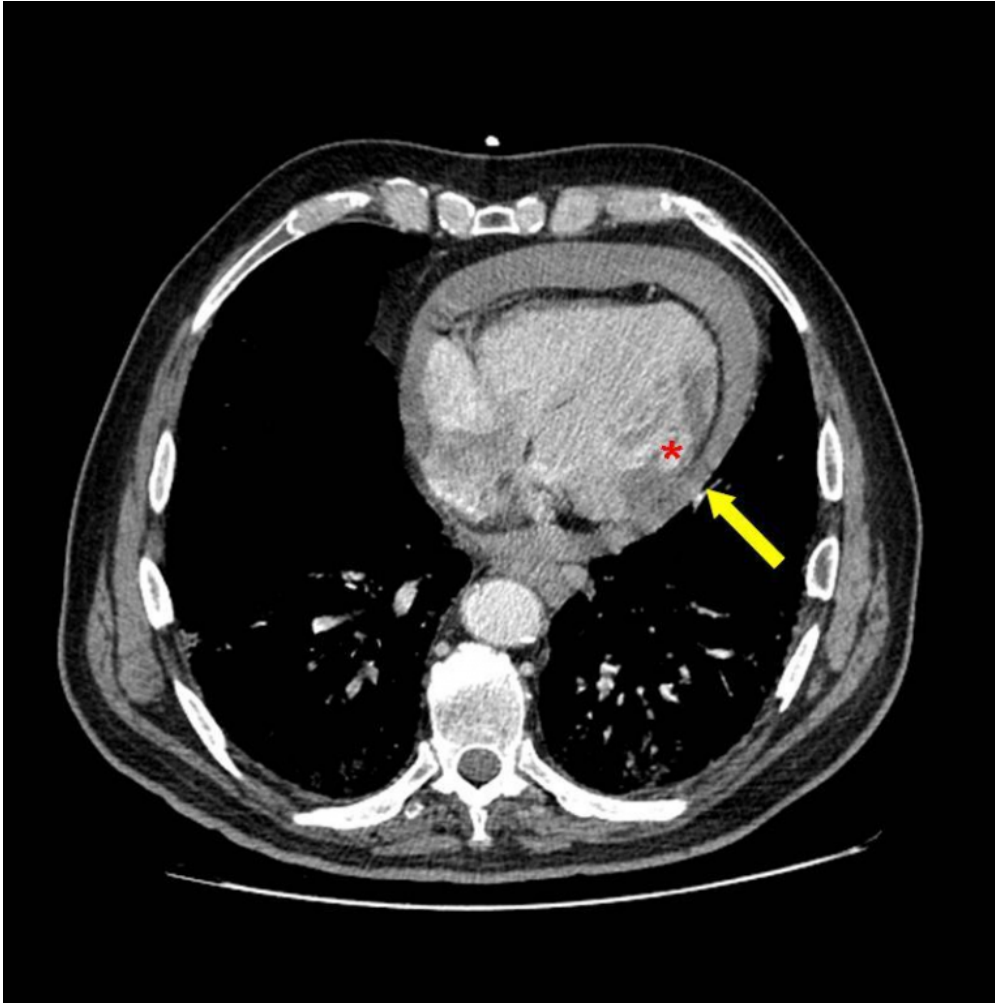
a



Description: Axial CT Chest Angiography in portal venous phase. Hypoenhancing area on the posterolateral wall of the LV suggesting myocardial ischaemia (orange arrow). **Origin:** Lloret J, Department of Radiology, Hospital Clínico Universitario San Carlos, Madrid, Spain

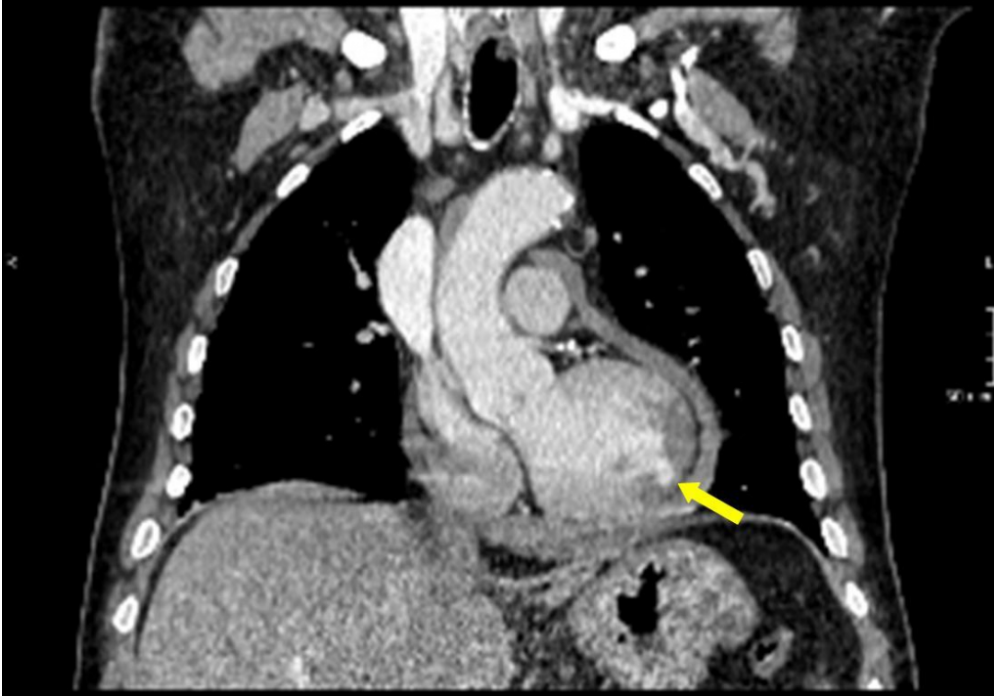
Figure 3

a



Description: Axial CT angiography in portal venous phase. Small area of contrast pooling (red star) within the hypoperfused area (yellow arrow). **Origin:** Lloret J, Department of Radiology, Hospital Clínico Universitario San Carlos, Madrid, Spain

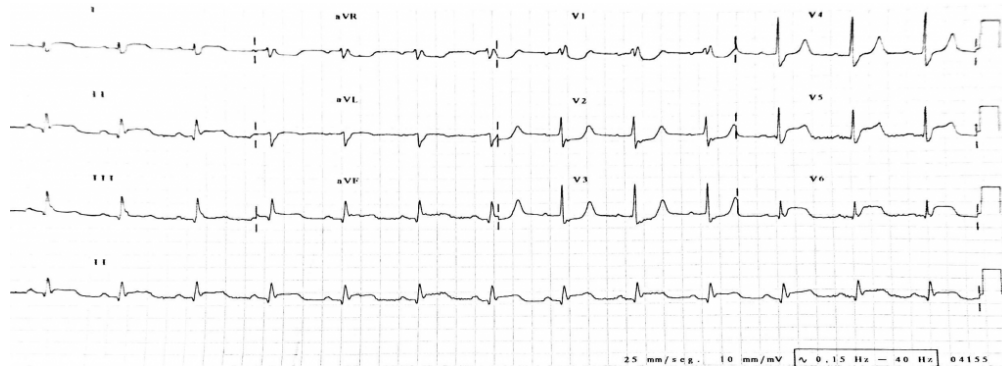
b



Description: Coronal image of CT angiography in portal venous phase. Small area of contrast pooling within the hypoperfused area (yellow arrow). **Origin:** Lloret J, Department of Radiology, Hospital Clínico Universitario San Carlos, Madrid, Spain

Figure 4

a

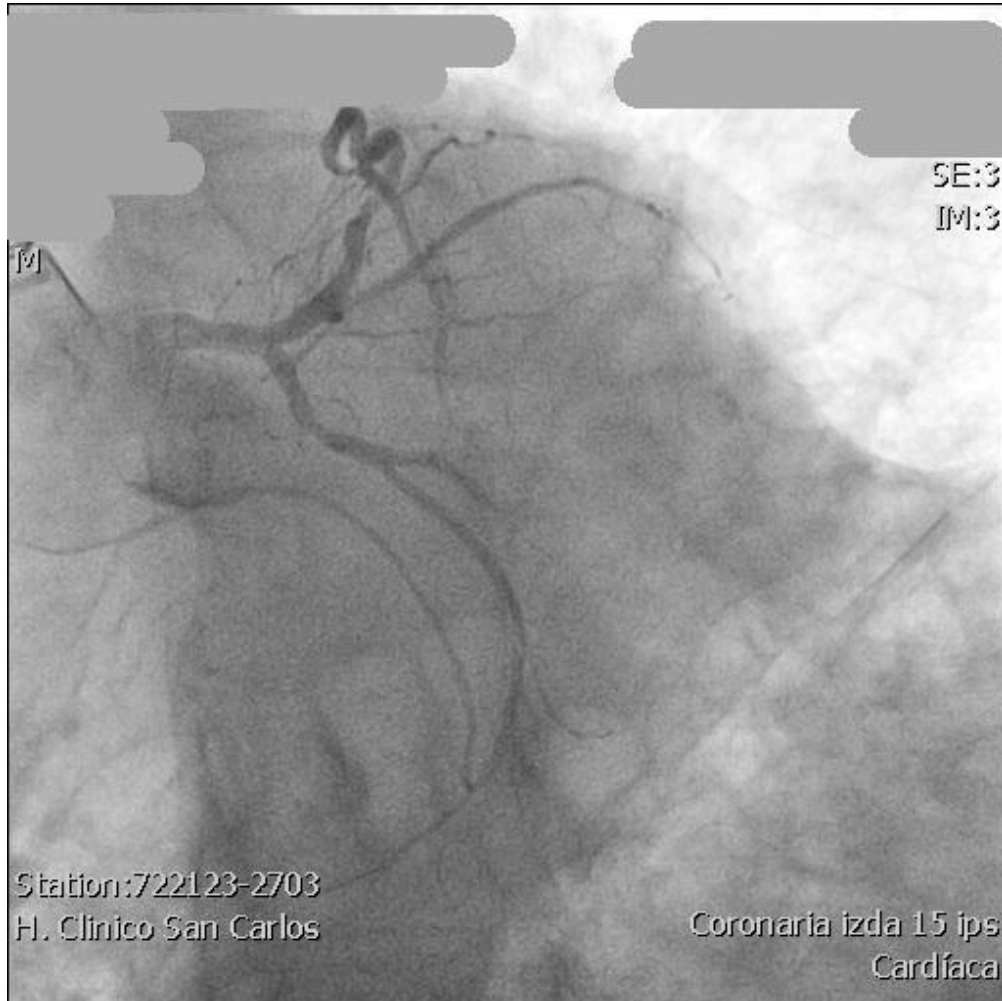


Description: EKG showing ST elevation in II, III, aVF, V5 and V6 derivations, consistent with STEMI.

Origin: Lloret J, Department of Cardiology, Hospital Clínico Universitario San Carlos, Madrid, Spain.

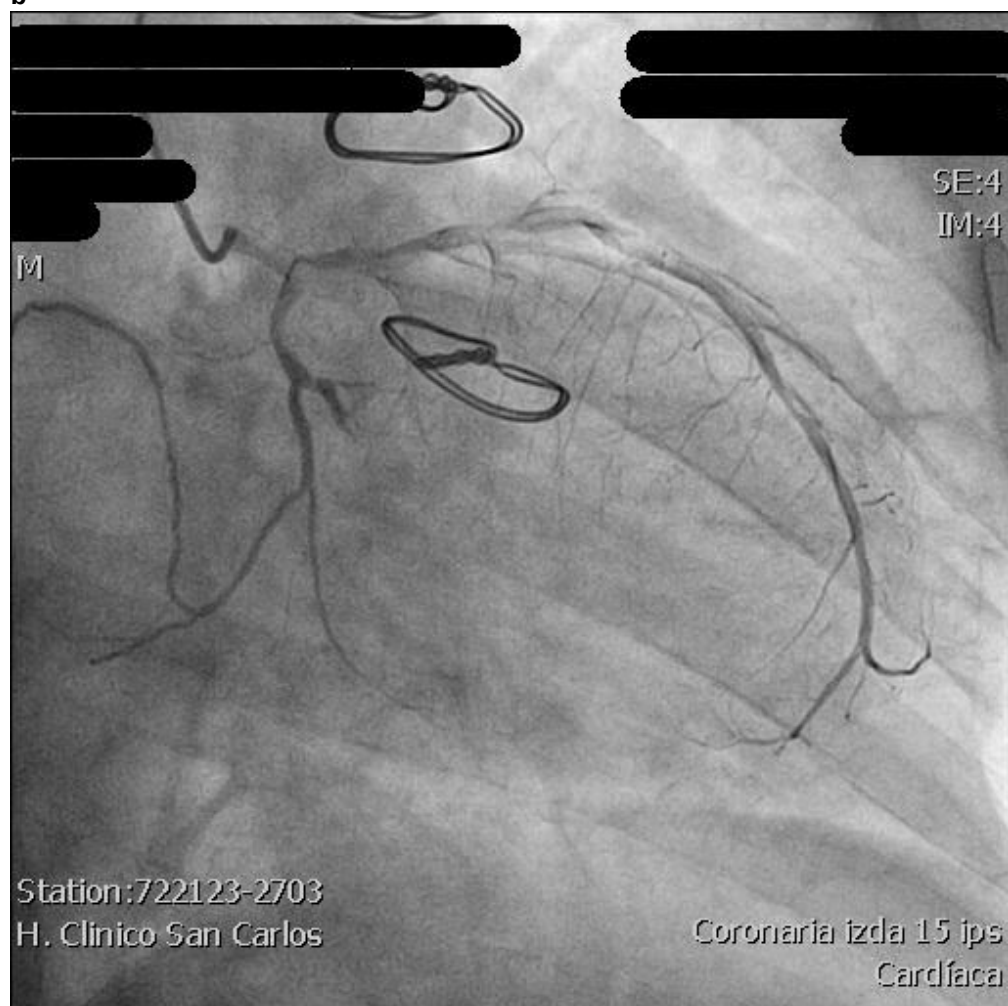
Figure 5

a



Description: Coronary atherosclerosis, distal anterior descending artery significant stenosis (70%) and total marginal obtuse coronary artery occlusion. **Origin:** Lloret J, Department of Radiology, Hospital Clínico Universitario San Carlos, Madrid, Spain

b



Description: Coronary atherosclerosis, distal anterior descending artery significant stenosis (70%) and total marginal obtuse coronary artery occlusion. **Origin:** Lloret J, Department of Radiology, Hospital Clínico Universitario San Carlos, Madrid, Spain