

Curiositas (Cardiology)

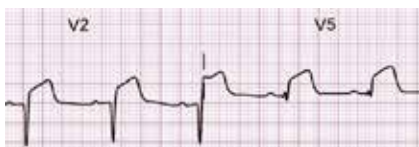
UNDERGRADUATE QUIZ

Anterior ST-segment elevation myocardial infarction (STEMI) can be a life-threatening condition. Prompt recognition of the typical ECG findings and rapid transfer to a primary percutaneous coronary intervention centre are critical. Although the ECG appearances of anterior STEMI are quite characteristic, confusion sometimes arises with 3 other ECG morphologies. Can you identify the genuine anterior STEMI and name the 3 imposters?

1. A 17 year old man presented with chest pain. He had a flu-like illness one week ago.



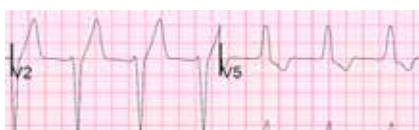
2. A 54 year old woman with diabetes complained of chest pain following a large meal. She is known to have hypercholesterolaemia and hypertension.



3. A 78 year old woman presented with chest pain. She attended a cardiology clinic with dizzy spells in the past, and had a procedure which helped.



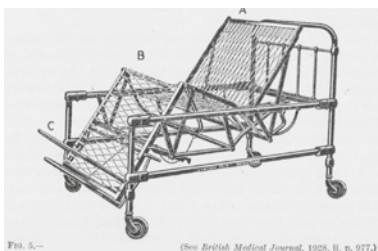
4. A 60 year old man with several previous myocardial infarctions attended the Emergency Department with chest pain.



Dr John Purvis (Consultant Cardiologist, Western Health & Social Care Trust) & Ms Sandra Messiha (Medical Student, Queen's University Belfast).

HISTORICAL QUIZ

The image below is taken from Sir Thomas Lewis's classic cardiology textbook *Diseases of the Heart* 4th Edition (MacMillan and Co. Ltd., 1946). It demonstrates an item of equipment designed by the author in 1928 to help with the management of which cardiac condition?

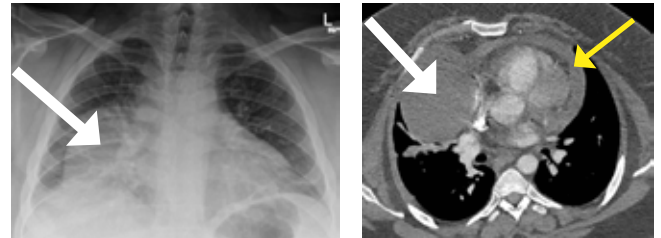


Dr John Purvis (Consultant Cardiologist, Western Health & Social Care Trust)

POSTGRADUATE QUIZ 1

A 28 year old man presented to the emergency department with a 2 week history of intermittent sharp chest pain and progressive breathlessness. He was afebrile. The white cell count was $12 \times 10^9/L$ and CRP 60 mg/L. Troponin T < 3 ng/L. His blood pressure was 130/76 mmHg and heart rate 113 beats/min. Sinus tachycardia was demonstrated on an ECG.

His chest radiograph and CT aortogram images are shown.

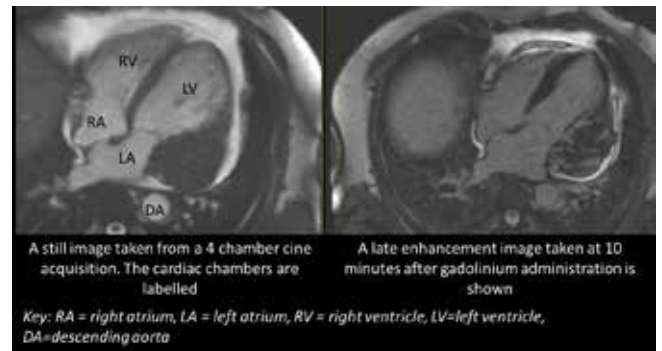


1. What are the most striking abnormalities on the images?
2. What would your acute and long term management priorities be for this man?

Drs Alison Smyth & John Purvis (Cardiology Unit, Western Health & Social Care Trust)

POSTGRADUATE QUIZ 2

A 50 year old man presented with flu-like symptoms and chest pain together with a small elevation in serum troponin concentration. He was provisionally diagnosed with myocarditis. He subsequently developed non-sustained ventricular tachycardia (VT) and frequent ventricular ectopy. Coronary angiography did not demonstrate any significant coronary artery disease. Echocardiography revealed severely reduced left ventricular function and a suspicious abnormality around the lateral aspect of the left ventricle. Cardiovascular magnetic resonance (CMR) imaging was performed in order to delineate this abnormality further.



1. Describe the most abnormal feature present on CMR.
2. What is the differential diagnosis?
3. What next investigation would be most useful?

Dr Caroline Bleakley, Prof Theresa McDonagh & Dr Dan Sado (Department of Cardiology, Kings College Hospital, London)

ANSWERS See overleaf

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CURIOSITAS: ANSWERS

UNDERGRADUATE QUIZ

1. Acute Pericarditis. There is concave ST segment elevation in the ECG shown, and slurred depression from the P wave to the QRS complex (PR depression). These changes are characteristic of acute pericarditis and will affect all 12 ECG leads as the viral inflammation affects the whole pericardium. In contrast, anterior ST segment elevation changes are seen predominantly in the territory of the left anterior descending artery (V2 – V4).
2. Anterolateral STEMI. There is convex-upward ST segment elevation. This will be seen primarily in leads V2-V4 in an anterior STEMI, but may extend into the lateral territory (V5, V6, I and aVL) as is seen here.
3. Paced ECG. This rhythm strip shows two electronic “spikes” with each heart beat – one before each P wave and one before each QRS complex. This patient has a dual-chamber pacemaker. The tip of the ventricular lead initiates ventricular contraction from the right ventricle. There is then slow conduction from cell to cell towards the left ventricle. This leads to a broad QRS complex (>3 small squares; >120 ms), and the pattern resembles left bundle branch block.
4. Left bundle branch block. The QRS complex is broad (>3 small squares; >120 ms), with a predominantly negative QRS axis in V1-V2 and a positive axis in V5-V6. Generally speaking, the axis of the QRS complex is opposite to that of the T wave in the same lead. In this case, damage from previous infarction has destroyed the conducting tissue in the left bundle branches so that ventricular activation occurs via the right bundle and then by slow neighbour-to-neighbour conduction through the left ventricle. This prolongs the QRS duration and affects the ST segments. The appearance is similar to a paced ECG but without the spikes!

Dr John Purvis (Consultant Cardiologist, Western Health & Social Care Trust) & Ms Sandra Messiha (Medical Student, Queen's University Belfast).

HISTORICAL QUIZ

This is an image of a “cardiac bedstead” used to prop patients upright when they were suffering from what Sir Thomas called heart “failure with congestion.” Normally, most pulmonary vascular flow to the lungs is directed to the lower dependent lung segments, but in heart failure, there is proportionally greater flow to the upper segments. This can be seen in classical chest radiograph appearances of pulmonary vascular congestion. The redistribution becomes even more marked when the patient lies supine, so keeping the patient propped up can indeed be helpful.

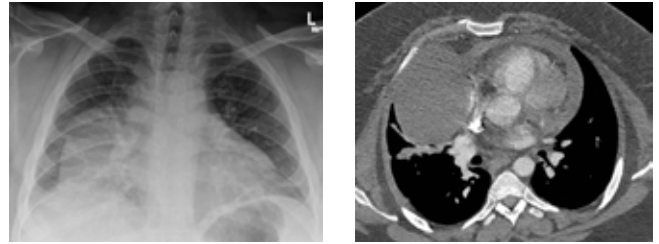
The advent of powerful pharmacotherapy (such as potent diuretics) from the 1950s onwards reduced the need for the cardiac bedstead. The physiology remains sound and keeping a patient upright can be of symptomatic benefit.

Dr John Purvis (Consultant Cardiologist, Western Health & Social Care Trust)



45 year old male with previous coronary artery bypass grafting and a left ventricular ejection fraction of 20%, admitted acutely 10 days after forgetting to renew his prescription for loop diuretics. The image shows evidence of previous sternotomy, gross cardiomegaly, small pleural effusions and upper lobe pulmonary vascular congestion.

POSTGRADUATE QUIZ 1



1. The chest radiograph demonstrates cardiomegaly and an opacity projected over the right hemithorax (white arrow). The right heart border is separately identified. The CT aortogram demonstrates a small pericardial effusion (orange arrow), most likely in keeping with pericarditis given the acute clinical history. A large pericardial cyst (white arrow) is noted extending from the right atrial border into the lower right hemithorax.
2. Acutely, pericarditis should be managed in accordance with current guidelines¹. First-line therapy is non-steroidal anti-inflammatory drugs, with colchicine used as needed, and steroids or steroid-sparing agents reserved for resistant or recurrent cases. The pericardial effusion, although small, should be evaluated by serial echocardiography. The pericardial cyst is incidental, but is large and is causing some compression of lung tissue. Long term surveillance with chest imaging will be required. Pericardial cysts are uncommon congenital anomalies that occur more commonly on the right side. They are benign lesions, and generally do not require surgical resection unless they are symptomatic.
1. Adler Y, Charron P, Imazio M et al. 2015 ESC Guidelines for the diagnosis and management of pericardial diseases: The Task Force for the Diagnosis and Management of Pericardial Diseases of the European Society of Cardiology (ESC). *Eur Heart J* 2015; 36: 2921-2964.

Dr's Alison Smyth & John Purvis (Cardiology Unit, Western Health & Social Care Trust)

POSTGRADUATE QUIZ 2

1. CMR shows a large mass within the myocardium measuring approximately 7cm at the posterolateral wall of the left ventricle. On late enhancement imaging, the mass shows heterogeneous uptake of gadolinium contrast.
2. Lymphoma or other cardiac tumour, thrombus or haematoma.
3. Biopsy.

The differential diagnosis of a cardiac mass includes cardiac tumours (lymphoma, primaries or metastases), thrombus or haematoma. A malignant process was felt to be the most likely cause here¹. However, the diagnosis made from tissue obtained from surgical endoscopic biopsy, was of a calcified thrombotic haematoma. Intramyocardial haematoma is extremely rare in the absence of preceding chest wall trauma (not present in this case). Only one similar case has been reported². Intracardiac cavity thrombosis is much more common in areas of slow blood flow such as the left atrial appendage or at an akinetic left ventricular apex following, for example, a myocardial infarction. A calcified intramural haematoma in the left ventricle is rarely reported, and as such, there is no standardised approach to management. After discussion with the cardiothoracic surgical team, it was felt that, in this case, excision would carry significant risk to surrounding structures including the left coronary arteries. The patient had a radiofrequency ablation for his VT (the focus of which was the area around the haematoma), and remains under surveillance.

1. Fussen S, De Boeck BW, Zellweger MJ et al. Cardiovascular magnetic resonance imaging for diagnosis and clinical management of suspected cardiac masses and tumours. *Eur Heart J* 2011; 32: 1551-60.
2. Arora A, Sheikh A. Calcified pericardial haematoma causing heart failure. *Br J Hosp Med (Lond)* 2015; 76: 487.

Dr Caroline Bleakley, Prof Theresa McDonagh & Dr Dan Sado (Department of Cardiology, Kings College Hospital, London)



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