A Lady With Dyspnoea

Clinical History:

This 61-year-old lady presented with sudden onset of dyspnoea and the following ECG was obtained (**Figure 1**).

Figure 1

Question 1: What might be the underlying cause of the ECG abnormalities?

A. Acute pericarditis

B. Asthmatic attack

C. Hyperventilation

D. Pulmonary embolism

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ECG ROUND

Answer : D. Pulmonary embolism

The ECG in **Figure 1** shows sinus rhythm (rate 86/min), S wave in lead I, small Q wave and T wave inversion in lead III and aVF. There were also T wave inversion in leads V1 to V4. These ECG abnormalities, together with the complaint of sudden onset dyspnoea, are highly suggestive of the diagnosis of acute pulmonary embolism. In fact, the ECG is most helpful in evaluating patients who have massive pulmonary embolism complicated by acute right heart strain.[1] In these patients, ECG often demonstrates a new $S_1Q_3T_3$ pattern, a new incomplete right bundle branch block, or signs of right ventricular ischaemia. The ECG is usually not helpful in patients with submissive pulmonary embolism.

It is very important to have high index of suspicion in diagnosing pulmonary embolism as the clinical presentation can be very variable and initial investigations such as ECG and chest x-ray may not be very helpful. Ventilation / perfusion lung scans are frequently performed for diagnosing pulmonary embolism, though pulmonary angiography is the most accurate test and regarded as the gold standard for the diagnosis. Contrast-enhanced helical CT scan of thorax is also useful in the diagnosis of pulmonary embolism involving the main trunks. It has the advantage of being non-invasive and can be performed as an emergency investigation.

This patient was tachypnoeic and in type I respiratory failure despite 50% of inspired oxygen. An urgent contrast-enhanced helical CT scan of thorax confirmed the diagnosis of massive pulmonary embolism involving the right and left main pulmonary trunk.

Question 2: Figure 2 was the ECG of the same patient obtained 4 days later. What treatment did the patient have?

A. Thrombolytic therapy
B. Aspirin
C. Morphine
D. Warfarin

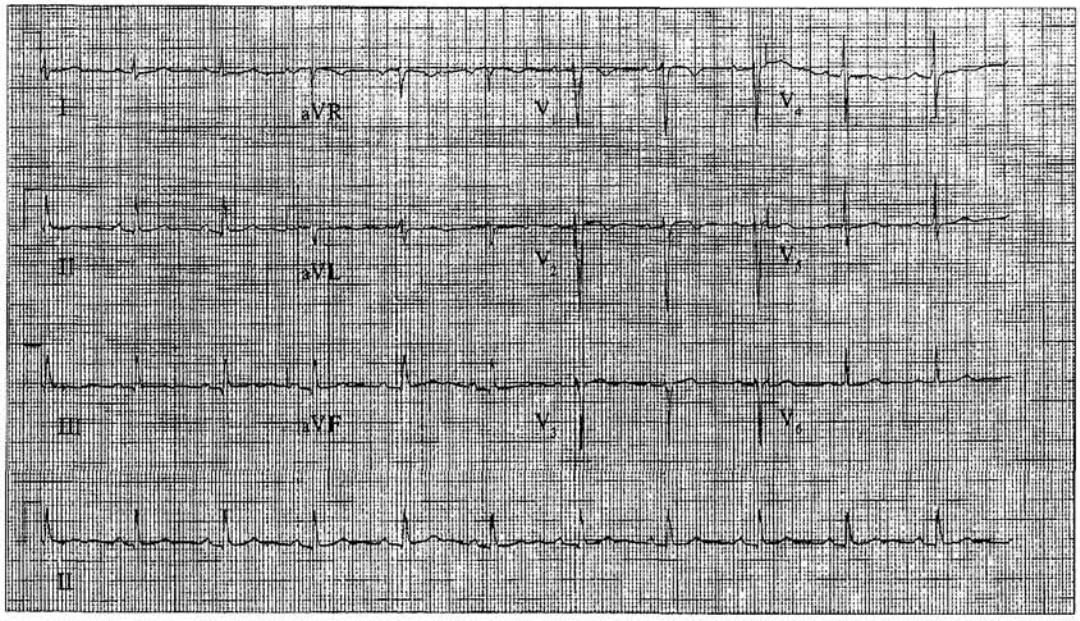
Answer: A. Thrombolytic therapy

The options of treatment of pulmonary embolism include heparin, thrombolytic therapy and surgery (pulmonary embolectomy). For patients with massive pulmonary embolism and continuing hypoxaemia while receiving high fractions of inspired oxygen, intravenous thrombolytic therapy is by far the most extensively investigated option and the most frequently used option of intervention.[2] In a recent study of 1001 consecutive patients with acute major pulmonary embolism from 204 centres, thrombolytic agents were given to 48% of them, often despite the presence of contraindications.[3] Thrombolytic therapy, in general, is quite safe. Our local experience showed that around 10% of patients receiving thrombolytic therapy had bleeding complication, mostly mild bleeding in the gum or around vascular puncture sites.[4]

In view of this lady's massive pulmonary embolism involving both right and left main pulmonary arteries, and continuing hypoxaemia despite high inspired oxygen concentration, she was given intravenous thrombolytic therapy. A few hours after the treatment, her tachypnoea resolved and her oxygen saturation was well-maintained with low fractions of inspired oxygen. Follow-up contrast-enhanced helical CT scan of thorax one day later revealed that the thrombus in right main pulmonary artery had decreased in size and the thrombus in left main pulmonary artery resolved completely. Comparing to the ECG before thrombolytic therapy (**Figure 1**), ECG after treatment (**Figure 2**) showed decreased amplitude of S wave in lead I, no T wave inversion in lead III or aVF, and decreased T wave inversion in leads V1 to V3. A haematoma developed around her radial artery puncture site and subsided gradually upon conservative treatment. She was otherwise stable and subsequently discharged home. ■

ECG ROUND

Figure 2



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