



Case of the Month

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“Differentiating high-risk acute Pulmonary Embolism from Acute Coronary Syndrome with ECG”

The clinical presentation of pulmonary embolism (PE) can be very non-specific; symptoms include dyspnoea, chest pain, syncope, and haemoptysis. Chest pain frequently occurs in PE possibly due to pleural irritation secondary to distal emboli causing lung infarcts.

Those symptoms especially chest pain are hallmark features of acute coronary syndrome and differentiating them can be tricky.

Acute high-risk PEs can present in ED with circulatory collapse, either as cardiac arrest, obstructive shock, or persistent hypotension. The over-riding pathophysiology in these cases is right ventricular involvement which can mimic myocardial infarction.

A 12-lead electrocardiogram (ECG) is the first investigation available in the ED or on first medical contact. ECG is often normal in acute PE in up to half of the cases.

We would like to highlight 2 ECG patterns in high-risk acute PE that mimic acute coronary syndrome (ACS).

Right Ventricular Injury (Figure 1)

In this case, there is ST elevation in aVR with global ST depression especially in lead I and V4-6. This patient had bilateral PEs and right ventricular enlargement on CTPA. They required thrombolysis for their management.

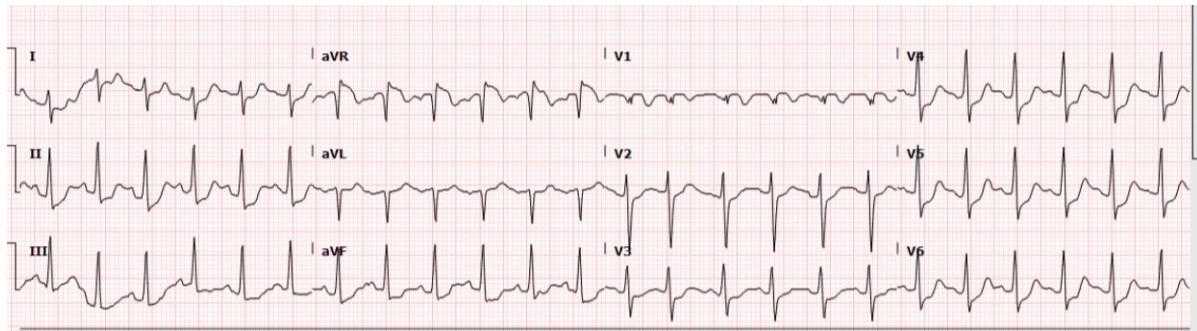


Figure1: ST elevation in aVR with global ST depression especially in lead I and V4-6

Right ventricular strain (Figure 2)

In this pattern, T wave inversions are found in V1-3. This can mimic acute coronary syndrome from a culprit lesion in the Left Anterior Descending artery. One study by Kosuge et al reports that among patients with acute PE and ACS who have precordial negative T waves, the presence of negative T waves in leads III and V1 and/or peak negative T wave in leads V1–2 simply but accurately differentiates APE from ACS, as seen in Figure 2.

So, in right ventricular strain, look for anterior T wave inversions in V1-3 and also in leads III and V1. The T waves in leads V1 or V2 will be deeper than other precordial leads. Their clinical course was complicated by a cardiac arrest requiring thrombolysis.

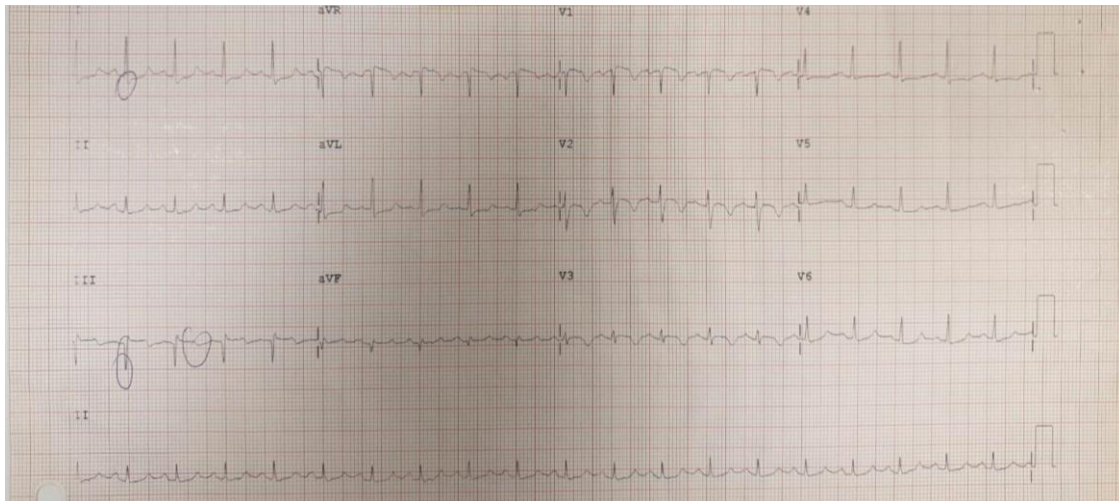


Figure 2: SIQIII TIII can be present with T wave inversions in V1-3

LEARNING POINTS

- Remember ECG changes and troponin elevation can be present in PE.
- The commonest ECG finding in PE is a NORMAL ECG.
- Sinus tachycardia can be seen in 40- 50% of all cases of PE.
- T wave inversion in anterior and inferior leads can be seen in up to 35% of cases and represents right heart strain pattern.
- SIQIIITIII is found only in 15-25% of all cases of PE. It is NOT always present in PE.
- Other ECG findings of PE include incomplete or complete right bundle branch block, right axis deviation and atrial arrhythmias.

REFERENCES

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