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When ECG is the mirror of the lung: Uncommon pattern in pneumothorax

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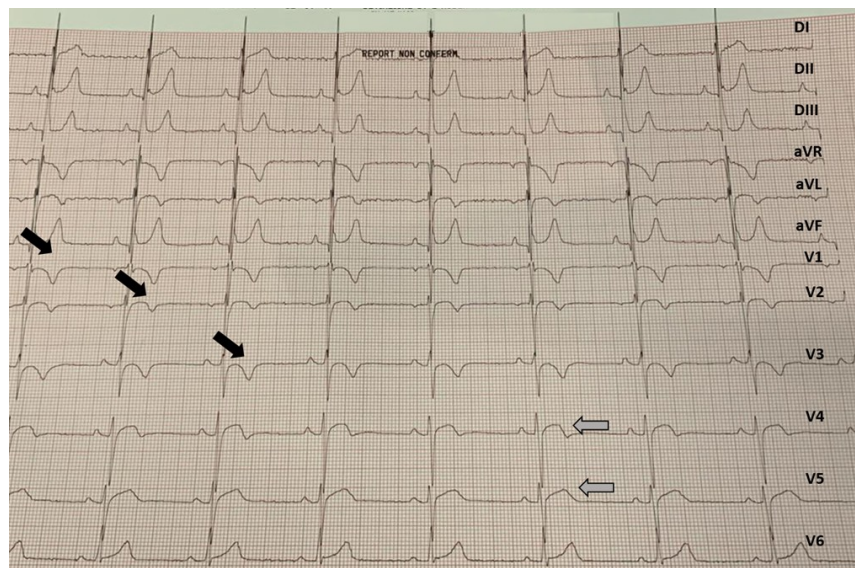
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Abstract

A 22-year-old man was admitted to the emergency department because of new onset chest pain. The discomfort started suddenly at rest and progressively increasing in intensity. As per protocol an electrocardiogram (ECG) was performed and troponin blood levels were measured. The ECG was abnormal with normal troponin levels at two evaluations 1-hour apart. Different diagnosis were then considered, such as unstable angina, pericarditis and myocarditis. However, because of troponin levels were normal, echocardiogram showed a normal myocardial function with no pericardial effusion, c-reactive protein and white blood cells were within the range, an extra cardiac cause was thought. Thus, a CT scan was scheduled showing the presence of a pneumothorax at which the ECG modifications were related.

QUESTION 1

A 22-year-old man was admitted to the emergency department because of new onset chest pain. As per protocol an electrocardiogram (ECG) was performed and troponin blood levels were measured. The ECG was abnormal with normal troponin levels at two evaluations 1-hour apart. What can explain this condition?

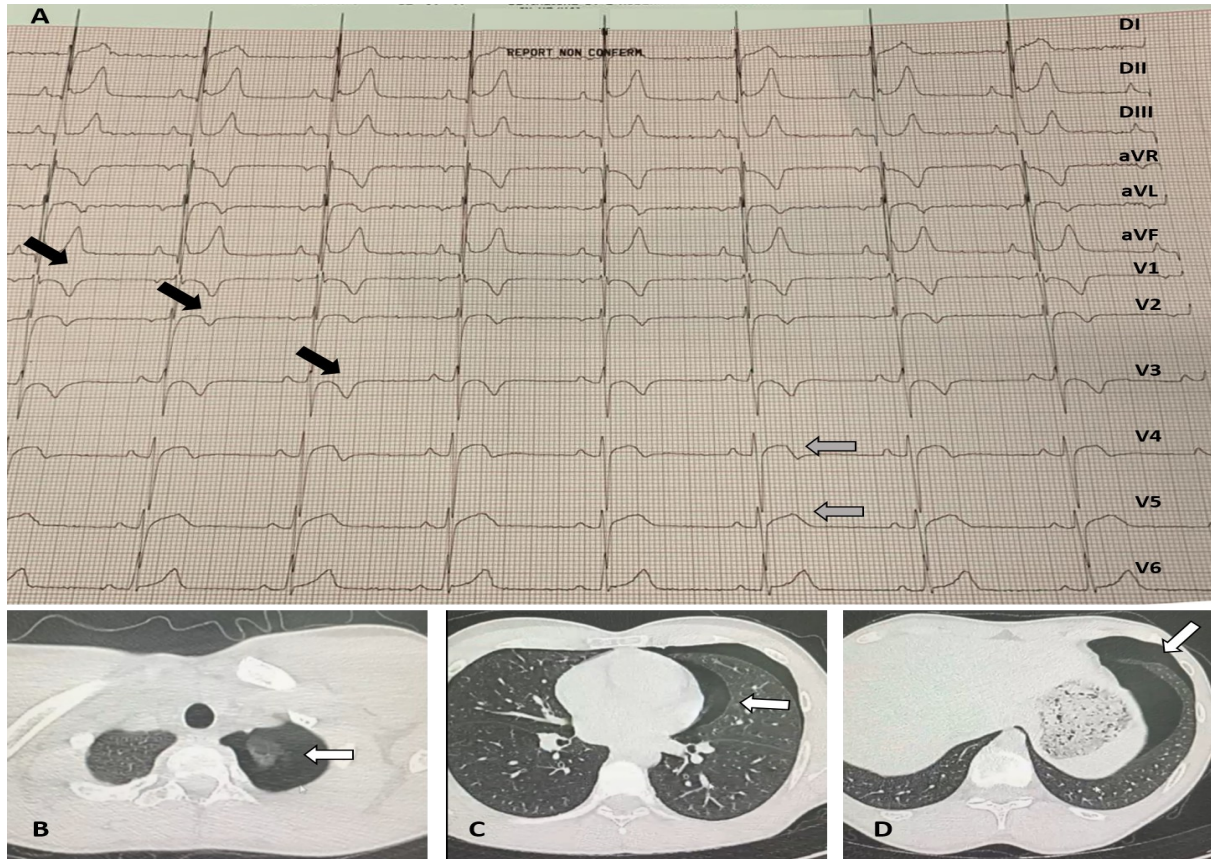


- | | |
|--------------------|-----------------|
| 1. Unstable angina | 3. Pneumothorax |
| 2. Pericarditis | 4. Myocarditis |



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CASE DISCUSSION



A 22-year-old man was admitted to the emergency department (ED) because of new onset chest pain. At admission, the electrocardiogram (ECG), troponin blood levels and emergency lab tests were performed. The chest pain suddenly occurred at rest and progressively increased in intensity. No trauma was recorded and personal history was negative for major cardiovascular event. No apparently risk factors. Pain was felt behind the breastbone, spreading to both shoulders and neck, getting worse when coughing, lying down and taking a deep breath with improvement when leaning forward. No fever. Heart rate was normal with a slightly increase in breath rate (up to 20 breaths per minute). A mild dyspnea was reported (Grade 1 nMRC) mainly for the severity of chest pain. The ECG show a T wave inversion from leads V1 to V3 (**Figure 1: A, black arrows**) with an ST elevation in leads V5-V6 (**Figure 1: A, gray arrows**). Troponin levels were normal at two evaluations 1-hour apart. C-reactive protein, D-Dimer and NT proBNP were negative and white blood count within the range. The echocardiographic evaluation was normal with no pericardial effusion but a missing apical view was reported. Acute coronary syndrome, myocarditis and pericarditis were then ruled out. Wells score was also evaluated with an unlikely diagnosis of pulmonary embolism. Because of the age, lab test within the range, ECG modifications, and echocardiographic findings, a thorax CT scan was requested straightly. It showed a large left-sided pneumothorax with rims of air around the edges of the lung from the apex to bottom (**Figure 1: B, C and D, white arrows**).^{1,2} The ECG changes here described are uncommon compared to the ones already reported in literature,³ thus they should be added to the existing patterns.

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