

CONTINUING MEDICAL EDUCATION ΣΥΝΕΧΙΖΟΜΕΝΗ ΙΑΤΡΙΚΗ ΕΚΠΑΙΔΕΥΣΗ

Electrocardiogram Quiz – Case 38

A 70-year-old man presented to the emergency department of our hospital complaining of sudden onset dyspnea and chest tightness of an hour duration. The patient's medical history included chronic obstructive pulmonary disease (COPD) and arterial hypertension under treatment. He was hemodynamically stable with normal vital signs. The initial 12-lead surface electrocardiogram (ECG) is depicted below.

Questions

- What abnormal ECG findings are present?
- What is the differential diagnosis?

Comment

COPD is a lung disease characterized by chronic obstruction of lung airflow that interferes with normal breathing and is not fully reversible.

ECG changes occur in COPD due to the presence of hyperexpanded emphysematous lungs within the chest; the long-term effects of hypoxic pulmonary vasoconstriction upon the right side of the heart, causing pulmonary hypertension and subsequent right atrial and right ventricular hypertrophy (i.e. cor pulmonale).

The most typical ECG findings in emphysema include: Rightward shift of the P wave axis with prominent P waves in the inferior leads and flattened or inverted P waves in leads I and aVL, rightward shift of the QRS axis towards +90° (vertical axis) or beyond (right axis deviation), exaggerated atrial depolarization causing PR and ST segments that "sag" below the TP baseline, low voltage QRS complexes, especially in the left precordial leads (V4–6), clockwise rotation of the heart with delayed R/S transition point in the precordial leads

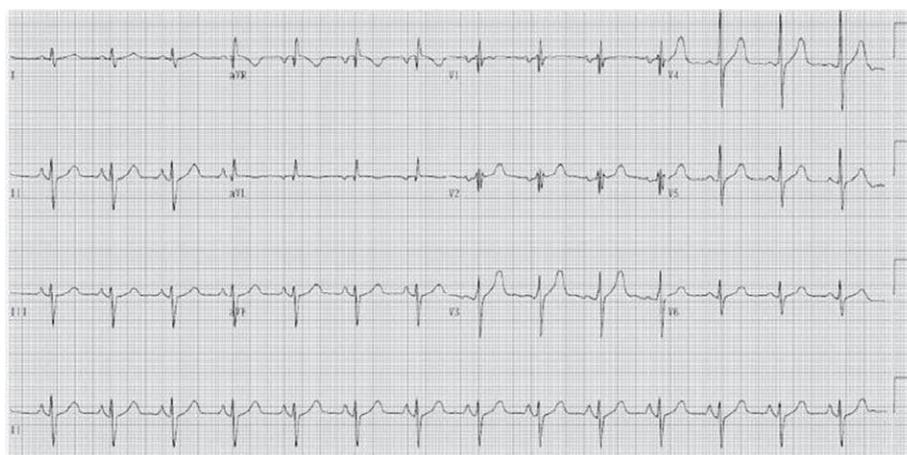


Figure 1

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ΑΡΧΕΙΑ ΕΛΛΗΝΙΚΗΣ ΙΑΤΡΙΚΗΣ 2017, 34(5):719

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+/- persistent S wave in V6. There may also be complete absence of R waves in leads V1–3 (the "SV1-SV2-SV3" pattern). With development of cor pulmonale, right atrial enlargement (P pulmonale – tall, peaked P waves in inferior leads I, II, aVF, as in our patient), and right ventricular hypertrophy (RVH) are also seen. It is important to note that P pulmonale may appear transiently in patients with acute pulmonary embolism. Additional ECG changes may include: Right bundle branch block (usually due to RVH), multifocal atrial tachycardia – a rapid, irregular atrial tachycardia with at least three distinct P wave morphologies (associated with increased mortality in patients with COPD).

References

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