

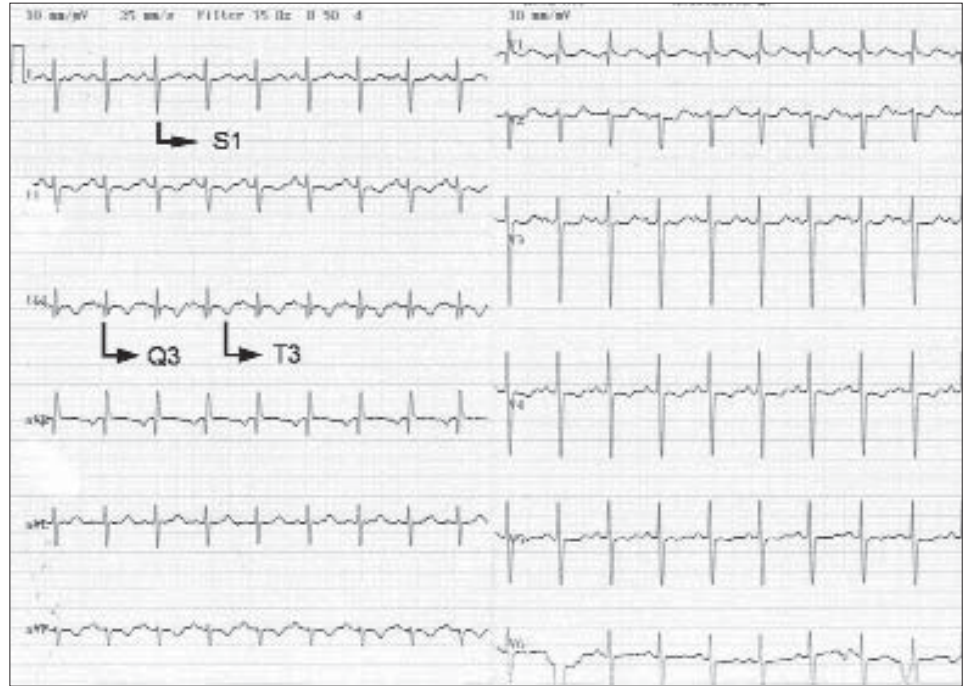
Shortness of Breath

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A 56-year-old male presented to the Emergency Department (ED) complaining of shortness of breath. Because of the high clinical concern for PE, the patient underwent diagnostic evaluation. The results of the clinical and laboratory evaluations confirmed the diagnosis of pulmonary embolism. An Electrocardiogram which was obtained in the ED is shown below.



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**For the diagnosis and teaching points, see page 97.*

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Diagnosis

S₁Q₃T₃ pattern

Teaching Points

Electrocardiogram showed S₁Q₃T₃ pattern (arrows) with incomplete right bundle branch block. This pattern is known as S₁Q₃T₃ and is characterized by an S wave in lead I, a Q wave in lead III, and shallow T wave inversions in lead III. Acute pulmonary embolism causes pulmonary artery flow obstruction, resulting in elevated pulmonary artery and right heart pressures. These changes can result in electrocardiographic changes consistent with right heart strain pattern (acute cor pulmonale).

The classic S₁Q₃T₃ pattern, mistakenly considered pathognomonic for acute PE by many clinicians, in fact, is seen quite rarely. A minority of patients (12%) with angiographically documented acute PE initially had the electrocardiographic S₁Q₃T₃.^[1] S₁Q₃T₃ on the electrocardiogram has been suggested to be specific for PE, however, it is equally likely to be found in patients without PE who were initially suspected to have PE.^[2] It is frequently transient, resolving within 14 days after onset of the disease.^[1]

References

1. Ullman E, Brady WJ, Perron AD, Chan T, Mattu A. Electrocardiographic manifestations of pulmonary embolism. *Am J Emerg Med* 2001;19:514-9.
2. Rodger M, Makropoulos D, Turek M, Quevillon J, Raymond F, Rasuli P, et al. Diagnostic value of the electrocardiogram in suspected pulmonary embolism. *Am J Cardiol* 2000;1;86:807-9, A10.