Visual Diagnosis in Emergency Medicine

BEDSIDE ULTRASOUND TO EVALUATE PULMONARY EMBOLISM MASQUERADING AS ST ELEVATION MYOCARDIAL INFARCTION (STEMI)

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INTRODUCTION

We present a case highlighting the use of bedside ultrasound to aid in the diagnosis of pulmonary embolism (PE). This patient had chest pain and electrocardiogram (ECG) findings that seemed otherwise consistent with ST elevation myocardial infarction (STEMI); ultrasound was instrumental in his diagnosis and subsequent treatment. The frequent similarities in presentation of these two diseases are well described. Several relevant studies have shown how bedside ultrasound can evaluate undifferentiated shock and suggest PE in cases such as this.

CASE REPORT

A 55-year-old previously healthy man presented with sudden, severe dyspnea and chest pain. He appeared distressed, with oxygen saturation of 91% on room air, clear lungs, and a blood pressure that declined over 15 min to 90/54 mm Hg. ECG showed sinus tachycardia with 2-mm ST elevation in aVR and V1, with 1–3-mm ST depression in the inferior and lateral leads (Supplementary Figure 1). While the patient was awaiting intrafacility transport for emergent coronary catheterization to treat presumed myocardial infarction (MI), the emergency medicine resident performed an ultrasound, which revealed right ventricular (RV) dilatation (Figure 1) and right popliteal vein thrombosis that was undetected on initial physical examination (Figure 2). The patient was diverted from coronary angiography and...

Figure 1. Apical 4-chamber view cardiac ultrasound showing right ventricular dilatation (RV) with septal bowing into the left ventricle (LV).

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underwent computed tomography pulmonary angiography, which showed bilateral PE (Figure 3).

**DISCUSSION**

PE can present with diverse ECG findings and is known to masquerade as MI (1,2). This patient’s presentation demonstrated how ST elevation in aVR with diffuse ST depressions—known to indicate left main coronary artery obstruction—can also represent PE (3). The basis for these ECG changes is poorly understood, but may be associated with elevated RV end-diastolic pressure (4).

Although not a direct test for PE, ultrasound both diagnoses deep vein thrombosis and shows echocardiographic changes such as RV dilatation that suggest hemodynamically significant PE (5). In the emergency department, ultrasound can be used to manage undifferentiated hypotensive patients and also may benefit patients with incorrect preliminary diagnoses such as suspected MI (6,7). Echocardiography showing RV dilatation may also determine which patients with PE benefit from reperfusion therapies such as fibrinolysis (8,9).

**REFERENCES**

Supplemental Figure 1. Presenting electrocardiogram showing ST elevation in aVR and V1 with ST depression in the inferior and lateral leads.