Saddle Up for a (Sub)Massive Problem

Zachary Wynne, MD; Robert Paterson, MD; Brian Euerle, MD
University of Maryland Emergency Medicine

Chief Complaint

Exertional chest pain and dyspnea

History of Present Illness

32 year old woman with past medical history of asthma who presents with intermittent, worsening, exertional chest pain and shortness of breath beginning several days after receiving the first of her COVID-19 vaccination series. No fever, cough, sore throat, abdominal pain, nausea, or vomiting.

Pertinent Physical Exam

Vitals: BP 115/85, P 120, RR 22, SpO2 98% on 3L NC, T 37.2
General: mild respiratory distress, speaking short sentences
Neck: supple, no JVD
Cardiovascular: tachycardic, regular rhythm, no murmurs
Pulmonary: no retractions, clear to auscultation bilaterally
Abdomen: soft, nontender
Extremities: 2+ peripheral pulses, no edema

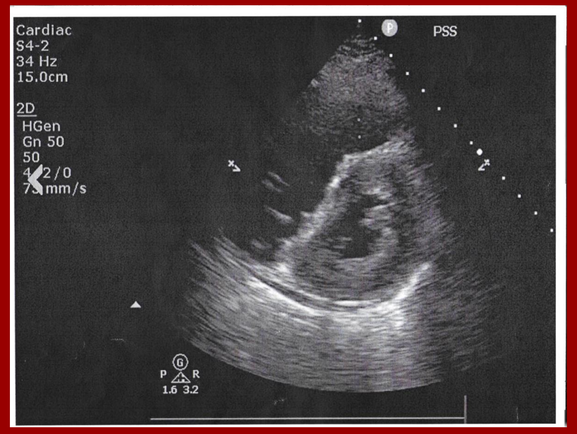

Image 1: Parasternal short axis view of heart showing "D-sign" consistent with right ventricular dilation

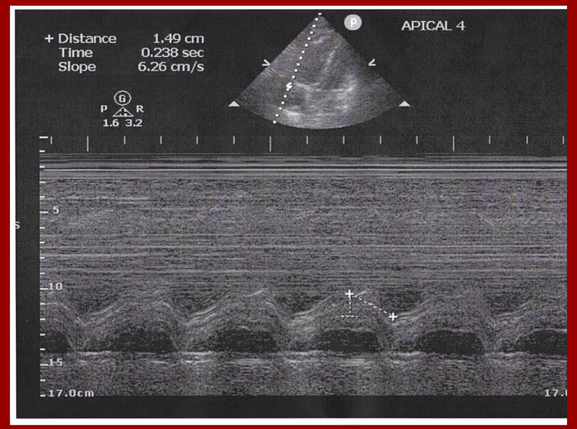

Image 2: M-mode of apical 4 chamber measuring tricuspid annular plane systolic excursion (TAPSE), measured to be 14.9 mm (normal > 17 mm)

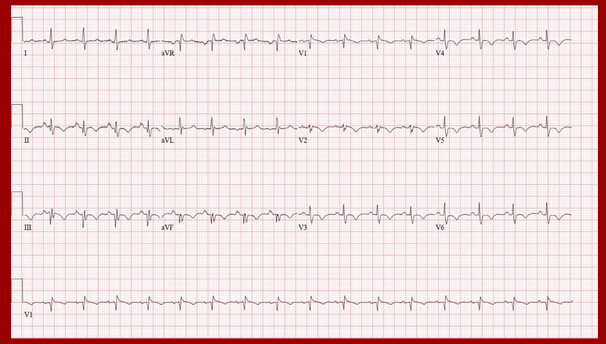

Image 3: EKG showing right heart strain pattern (S1Q3T3 pattern)

Case Discussion

- CTA Chest was obtained which showed a saddle pulmonary embolism.
- Troponin of 0.16 and BNP of 920 confirmed presence of RV strain with a BOVA score of 4
- Case was discussed with Pulmonary Embolism Response Team (PERT) who recommended ICU admission. Patient was started on a heparin drip for anticoagulation.
- Patient remained stable. Vascular Surgery was consulted and recommended no surgical intervention.
- Patient was ultimately transitioned to dabigatran for oral anticoagulation for minimum three months.
- A hypercoagulability workup was planned to be performed as an outpatient as the patient later found out her mother had a history of blood clots.

Pearls

- The "classic EKG findings in acute PE are:
  1. Tachycardia
  2. Complete or incomplete right bundle branch block
  3. Right axis deviation
  4. S-wave in lead I, Q-wave in load III, and T-wave inversion in lead III (S1Q3T3)
  5. Simultaneous T-wave inversions in anteroseptal and inferior leads

- Tricuspid annular plane systolic excursion (TAPSE) is a gross estimate of right ventricular function based on the change in length of the RV. Several studies have shown that values less than 15-16 mm correlate with PE-related mortality.

- The "D-sign" is septal flattening in the parasternal short axis resulting from increased RV pressures and volume relative to the adjacent left ventricle. It is widely considered to be a sign of right heart strain in acute PE.

Clinical Questions

1. What percentage of patients diagnosed with a PE do not report chest pain?

Approximately 50%!

2. Which patients can be considered for outpatient treatment of a PE after ED observation?

Patients without signs of right heart strain on EKG, biomarkers, or echocardiography; not on supplemental oxygen; who are not at risk for bleeding; and have good outpatient follow-up.