CHEST

A 70-Year-Old Woman Presenting With Diarrhea and In-hospital Cardiac Arrest

Arun Jose, MD; Domingo Franco-Palacios, MD; Christopher S. King, MD, FCCP; and Mardi Gomberg-Maitland, MD, FCCP

VIDEO

CHEST 2018; 153(1):e5-e8

A 70-year-old woman with a history of asthma, a renal transplant in 2010, and long-standing paroxysmal atrial fibrillation presented to the hospital with bloody diarrhea for 1 week. She also reported dyspnea, weight loss, fatigue, and hair loss for several months. An evaluation for her dyspnea included a coronary angiography without obstructive disease and echocardiography exhibiting normal biventricular function.

On admission, the patient was afebrile in no acute distress, with an irregular heart rate of 86 beats/min, blood pressure of 128/72 mm Hg, and a room air oxygen saturation of 98%. Her neck was supple without visible goiter, her cardiopulmonary system examination was normal, and her abdomen was soft.

The patient's evaluation included an ECG in sinus rhythm with no evidence of ischemia, atrial, or ventricular enlargement or hypertrophy. She had noninfectious diarrhea. An abdominal CT scan showed nonspecific colitis, later dismissed by a colonoscopy revealing only hemorrhoids. The patient improved with antibiotic treatment. Postprocedure, she developed atrial fibrillation with a rapid ventricular rate requiring treatment with beta-blockers, calcium channel blockers, and several loading doses of IV amiodarone.

The patient's thyroid-stimulating hormone level was undetectable, and the free T4 level was three times above the upper reference limit. She had a markedly elevated thyroid peroxidase antibody and thyrotropin receptor antibody levels. A neck ultrasound revealed multiple thyroid nodules without increased vascularity. With the discovery of these laboratory abnormalities, and in agreement with endocrinology and cardiology, the amiodarone was subsequently stopped, approximately 5 days following its initiation.

One week following admission, during physical therapy, the patient experienced nausea, diaphoresis, and subsequently experienced pulseless electrical activity cardiac arrest. She was resuscitated, intubated, and transferred to the ICU. A bedside cardiac ultrasound was performed (Video 1).

Question 1: What abnormalities are seen in this patient's cardiac ultrasound, and based on these abnormalities, what is the next appropriate examination that should be performed?

Question 2: Based on the clinical presentation and imaging data so far, what is the most likely diagnosis? What is the next appropriate examination that should be performed?

Question 3: Based on the imaging studies and the patient's clinical presentation and laboratory data, what is the most likely etiology for the patient's cardiac arrest?

AFFILIATIONS: From the Pulmonary, Critical Care, Sleep Division (Dr Jose), The George Washington University MFA, Washington, DC; Advanced Lung Disease and Lung Transplant Program (Drs Franco-Palacios and King), Inova Fairfax Hospital (Dr King), Falls Church, VA; and Pulmonary Vascular Disease Program (Dr Gomberg-Maitland), Inova Fairfax Hospital, Falls Church, VA.

CORRESPONDENCE TO: Arun Jose, MD, Pulmonary, Critical Care, Sleep Division, Ste 8-404, The George Washington University MFA, 2150 Pennsylvania Ave, NW, Washington, DC 22037; e-mail: ajose2@gwu.edu

DOI: https://doi.org/10.1016/j.chest.2017.07.042

Answer 1: There is a dilated right atrium, a dilated and hypokinetic right ventricle, and flattening of the interventricular septum in systole. These findings are indicative of elevated right-sided pressures and right ventricular failure. Performing a bedside lower-extremity Doppler ultrasound examination to rule out DVT is the next appropriate step in diagnosis.

Answer 2: The most likely diagnosis at this point would be an acute pulmonary embolism. Despite the negative venous Doppler ultrasound examination, the presence of right ventricular failure following an acute cardiac arrest event is highly concerning for an underlying pulmonary embolism. A CT angiography examination would be required to definitively rule out the diagnosis. In the presence of hemodynamic shock requiring vasopressors and a high suspicion for pulmonary embolism with acute right ventricular failure, consideration should be given to empiric thrombolytic therapy. However, the patient was deemed stable to be transported for a CT scan, and the recent cardiopulmonary resuscitation event and associated trauma, as well as the low amount of vasopressor support required, made empiric thrombolysis a less attractive option.

Answer 3: Hyperthyroidism-inducing acute pulmonary hypertension and right ventricular failure.

Ultrasound examination of the lower extremities was performed and was negative for thrombus (Figs 1, 2).

CT angiography ruled out pulmonary embolism but was notable for an enlarged pulmonary artery and dilated right ventricle (Figs 3, 4). Results of comprehensive testing for autoimmune, rheumatologic, and HIV disease were negative. Results of a ventilation/perfusion scan were also negative.

Discussion

The patient experienced a cardiac arrest event in the setting of right ventricular dysfunction, frequent atrial fibrillation, and laboratory data indicative of hyperthyroidism. Following a successful resuscitation, the patient was transferred to the ICU and was evaluated for the etiology of her cardiac arrest. CT angiography postarrest ruled out pulmonary embolism. Her rib fractures, a small pneumothorax, and a small hemoperitoneum were all believed to be secondary to the resuscitative effort. On initial bedside echocardiography, a dilated right atrium and right ventricle were noted, with evidence of acute right ventricular pressure overload and thickening of the right ventricular wall.

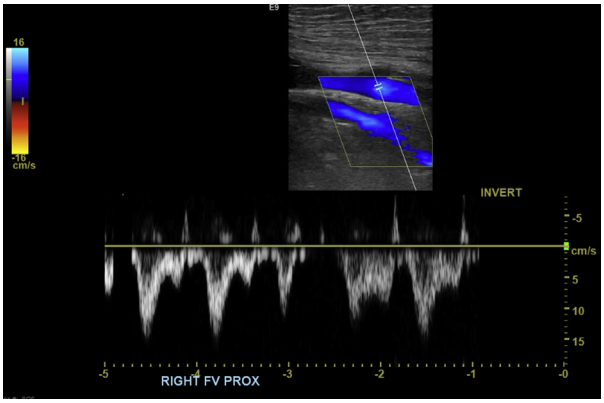

Figure 1 – *Ultrasound image of right proximal femoral vein (PFV) demonstrating lack of thrombus.*

Given the relatively normal echocardiographic assessment a few months earlier, this new right heart abnormality on echocardiography suggests that a diagnosis of acute-on-chronic right ventricular failure contributed to the patient's cardiac arrest, likely exacerbated by a physical therapy session and thyrotoxicosis-induced myocardial hyperstimulation. Graves' disease, Hashimoto's thyroiditis, and the presence of thyroid autoantibodies are all associated with pulmonary arterial hypertension (PAH). A prospective study of patients with PAH who underwent

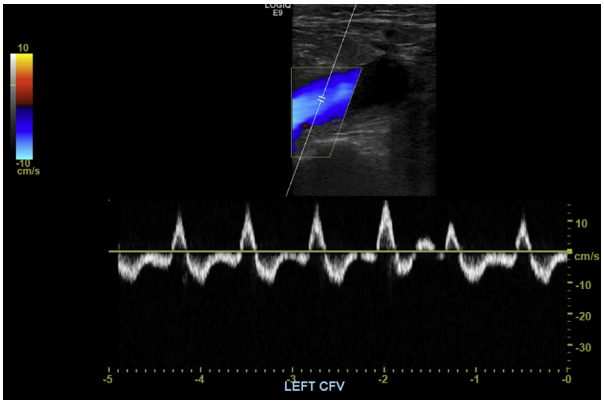

Figure 2 – *Ultrasound image of left CFV demonstrating lack of thrombus. CFV = common femoral vein.*