A cardiac mass diagnosed using point-of-care ultrasound in a dyspneic patient

An integrated ultrasound examination of lung-heart-inferior vena cava

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Case Presentation

A 74-year-old woman with history of hypertension presented to the Emergency Department (ED) with severe resting dyspnea and swelling in the feet, ankles and legs. She was on treatment with furosemide and a beta blocker. At the time of admission blood pressure was 145/88 mmHg, heart rate (HR) 99 bpm, regular, oxygen saturation was 89\% (FiO2 21\%) and respiratory rate was 17 breaths/min. Chest auscultation revealed no significant abnormality. Cardiovascular examination revealed normal cardiac rhythm and extremities’ pitting edema. The ECG exhibited sinus rhythm (HR=99 bpm), right bundle branch block (RBB) and left anterior fascicular block (LAFB).

Blood tests revealed leukocytosis of 13,900 cells per mm\(^3\), N-Terminal pro-Brain Natriuretic peptide (NT-pro-BNP) level of 23336 pg/mL (normal, < 125 pg/mL), international normalized ratio of 1.59, bilirubin level of 3.12 mg/dL (normal, < 1.2 mg/dL), Aspartate aminotransferase (AST/GOT) level was 71 UI/L (normal, <40), Glomerular Filtration Rate (GFR) was 54.32 mL/min/1.73 m\(^2\) and electrolytes were within normal parameters. The patients denied previous viral hepatitis or other liver disease. Chest radiography appeared normal.

Point-of-care ultrasound (POCUS) with pocket size device was done upon arrival in ED (online Video S1-1a-2).

Discussion

On POCUS the parasternal long axis view showed left ventricle normal in size and function. From Apical 4-chamber view a large mass in the right atrium (RA) extending to or originating from the inferior vena cava (IVC) (online Video S1) was found with clear impairment of tricuspid valve function (online Video S1a). Point-of-care abdominal ultrasound revealed a hepatic lesion extending in the IVC (Figure 1, online Video S2) and into the RA. Lung ultrasound showed predominantly A-Profile bilaterally.

The patient underwent Contrast-enhanced CT scan of abdomen and thorax that showed a large liver lesion (15x12x12 cm) suggestive of Hepatocellular Carcinoma (HCC) extending into IVC and RA and multiple right lung segmental perfusion defects (Figure 2).

Our diagnosis was: pulmonary microembolism due to neoplastic mass infiltrating the inferior vena cava and the right atrium.

Among cardiac masses secondary tumors are a hundred times more common than primary cardiac lesions and they are, usually, located in the right side of the heart [1][2]. Metastasis may reach the heart via the lymphatic or hematogenous route, or by direct or venous extension [1]. Hepatocellular carcinoma accounts for 1-2.5\% of all cancer in America with extension to inferior vena cava and right atrium in 1-4\% of the cases [3].

Symptom presentations for cardiac tumors is quite varied, but it is dependent upon tumor location and size, rather than upon histologic characteristics. Presentation includes congestive heart failure from intracardiac obstruction, systemic or

Figure 1. A large liver lesion extending into Inferior Vena Cava (IVC).
Conclusions

The integrated ultrasound examination of lung-heart-inferior vena cava is an extension of the clinical examination. In particular, Point-of-care ultrasound done in emergency department can be of a great help in rapid identification of correct diagnosis in patients with heart failure even in presence of rare conditions (such as cardiac masses) that require usually more advance imaging modalities.

References