Acute Cor Pulmonale from Massive Bilateral Pulmonary Emboli

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Citation

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Abstract

In the United States, pulmonary embolism (PE) is a common cause of morbidity and mortality. Several authors have described the EKG changes associated with PE, the presence of a S1 Q3 T3 is suggestive of right heart strain and cor pulmonale. We present a case of 62 y/o male on day number 20 s/p radical cysto-prostatectomy and neobladder for Urothelial Cell Carcinoma, who after a long automobile trip developed acute cor pulmonale from a lethal pulmonary embolism.

CASE PRESENTATION

This is the case of a 62 y/o male on day number 20 s/p radical cysto-prostatectomy and neobladder for Urothelial Cell Carcinoma. Days prior to the Emergency Department visit he was hospitalized at another institution for a partial small bowel obstruction that resolved. Patient was sent to our hospital for a urological evaluation, to get to our institution patient drove approximately four hours, upon arrival to our city patient became acutely short of breath, tachycardic with chest discomfort and light-headedness Emergency Medical Services transporting the patient to our Emergency Department were initial vital signs were significant for a heart rate of 130's Blood Pressure of 80/50s and a respiratory rate of 35-40. The patient developed Acute Cor Pulmonale as witnessed by and EKG demonstrating an S1Q3T3 and new right bundle branch block (figure-2) with a comparison EKG from three weeks earlier (figure-1) demonstrating a normal sinus rhythm, this phenomenon resulted from massive bilateral pulmonary emboli (PE) as seen in figure-3.

Figure 1

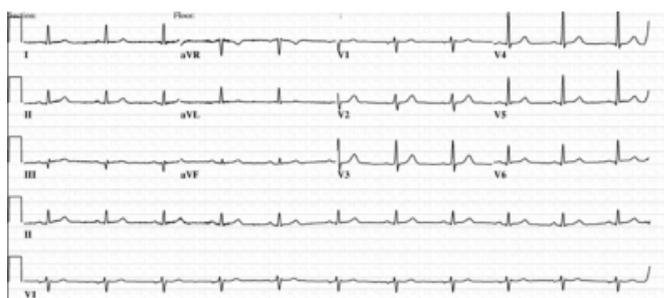Figure 1: Patients EKG three weeks prior to presentation

Figure 2

Figure 2: Electrocardiogram at presentation to the Emergency Department

Figure 3

Figure 3:Computerized Axial Tomography (CT) demonstrating bilateral main pulmonary artery emboli.

DISCUSSION

In the United States, pulmonary embolism is the third most common cause of death, with at least 650,000 cases occurring annually and a death toll of 50,000 to 100,000 annually ([1]). For pulmonary embolism, the electrocardiogram (EKG) has been described to be neither sensitive nor specific ([2]), with the most commonly seen EKG abnormality seen in patients with PE is sinus tachycardia.

The initial characterization of electrocardiographic abnormalities associated with pulmonary embolism was reported by McGinn and White in 1935, their description included the presence of a Q wave in lead III with late inversion of the T wave, and an S wave in lead I (S1Q3T3). The classic S1Q3T3 pattern is described to be present only in 20 % of cases, Ferrari et al ([3]) found that this pattern had a sensitivity of 54% and a specificity of 62%. Other ECG findings in PE include right bundle-branch block, right axis deviation, atrial fibrillation, and T-wave changes ([2,3]). The combination of S1Q3T3 with a new right bundle branch block seen in this case presentation is indicative of acute Cor Pulmonale, but in this particular clinical setting was highly suspicious for PE with right ventricular strain. Any cause of acute cor pulmonale can cause the S1Q3T3 finding on the

ECG including PE, acute bronchospasm, pneumothorax, and other acute pulmonary problems.

In a retrospective study published by Sreeram et al ([4]) the admission and serial ECGs of patients hospitalized with proven pulmonary embolism ECGs of 49 patients were reviewed by three independent observers, they found that Pulmonary embolism was considered as the primary diagnosis in 76 percent of the patients based on the presence of three or more of the following diagnostic ECG criteria: (1) incomplete or complete right bundle branch block (2) S waves in leads I and aVL of > 1.5 mm (3) a shift in the transition zone in the precordial leads to V5 (4) Q waves in leads III and aVF, but not in lead II (5) right-axis deviation, with a frontal QRS axis of > 90 degrees or an indeterminate axis (6) a low-voltage QRS complex of < 5 mm in the limb leads and (7) T-wave inversion in leads III and aVF or leads V1 to V4 .Overall, the 12-lead ECG was suggestive of pulmonary embolism in 82 percent of the subjects.

The clinical presentation of PE is believed to be dependent on the clot size and lung function, with a variable ranging from an asymptomatic patient to cardiogenic shock and cardiopulmonary arrest. Signs of Right Ventricular strain and hemodynamic instability in the setting of a PE are described as indications for emergency thrombolysis and or embolectomy.

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