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ECG Conundrum

The S1Q3T3 Pattern

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A 19-year-old male, known case of nephrotic syndrome on oral steroids, presented in ER with a history of syncopal episode at home. There was no history of fever, cough ,calf pain, trauma, chest pain or immobilization. On examination, he was afebrile with a heart rate of 90 bpm, blood pressure 110/90 mm Hg, respiratory rate of 24 b/min and was maintaining oxygen saturation of 97% at room air. His general physical examination showed a slightly overweight teenager lying comfortably, in no visible distress. The systemic examination was unremarkable. His ECG was done which is shown in Figure 1.

All baseline labs including electrolytes were normal however there was a troponin leak of 74 pg/mL (up to 34.2 pg/mL) . Keeping in mind the syncopal episode, a slight troponin leak and a questionable S1, Q3, T3 pattern, we went for a D-dimer, although his PERC rule was negative. D-dimer was reported as 4749 ng/mL (up to 250 ng/mL). CT pulmonary angiogram was performed which showed prominent filling defects in bilateral pulmonary arteries, their bifurcations, upper and low lobar, segmental and subsegmental branches. He was started on anti-coagulation and admitted in high dependency unit.

Less than 5% of the people diagnosed with pulmonary embolism can have an initial presentation as syncope.[1] In a recent meta-analysis, the pooled estimate of pulmonary embolism in syncopal patients presenting to emergency department was 0.8% (95% CI 0.5-1.3%, I2=0) which is low in comparison to 3.8% in PESIT trial.[2,3] Zikai et al described a similar case of acute pulmonary embolism in two individuals with nephrotic syndrome leading to a conclusion that a hypercoagulable state may be responsible.[4] The incidental ECG finding led us to do a workup on the lines of pulmonary embolism. Current literature has shown that right ventricular strain manifested by complete or incomplete right bundle branch block and right axis deviation, tachycardia, increased QRS duration, prominent S wave in lead 1 among other changes are significantly associated with acute pulmonary embolism but show no specific association with S1Q3T3 pattern.[5] Qr pattern in lead V1 could be a potential factor associated with in-hospital mortality in high risk patients. Thus ECG changes in a patient presenting with syncope can give important clues towards a potential diagnosis of pulmonary embolism.

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Figure.1