



Diagnosis of acute myocardial infarction in the setting of left bundle pacing

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Abstract

We present a relatively rare case of ST Elevation Myocardial Infarction (STEMI) noted with left bundle pacing. Pacemaker implantation with left bundle pacing has been implemented in the electrophysiology community over the past few years as a way of creating a relatively narrow pacing QRS morphology due to the location of the pacing lead near the left bundle in the interatrial septum. Diagnosing STEMI in patients with a Left Bundle Branch Block (LBBB) or a ventricular-paced rhythm can be challenging due to discordant QRS complexes which obscure the typical ST-segment and T-wave changes.

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Case report

A 67-year-old with past medical history of aortic stenosis with previous transaortic valve replacement as well as complete heart block status post pacemaker implantation with left bundle pacing presented to the hospital experiencing 10/10 crushing chest pain. Review of Electrocardiogram (ECG) showed normal sinus rhythm with left bundle-branch pacing as well as ST-elevations noted in V2 through V5. The patient underwent an emergent angiogram which revealed a 100% ostial LAD occlusion secondary to organized thrombus. A drug-eluting stent was placed which resulted in resolution of chest pain as well as ST elevations previously noted on ECG.

Discussion

The Sgarbossa criteria can be utilized to diagnose a STEMI in the presence of a LBBB or pacing although this approach has been fraught with low sensitivity. The Sgarbossa criteria consists of three specific entities: 1) discordant ST-segment elevation greater than 5 mm in any lead leading to two points 2) concordant ST-segment depression greater than 1 mm in leads V1, V2, and V3 resulting in three points 3) concordant ST-segment

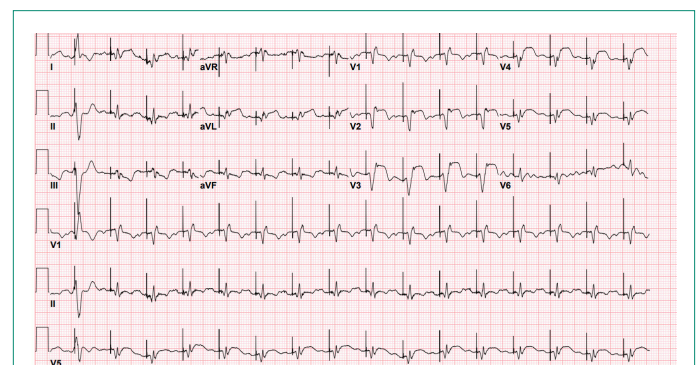


Figure 1: Presenting electrocardiogram for ST elevation in the LAD territories; note concordant ST elevation greater than 1 mm in lead aVL as well as discordant ST elevation greater than 5 mm in lead V3 thus fulfilling the Sgarbossa criteria.

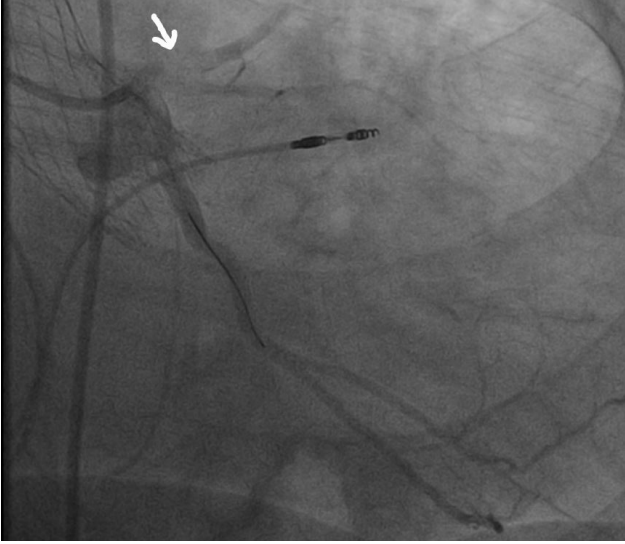


Figure 2: Coronary angiogram depicting acute thrombus formation in the ostial portion of left anterior descending artery.

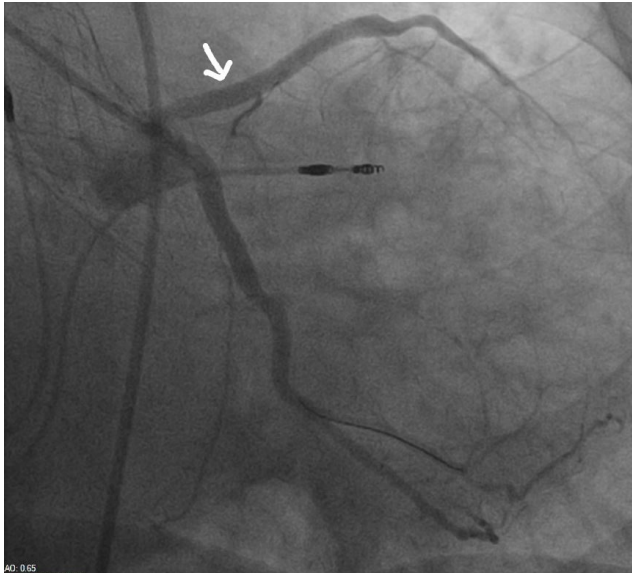


Figure 3: Coronary angiogram status post drug-eluting stent to ostial portion of left anterior descending artery.

elevation greater than 1 mm in any lead resulting in five points. In order to be diagnosed with a STEMI in the setting of pacing or LBBB, a patient needs at least three points which demonstrates a specificity of 96% and sensitivity of 36% [1,2]. Our patient was noted to have concordant ST elevation greater than 1 mm in lead VL as well as discordant ST elevation greater than 5 mm in lead V3 thus fulfilling the criteria with a total of 7 points (Figure 1).

However not all patients presenting with STEMI in the setting of pacing can be accurately diagnosed via Sgarbossa criteria [1]. As a result, the modified Sgarbossa criteria was created resulting in an increased sensitivity to 84% while maintaining a specificity >90%. The modified Sgarbossa criteria is positive if the discordant ST elevation has an amplitude >25% of the depth of the preceding S-wave [3].

Further studies are needed to determine the sensitivity and specificity of the Sgarbossa criteria as well as modified Sgarbossa criteria in patients with biventricular pacing as well as left bundle pacing.

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