

ST Segment Elevation Myocardial Infarction in Biventricular Paced Rhythm



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Introduction

The diagnosis of ST elevation myocardial infarction (STEMI) in patients with paced ventricular rhythm can be challenging [1] and often delays reperfusion therapy. Well validated and often cited Sgarbossa criteria [2] for diagnosis of STEMI in patients with LBBB although holding true for patients with right ventricular pacing may not be applicable to the patients with bi-ventricular paced rhythm. No such criteria are available for the diagnosis of STEMI in patients with biventricular-paced rhythm.

Case Report

An 85-year old gentleman with coronary artery disease (CAD) and prior proximal left anterior descending artery (LAD) stent, atrial fibrillation treated with AV nodal ablation and biventricular pacemaker implantation (Fig. 1A), and hypertension presented with Non- ST segment elevation myocardial infarction. Coronary angiogram revealed severe multivessel CAD. The LAD had a high-grade stenosis proximal stenosis and to 60% in-stent restenosis. The ramus intermedius had a 70%, second obtuse marginal artery, and an 80% and mid right coronary artery 90% stenosis. Due to recent clopidogrel use coronary artery surgery was deferred. While awaiting surgery in hospital, the patient developed abdominal discomfort and profuse diarrhoea that was complicated by acute renal failure (creatinine rose from 1.2 to 2.6). A routine electrocardiogram (ECG) ordered as a part of evaluation of hyperkalaemia in

the setting of acute renal insufficiency demonstrated concordant ST elevation of greater than 2 mm in V2, V3, aVL, discordant ST elevation of 3 mm in V4-V6 and ST depression in lead III and aVF (Fig. 1B). His baseline ECG showed biventricular pacing demonstrated by tall R wave in V1 and V2 without ST changes (Fig. 1C). With concerns of anterolateral ischaemia, the patient underwent emergent coronary angiography that revealed sub-total occlusion of LAD (Fig. 1D), which was treated with angioplasty and placement of a bare metal stent. Post intervention coronary angiography showed TIMI 3 flow. Repeat ECG showed ST segment returned to almost baseline (Fig. 2) with the exception that R wave amplitude in V1 never came to baseline, which could not be explained.

Discussion

On reviewing the literature we found only two case reports addressing diagnosis of STEMI in patients with biventricular-paced rhythm [3,4]. The clinical presentation, ECG changes and angiographic results of the identified cases and that of ours are summarised in Table 1s. Cases 1 and 3 fulfilled both Sgarbossa criteria for > 1 mm concordant (QRS complex and T wave in same direction) ST elevation while neither fulfilled criteria for > 5 mm discordant (QRS complex and T wave in opposite direction) ST elevation. STEMI was documented on coronary angiogram despite < 5 mm discordant ST elevation. In case 2 these criteria could not be definitely documented as

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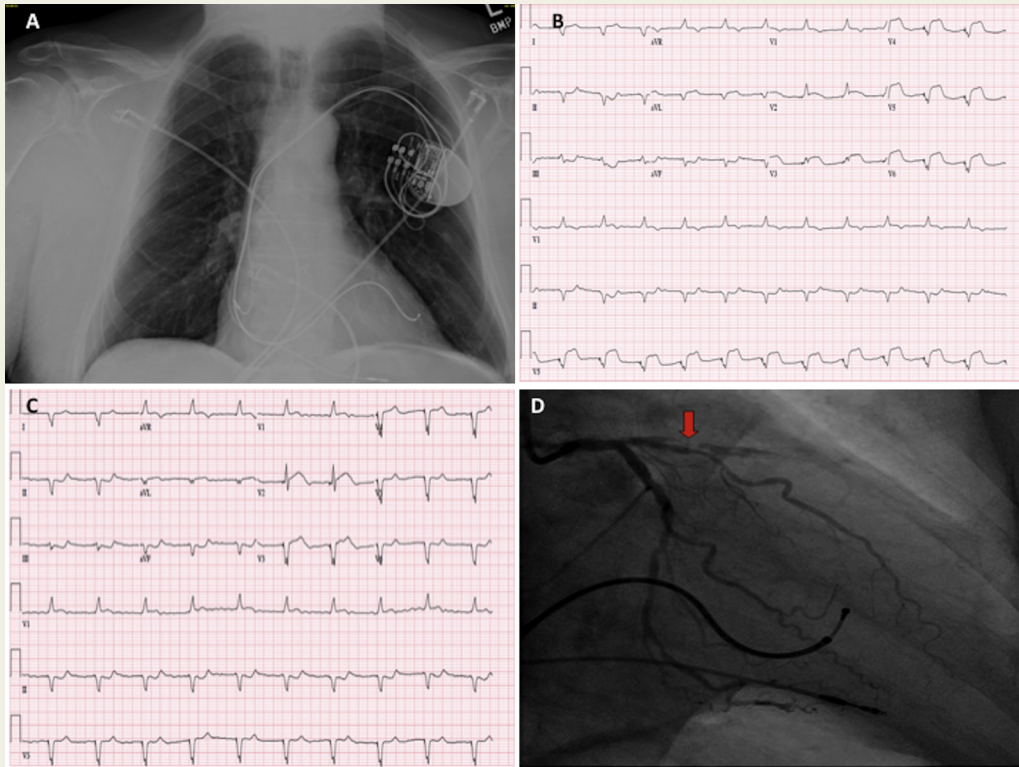


Figure 1 1A, Chest X ray demonstrating biventricular pacing leads; one in right ventricular apex and another one in posterior lateral cardiac vein. 1B, ECG showing biventricular pacing demonstrated by tall R wave in V1 and V2. The patient did not have any ST elevations on baseline ECG. 1C, ECG showing ST elevation greater than 2 mm in V2, V3, aVL (concordant leads), ST elevation less than 5 mm in V4-V6 (discordant) leads and ST depression in lead III and aVF. 1 D, Still image of coronary angiography demonstrating subtotally occluded proximal left anterior descending artery (Arrow) on right anterior oblique view.

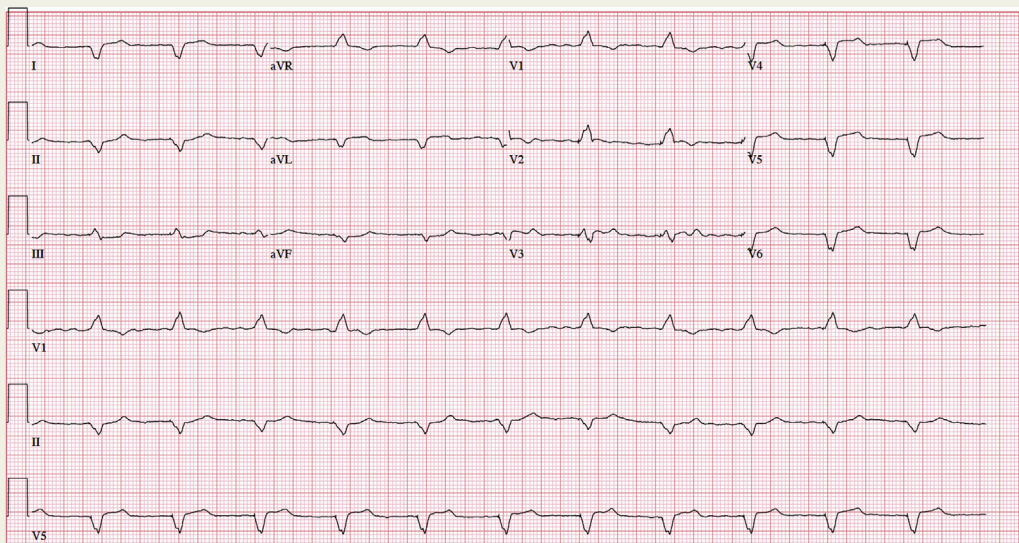


Figure 2 ECG showing normalisation of ST segments after coronary revascularisation procedures.

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