

**Transient prominent anterior QRS forces in the setting ST segment elevation
coronary syndrome: Left Septal Fascicular Block**

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Abstract

Numerous successive publications have shown that transient prominent anterior QRS forces (PAF) in the setting of acute coronary syndrome (ACS) is suggestive of critical proximal obstruction of left anterior descending coronary artery (LAD) before its first septal perforator branch (S₁). Transient ischemia of the left septal fascicle resulting in left septal fascicular block has been proposed as the causative mechanism. We present a case of acute inferior ST-elevation myocardial infarction caused by acute proximal occlusion of the right coronary artery associated with proximal critical obstruction of the left anterior descending coronary artery.

Keywords: Acute inferior myocardial infarction; prominent anterior QRS forces; Left Septal Fascicular Block, Proximal obstruction of the LAD.

Case report

A 59-year-old man, Caucasian, smoker, was admitted to our emergency department complaining of prolonged constrictive retrosternal pain for 3 hours accompanied by cold sweating.

The admission ECG is typical for impending inferior ST-elevation myocardial infarction (STEMI) accompanied by prominent anterior forces (PAF) (Figure 1). Emergent coronary angiography revealed complete proximal obstruction of the right coronary artery (RCA) with a concomitant critical lesion in the ostium of the left anterior descending coronary artery (LAD) (Figure 2); the door-to-balloon time was three and a half hours. Primary percutaneous coronary intervention (PCI) was performed with implantation of two drug-eluting stents (DES). Figure 3 shows the ECG features immediately after stent implantation.

Figure 1

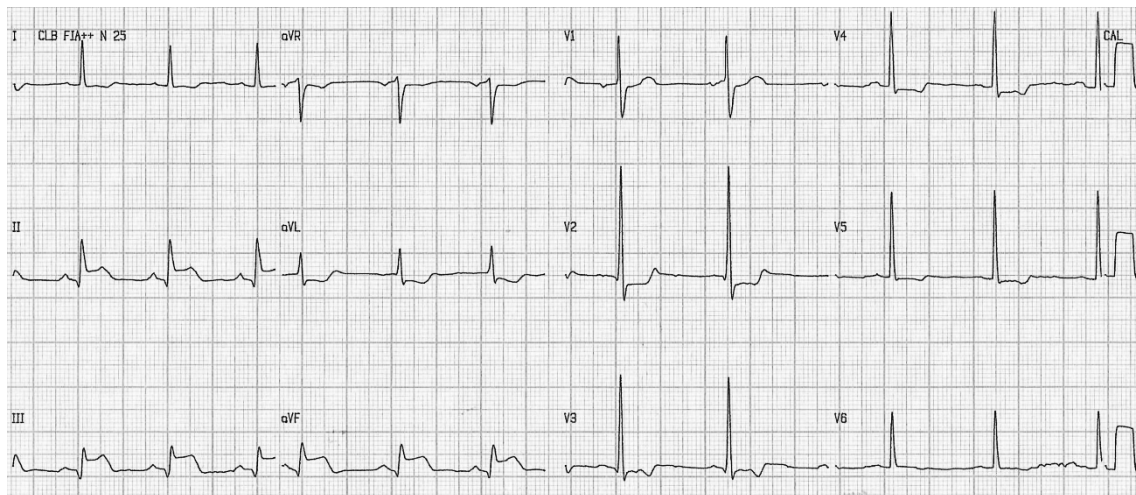


Figure 2

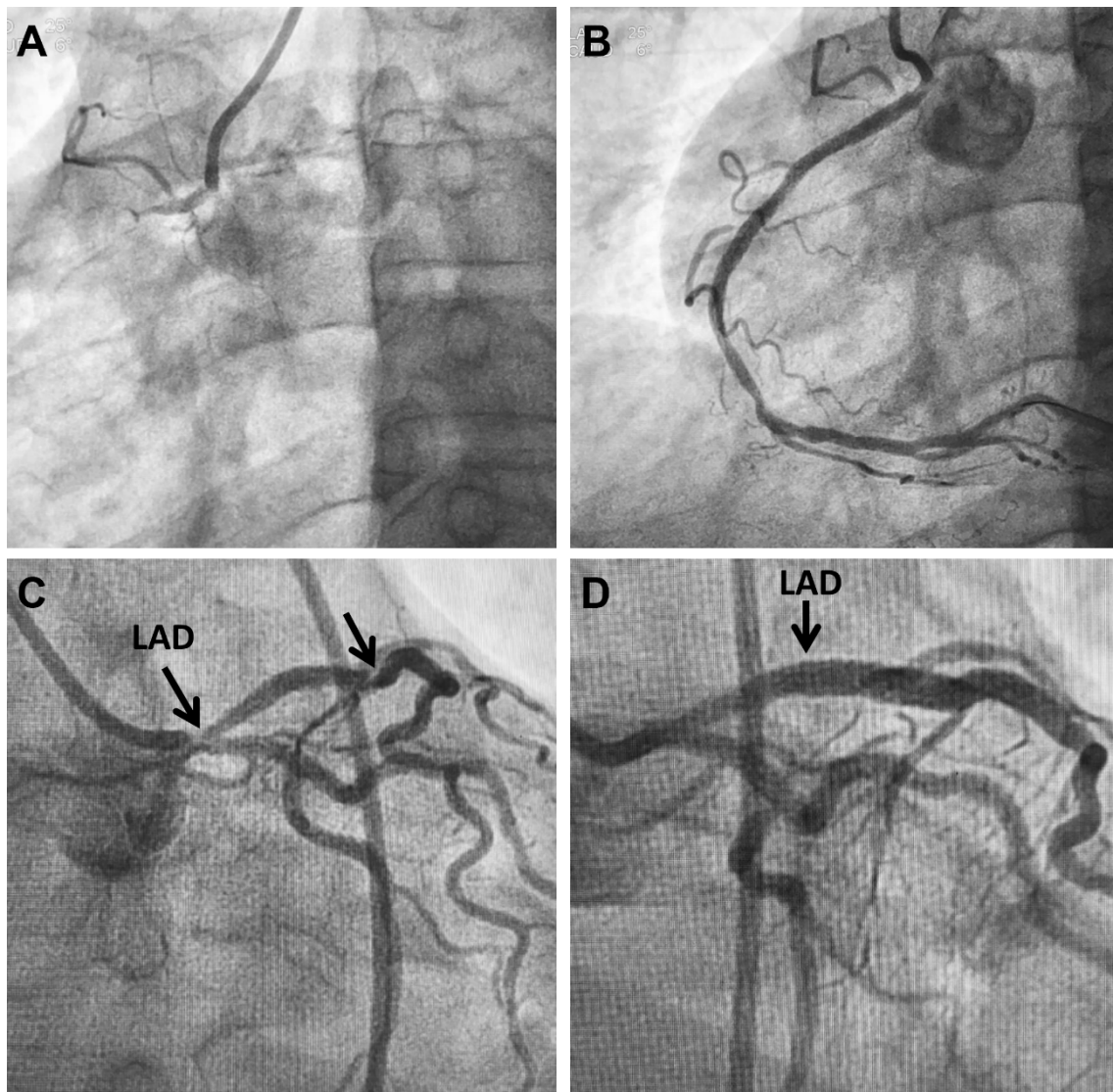
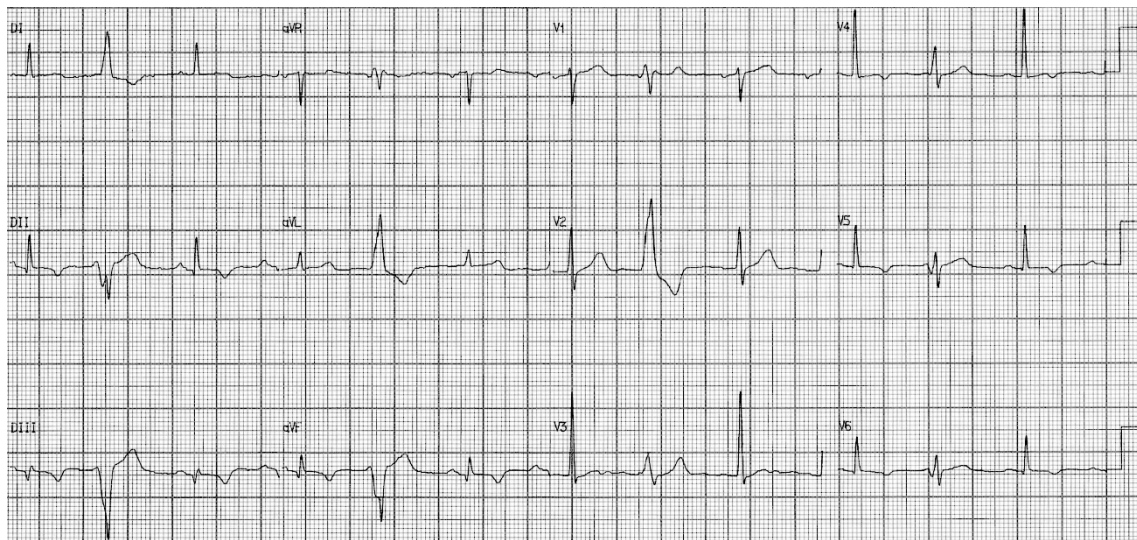


Figure 3



Discussion

Left septal fascicular block (LSFB) has been described in the following scenarios: critical proximal obstruction of the LAD before its first septal perforator branch [1] with ACS [2], Wellens' syndrome [3], chronic chagasic myocarditis in Latin America [4], Kearns-Sayre syndrome [5], self-expandable percutaneous transcatheter aortic valve implantation for severe aortic stenosis [6], diabetes mellitus [7], and manifested as aberrant conduction in apparent healthy individuals [8]. Unlike left anterior and left posterior fascicular blocks, which modify the ECG in the frontal plane, LSFB exclusively affects the precordial leads, causing PAF with anterior displacement of the QRS electromotive forces.

The anatomic background of LSFB stems from the fact that the left bundle branch divides into three fascicles or "fan-like interconnected network" in most human hearts. This has been shown in anatomical, anatomopathological, histopathological, electrocardiographic, vectorcardiographic, electrophysiologic and experimental studies.

Conclusion

In the present case report we present a 12-lead ECG, where transient ECG changes fulfilling the criteria for LSFB are present in the scenario of STEMI. PAF may have many causes, including LSFB. However, the transient nature of the ECG changes excludes all other known causes of PAF and is decisive in the differential diagnosis. A tetrafascicular conception of the intraventricular conduction system of the heart should ultimately prevail. The concept that the left bundle branch is anatomically a bifascicular structure appears to be too simplified. Therefore, we think that it is time for the term hemiblock to be replaced, thereby breaking a paradigm.

Conflicts of interest

None.

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Figure legends

Figure 1 ECG performed at admission 3 hours after the onset of pain

Electrocardiographic diagnosis: ST segment elevation in the inferior wall (STE III > STE II), concomitant ST segment depression in aVL, I and from V₁ to V₅ (reciprocal changes). Additionally, prominent anterior QRS forces: R wave voltage of V₁ \geq 5 mm; R wave of V₂ > 15 mm, R wave “in crescendo” from V₁ through V₂, small (embryonic) q wave in V₂-V₃, absence of q wave in V₅ -V₆, and I (probable absence of the first left middle septal vector), and prolonged R-wave peak time in V₁-V₂ (\geq 35 ms).

Conclusion: acute inferior STEMI indicating proximal obstruction of the RCA (STE III > STE II) and PAF suggestive of left septal fascicular block (LSFB) as a consequence of proximal severe obstruction of the LAD before its first septal perforator branch.

Figure 2

A) Proximal total obstruction of the RCA; B) RCA after stent implantation in the proximal portion of the RCA with TIMI 3 flow. In addition, we observe \approx 60% obstruction between the middle and the distal part of the RCA; C) LAD showing critical ostial obstruction (arrows); D) LAD after stent implantation with TIMI 3 flow (arrow).

Figure 3 ECG after stent implantation

Electrocardiographic diagnosis: Significant STE reversal followed by inferolateral post-ischemic T wave inversion. Disappearance of high R-wave amplitude in V₁ and V₂ and reappearance of small q waves in V₅-V₆, suggestive of conduction recovery by the left septal fascicle. Interpolated unifocal premature ventricular contractions with constant coupling from the inferior wall of the left ventricular.