



INTRODUCTION

We describe a case of high lateral ST-elevation myocardial infarction (STEMI) which was managed at our Emergency Department (ED) with a favorable outcome.

CASE REPORT

A 71-year-old lady presented to ED with typical left sided chest pain associated with diaphoresis and shortness of breath. Her electrocardiogram (ECG) showed ST elevation (STE) in leads I and aVL with reciprocal changes in lead III and aVF (Figure 1). There were no STE in the septal (V1-2) or anterior (V3-4) leads. These ECG changes correspond to a high lateral myocardial infarction (MI). At angiography, our patient had an isolated occlusion of diagonal branch (D1) of left anterior descending artery (LAD), which supplies the high lateral region of the heart (Figure 2). The occlusion was ballooned and stented, and she made an uneventful recovery.

DISCUSSION

Occlusion of the first diagonal branch (D1) of the LAD may produce isolated STE in I and aVL. The ST-segment elevation in high lateral STEMI is usually localized to lead I and aVL without involvement of V5 and V6. Occlusion of the left circumflex artery may cause STE in I, aVL along with leads V5-6 (Figure 3). Concurrent ST depression (STD) of lead II, III and aVF is usually present, as these leads are electrically opposite to I and aVL. The STE in lead I and aVL in our patient was obvious. However, other patients may present with subtle STE in the high lateral leads and the only clue is the presence of inferior STD on the ECG (Figure 4), which may be misdiagnosed as inferior ischemia. In many instances the first diagonal branch (D1) occlusion will not fulfil the STEMI criteria. The resulting missed MI are often associated with poor outcomes. Therefore, it is important to look for other early ECG clues for acute coronary occlusion which includes non-concave STE, hyperacute T waves in lead I & aVL, along with inferior reciprocal STD. A serial ECG may be useful in revealing the progression of STE in the high lateral leads.

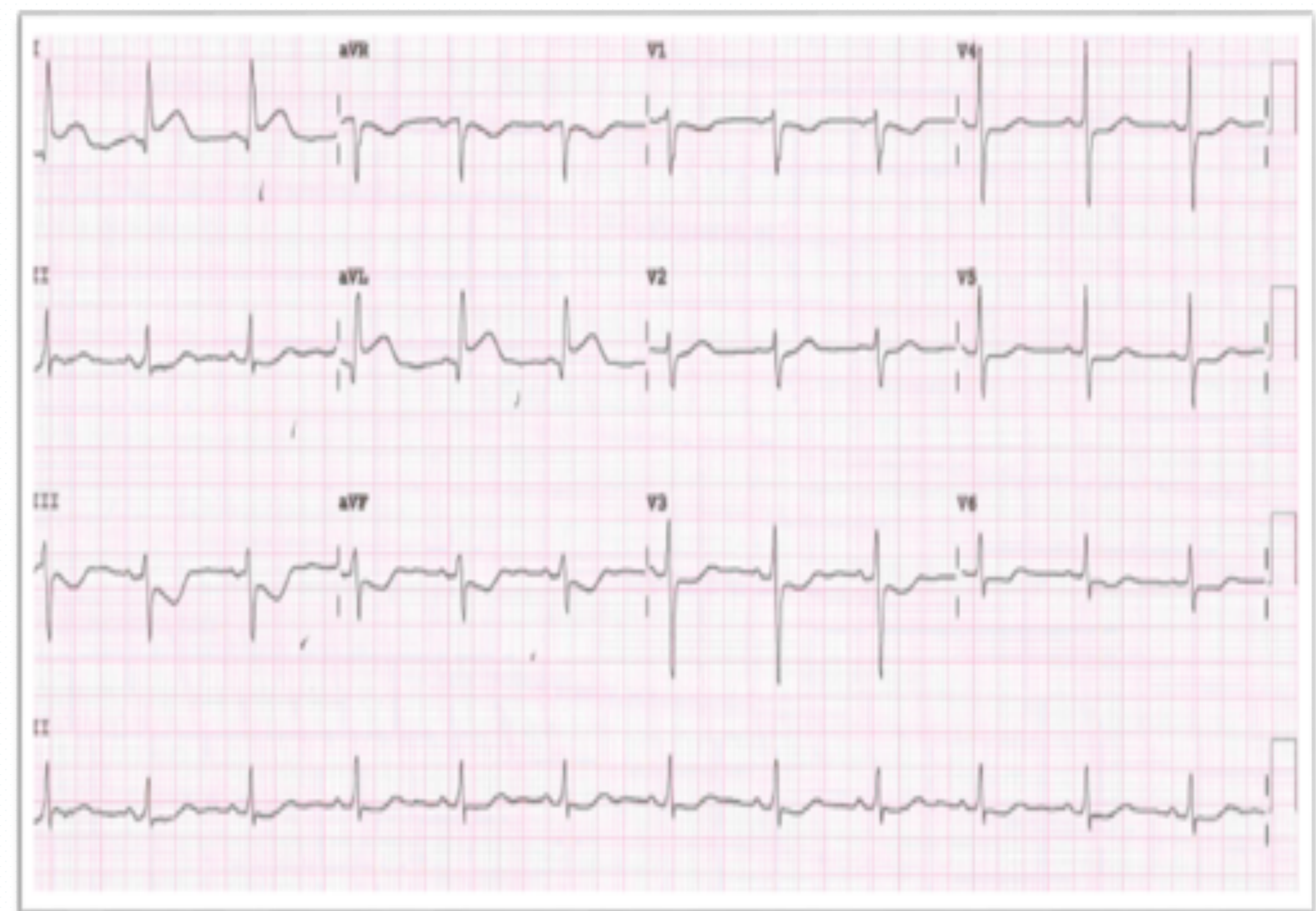


Figure 1: ST-segment elevation of lead I & aVL, with STD in lead III & aVF.

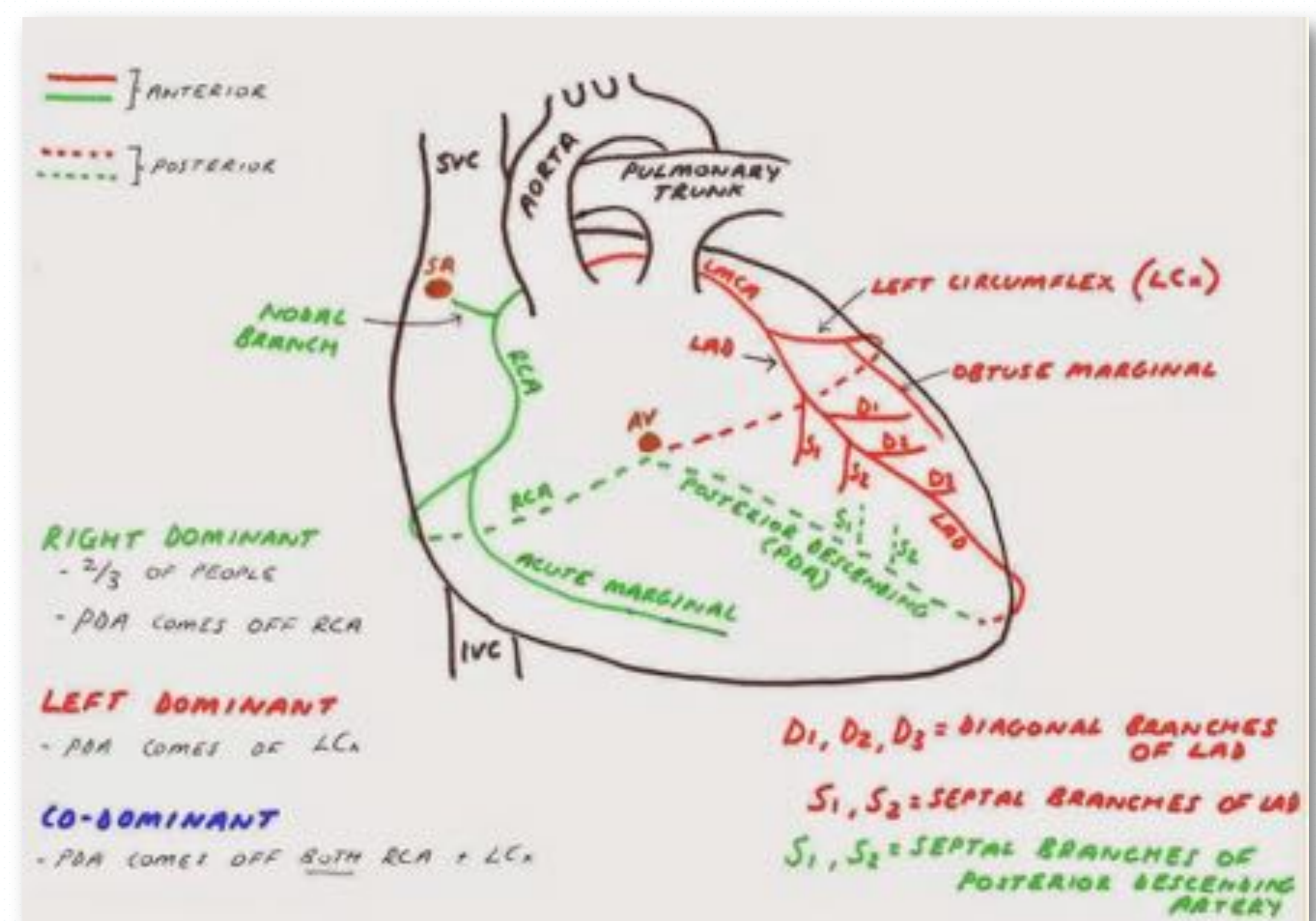


Figure 2 : The LAD gives off the septal and diagonal arteries. The diagonal arteries (D1,D2,D3) supply the lateral wall of the left ventricle.

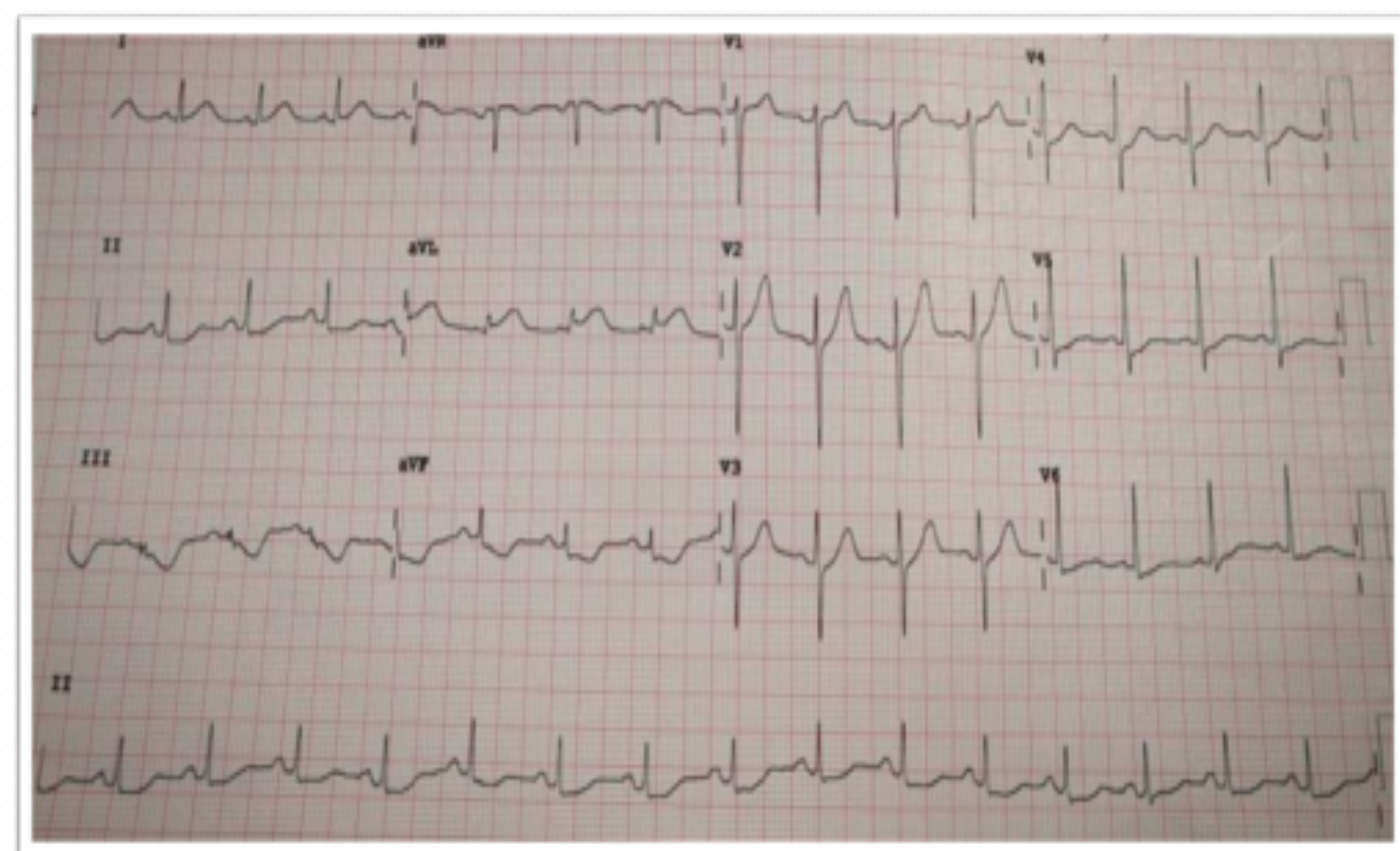


Figure 4: The ECG of another patients showing ST segment depression in II,III & AVF. The STE seen in AVL is subtle & may be easily missed.

We wish to acknowledge the assistance provided by the Clinical Research Department, Institut Jantung Negara (IJN).

The Authors have no conflict of interest to declare

REFERENCES

- Cardogan M, Buttner R (2021, March 24). High Lateral STEMI. Life In The Fast Lane. <https://litfl.com/high-lateral-stemi-ecg-library/>
- Durant E, Singh A. Acute first diagonal artery occlusion: a characteristic pattern of ST elevation in noncontiguous leads. *Am J Emerg Med.* 2015;33(9):1326.e3-5
- PonderMed (2016, January 5). Hunting the Culprit 2: Coronary Artery Anatomy. <https://www.pondermed.com/pondering-cardiology/how-to-hunt-culprit-2-coronary-artery/>

CONCLUSION

First diagonal branch (D1) occlusions of the LAD can be challenging to identify on the ECG, as the STE may be subtle. STD in the inferior leads should be regarded as the reciprocal to a high lateral STEMI until proven otherwise.

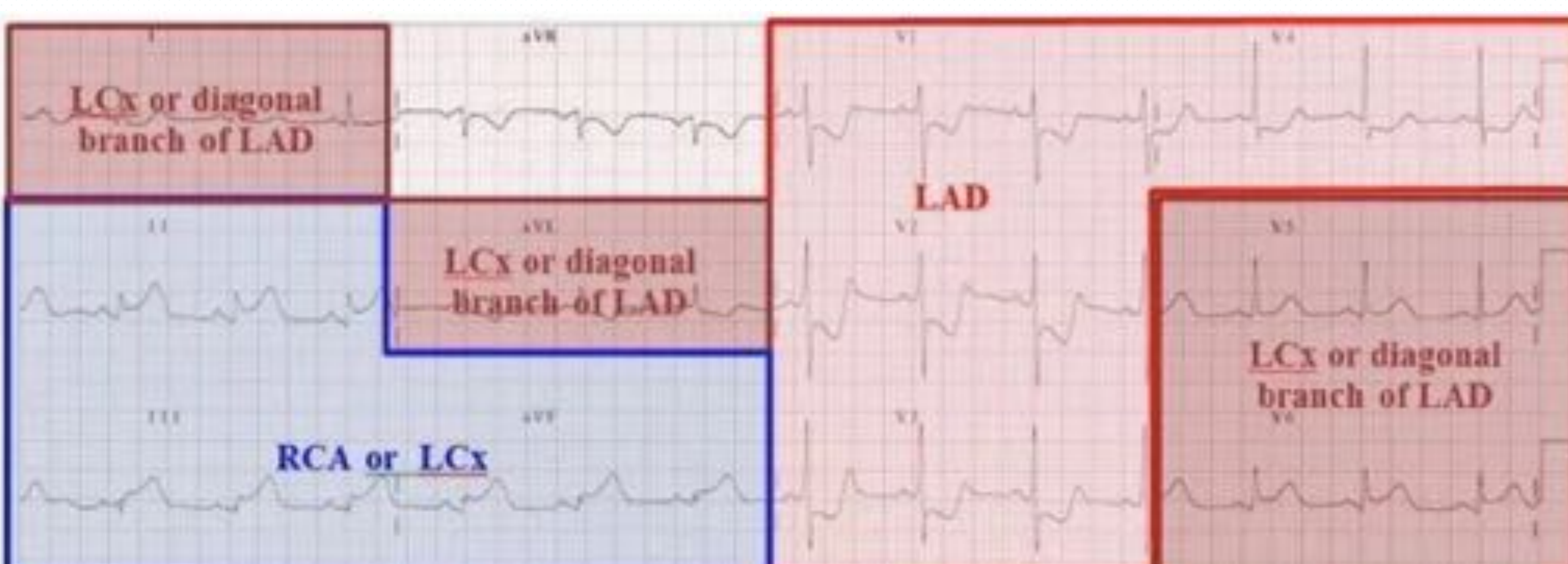


Figure 3: Major coronary artery supply in relation to the region of the heart, mapped on the ECG