Hombre de 60 anos admitido en fase hiperaguda de IM con elevación del segmento ST y tratado con angioplastia primária

Amigos del foro
Hombre de 60 años de edad fue admitido a la sala de urgencias con una historia de dolor torácico retroesternal.
ECG1-Admisión
ECG2 Después de la angioplastia primaria con STENT

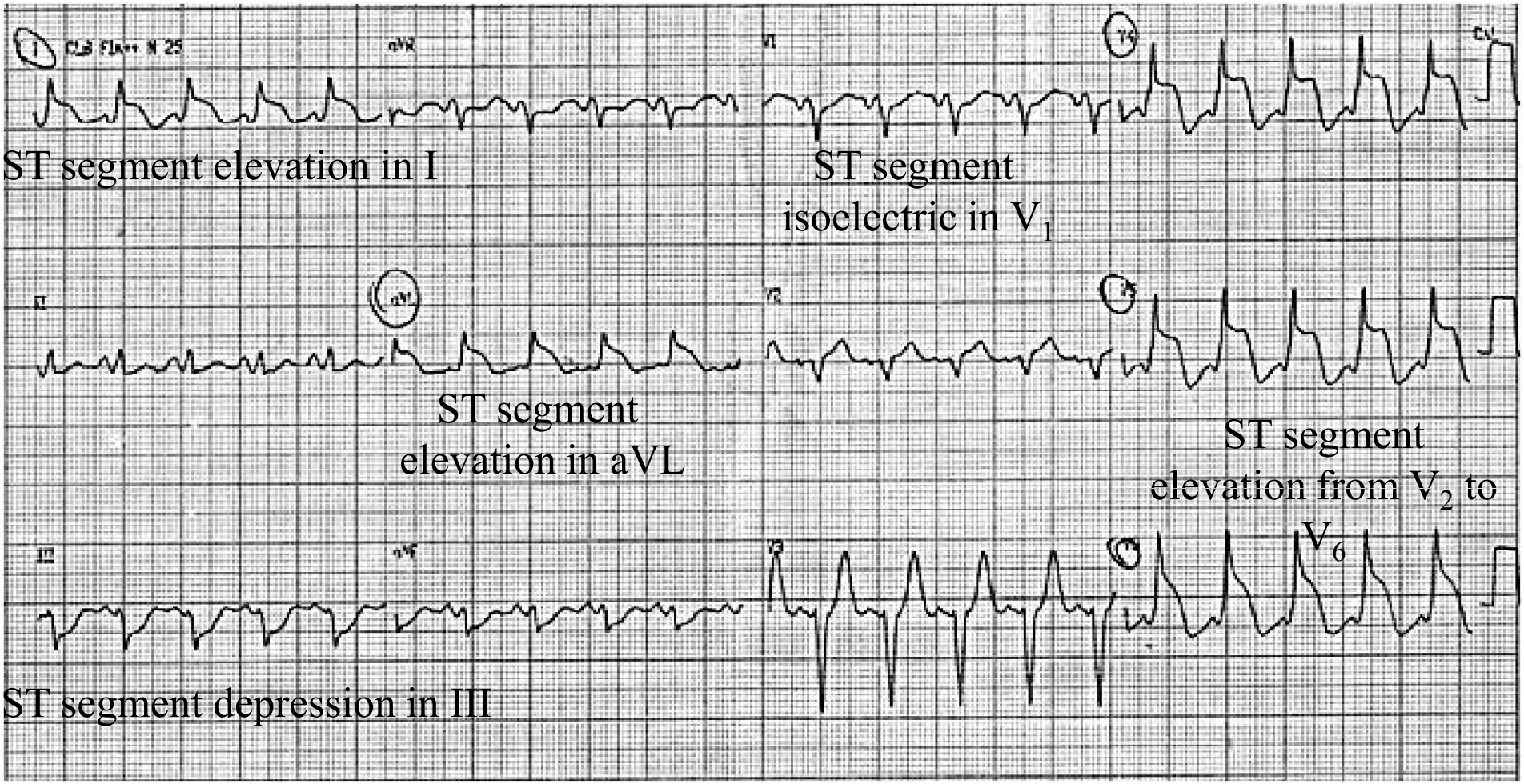
¿Cual es la arteria culpable?

¿Existen signos de infarto atrial?

Saludos

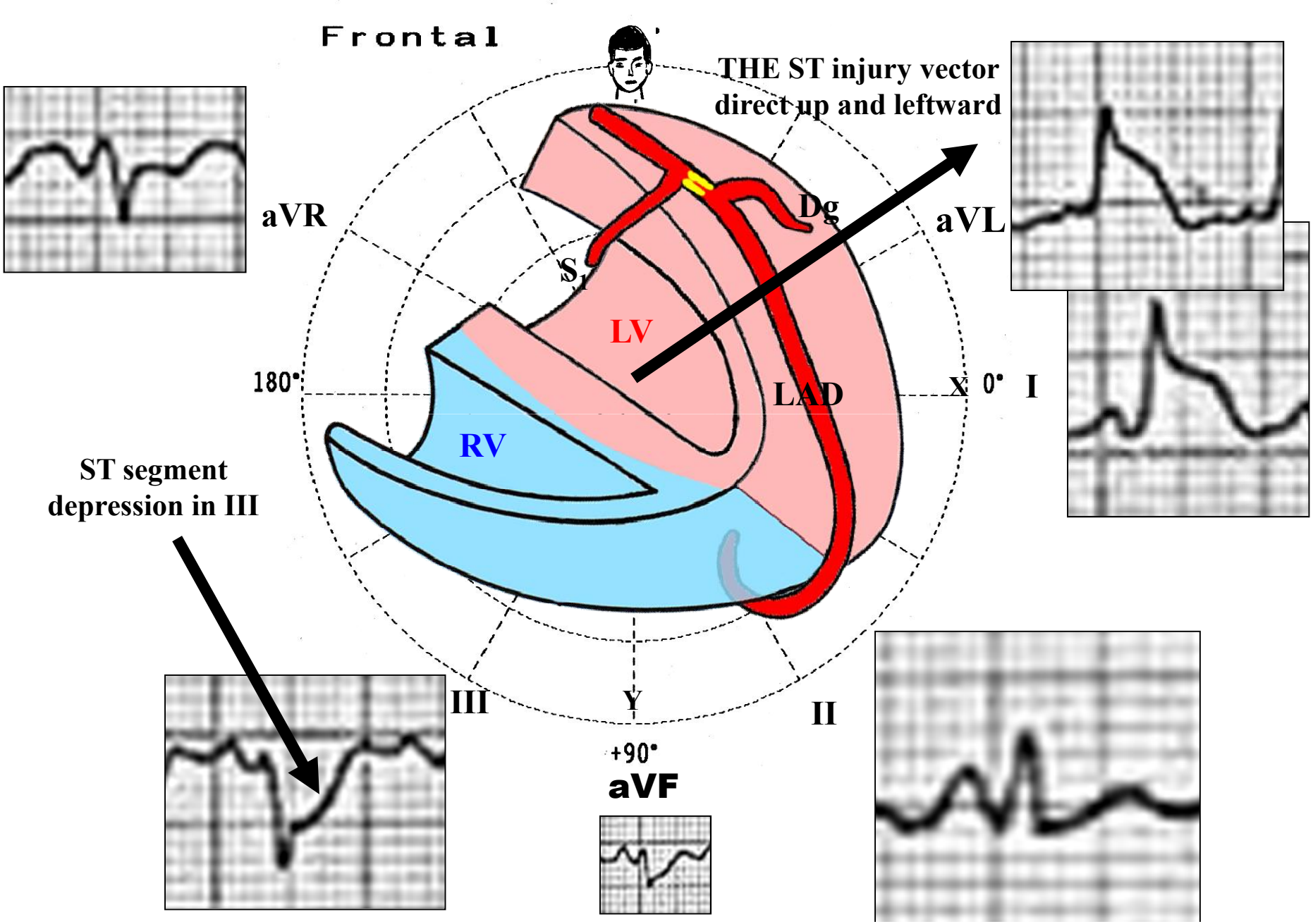
Raimundo

ECG – 1 Admission

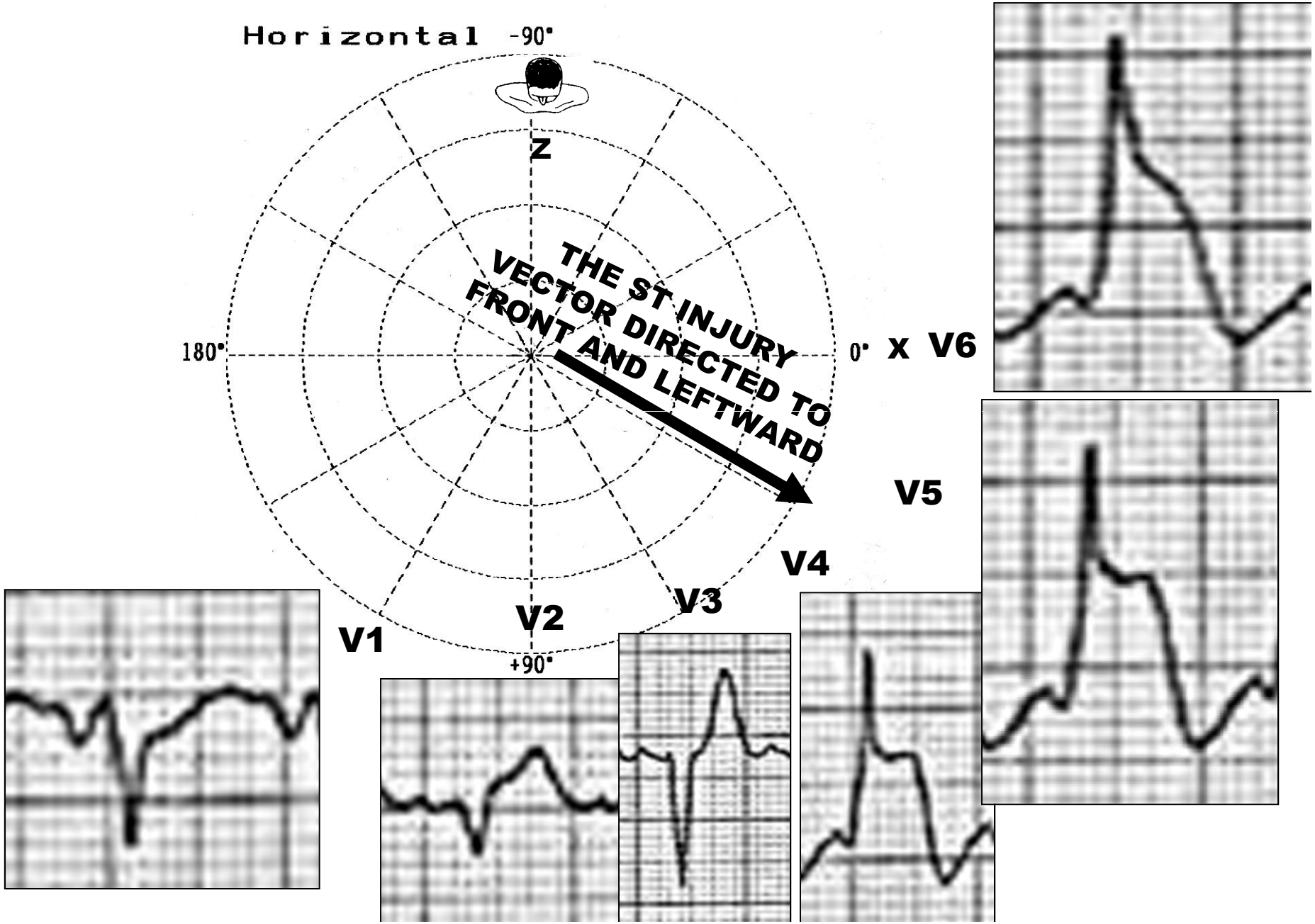


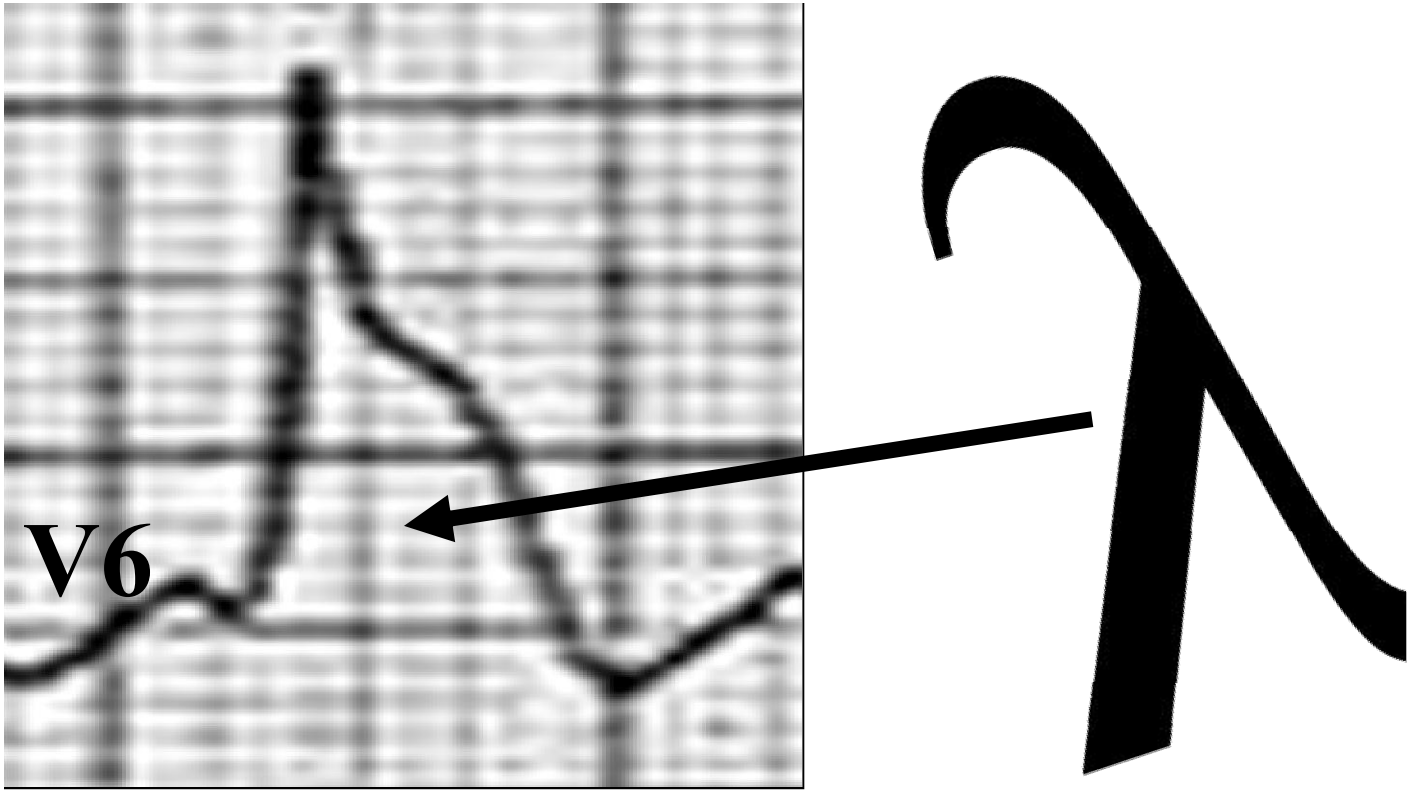
Culprit artery: occlusion of LAD after the first septal perforator and before the first diagonal branch. Why? Because the injury vector point to front, upstairs and leftward. See next two slides.

ST segment elevation in I and aVL. ST segment depression in III



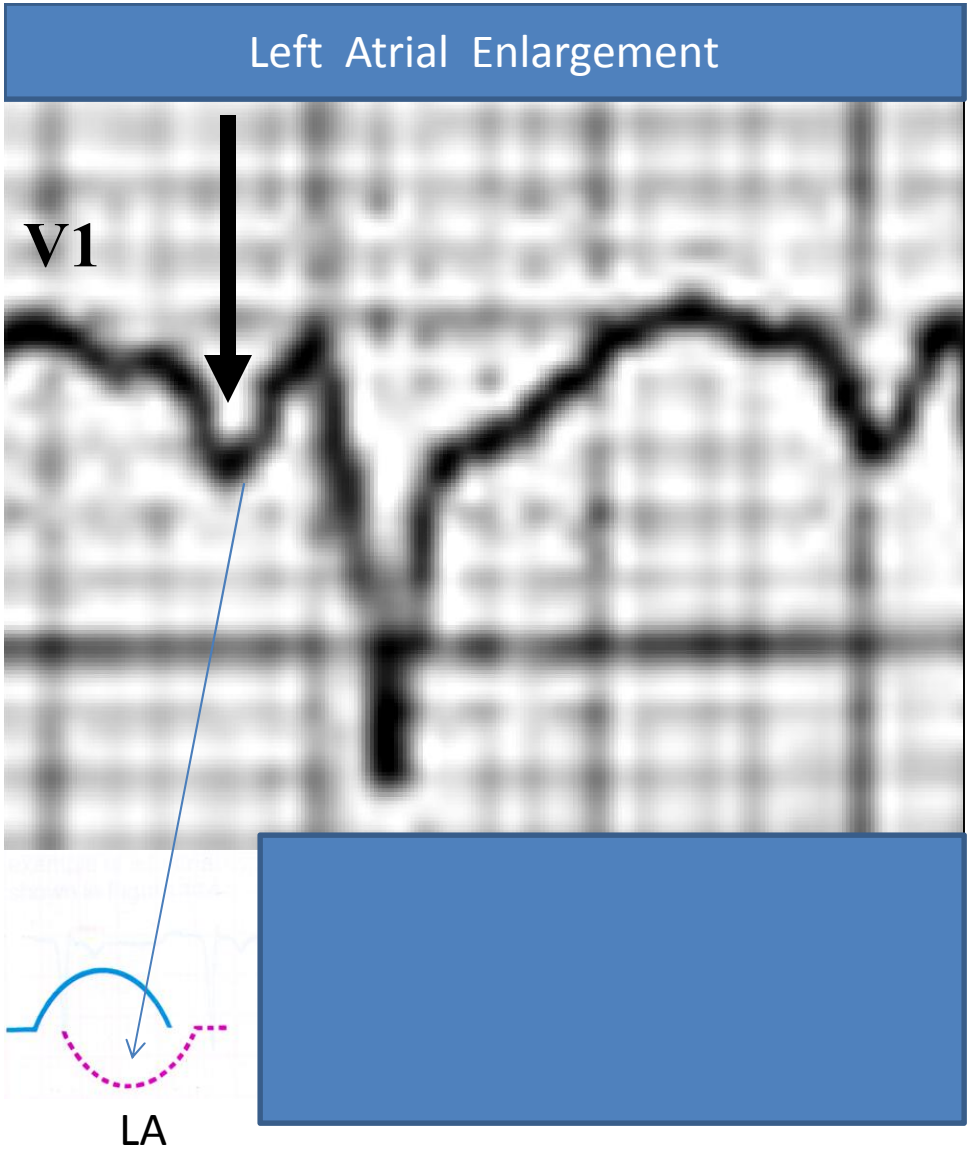
ST segment elevation from V_2 to V_6 and isoelectric in V_1





This ECG pattern resembles the ST segment elevation shape in the type 1C Brugada syndrome. The 'lambda-like' ST segment elevation in AMI may identify patients with increased risk of VF or SCD.(1)
Recently , Yamaki et al descried this wave in Left Main Coronary Artery Obstruction(LMCA) (2)
We observed in 2004 in idiopathic ventricular fibrillation(3)

1. Kukla P, Jastrzebski M, Sacha J, Bryniarski L. Lambda-like ST segment elevation in acute myocardial infarction - a new risk marker for ventricular fibrillation? Three case reports. Kardiol Pol. 2008 Aug;66(8):873-7.
2. Yamaki M, et al.Acute myocardial infarction with a left main trunk lesion and documented lambda-like J waves. Intern Med. 2012;51(19):2757-61.
3. Perez-Riera AR, et al. "Benign" early repolarization versus malignant early abnormalities: clinical-electrocardiographic distinction and genetic basis. Cardiol J. 2012;19(4):337-46.

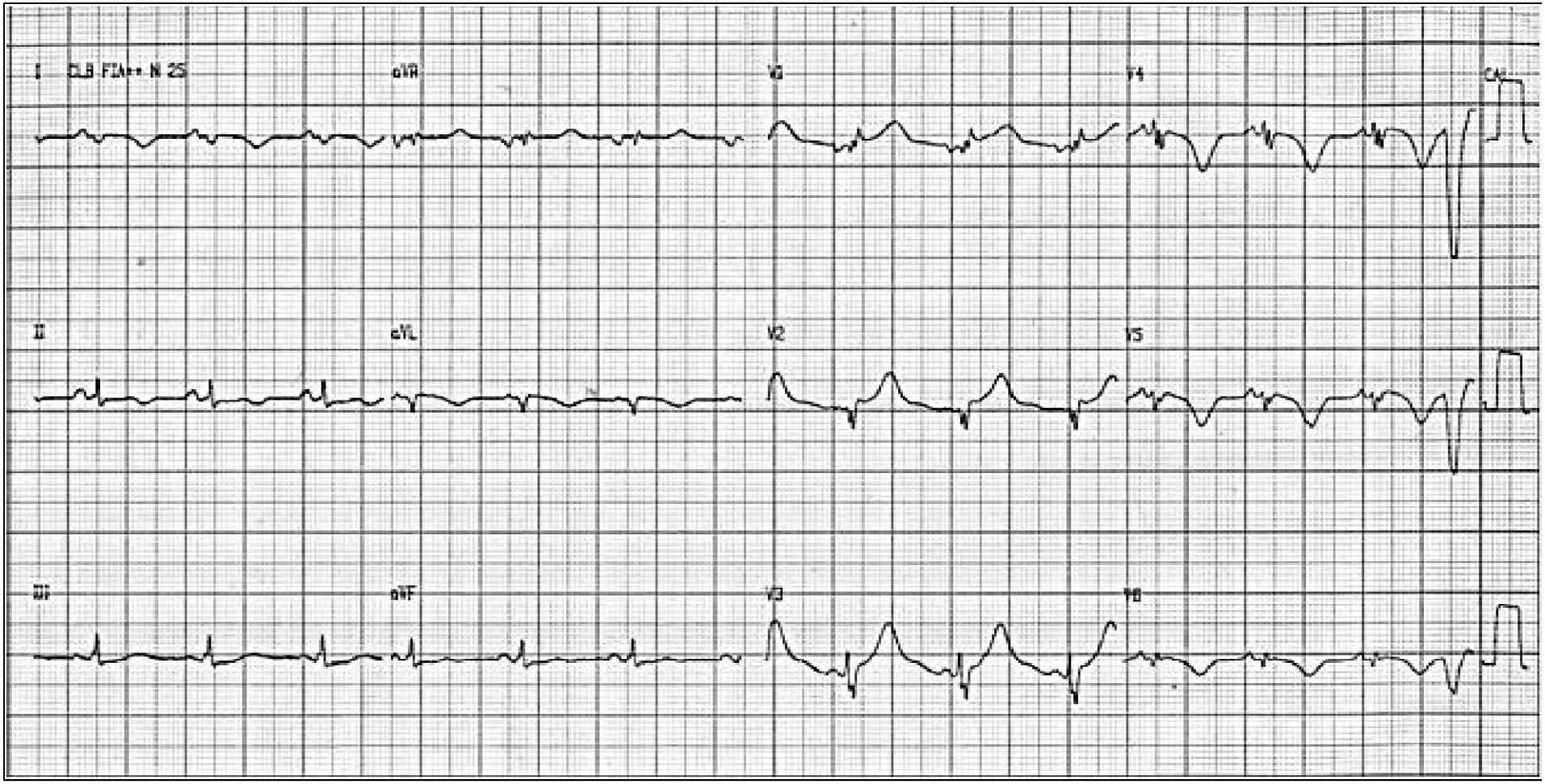


Increase in depth and duration of final negative component of the wave in V_1 (left atrial enlargement Morris' index[1]); slow and deep of P in V_1 or V_1-V_2. PTFV1. P terminal force in lead V_1 equal or more negative than 0,04mm/seg Greater than 0.03 mm/sec: product of the duration of the final negative component (duration expressed in seconds); while depth is expressed in mm. Values above 0.03 mm per second constitute a highly sensitive criterion for diagnosis of LAE.(1).In the present case it is expression of LV augmentation fo final LV pressure. (Pd2 LV)

1. **Morris JJ Jr, Estes EH Jr, Whalen RE, Thompson HK Jr, Mcintosh HD. P-WAVE ANALYSIS IN VALVULAR HEART DISEASE. Circulation. 1964 Feb;29:242-252.**

ECG-2 Post-angioplastia primária

ECG- 2 After Percutaneous coronary intervention (PCI),



Transmural myocardial infarction and subepicardial ischemia of anterolateral wall.

Infarto do miocárdio antero-lateral e isquemia subepicárdica.

ATRIAL INFARCTION

ECG DIAGNOSIS CRITERIA

PR (PRs), PQ segment (PQs), STa segment or PTa-segment: it stretches from the end of P wave to the onset of QRS complex. Displacement of this segment (depression or elevation), which represents part of the atrial ST (STa) segment only ostensive when associate with AV block as a consequence of atrial infarction (Figure 1).

Ja point: Point of junction between the end of the P wave and the onset of PRs.
(Figure 2)

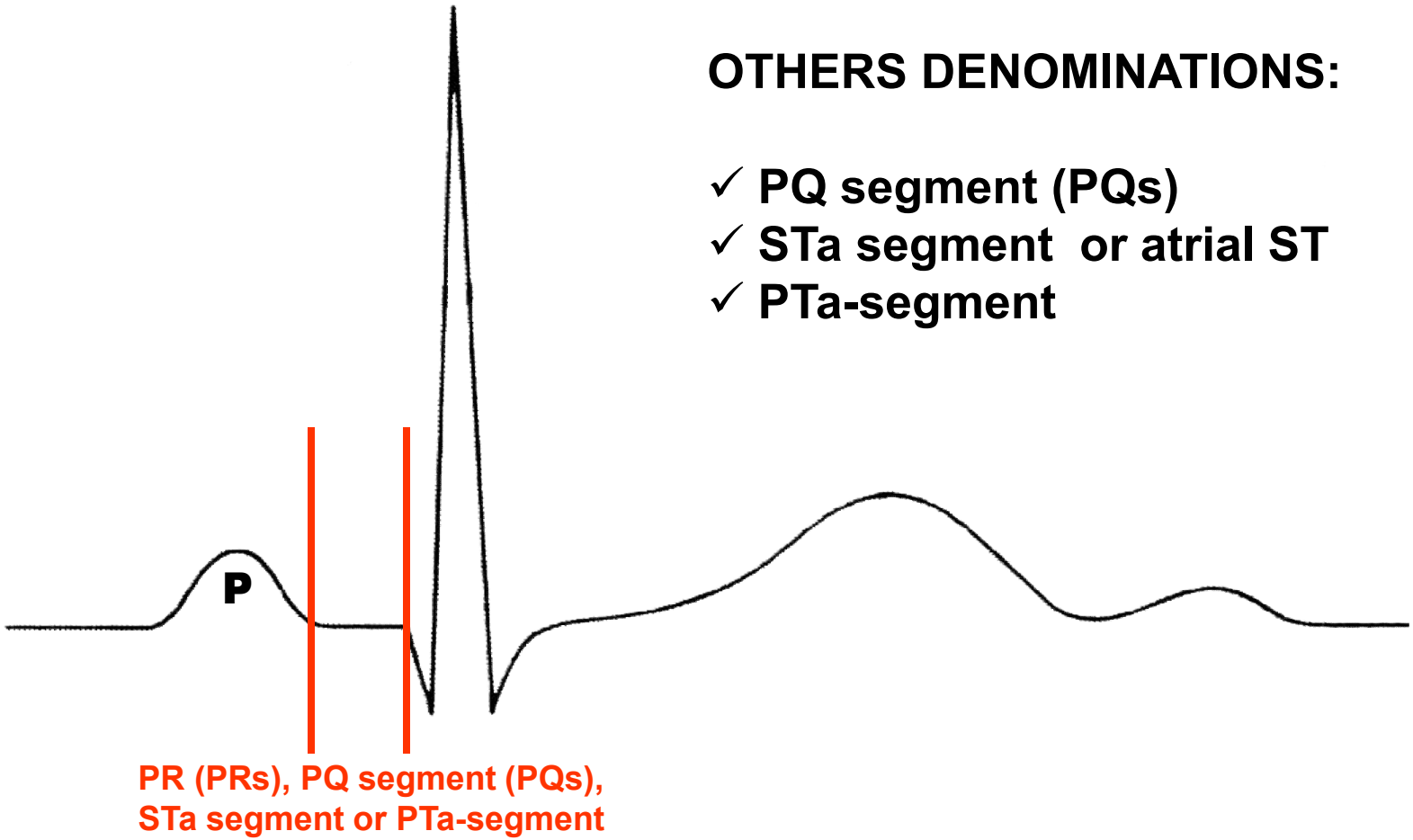
Normal location of atrial repolarization (Ta or TP wave). It coincides with ventricular depolarization (QRS complex), what explains its absence for being concealed by the ventricular phenomenon (Figure 3).

The 3 segments **PRs, ST** and **TPs** normally are at the same level (Figure 4).
Ta wave may cause falsely positive strain tests in the presence of important PR segment depression in maximal strain, longer time of exercise and maximal strain faster than those truly positive, absence of effort-induced pain and P wave of voltage higher in maximal strain.

In acute right ventricular MI high degree AV block is present in almost half of the cases.

STa segment elevation may produce a diagnostic monophasic pattern during the early stage of ventricular ischemia.

PR segment (PRs)

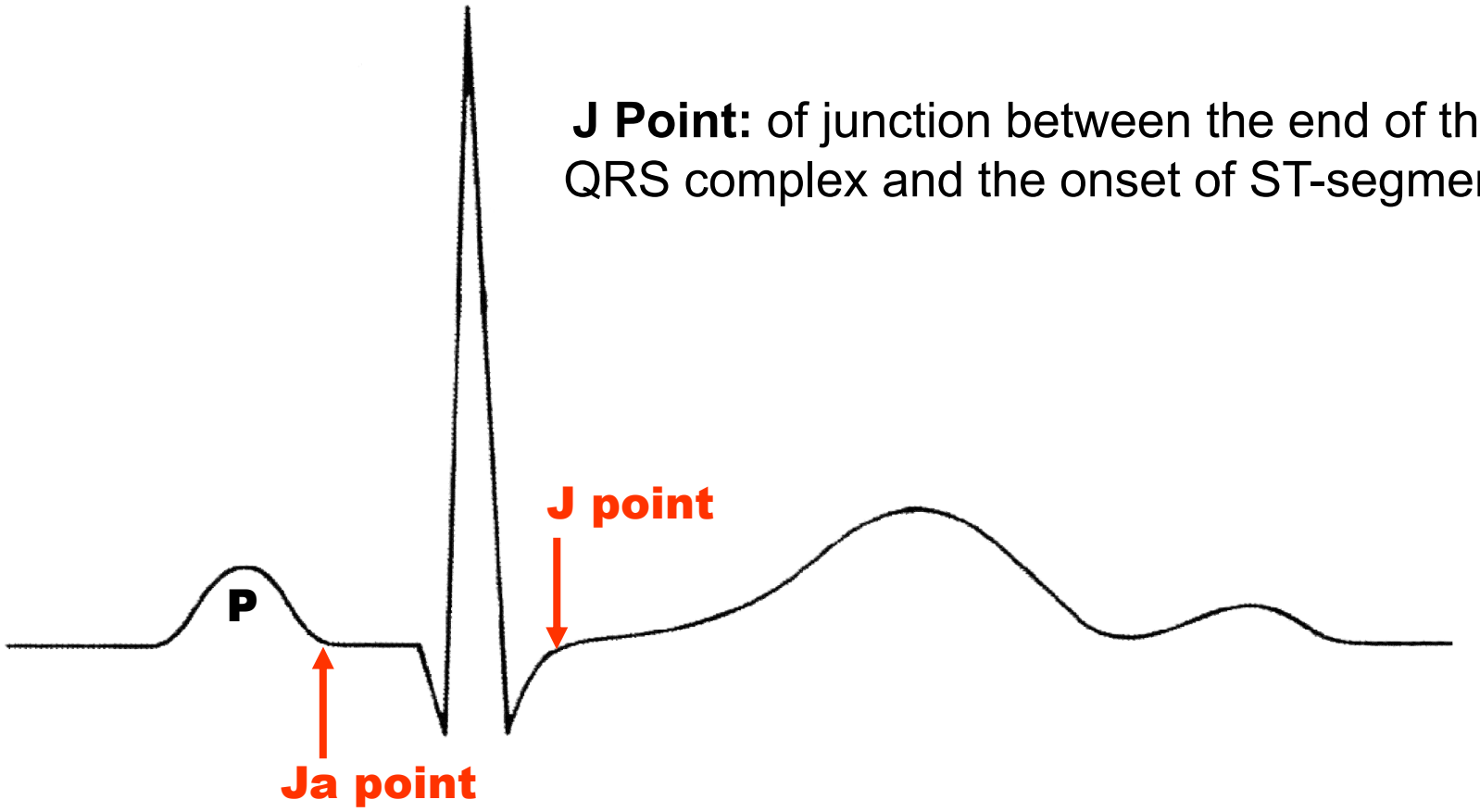


OTHERS DENOMINATIONS:

- ✓ **PQ segment (PQs)**
- ✓ **STa segment or atrial ST**
- ✓ **PTa-segment**

PRs: from the end of P wave to the onset of QRS complex.

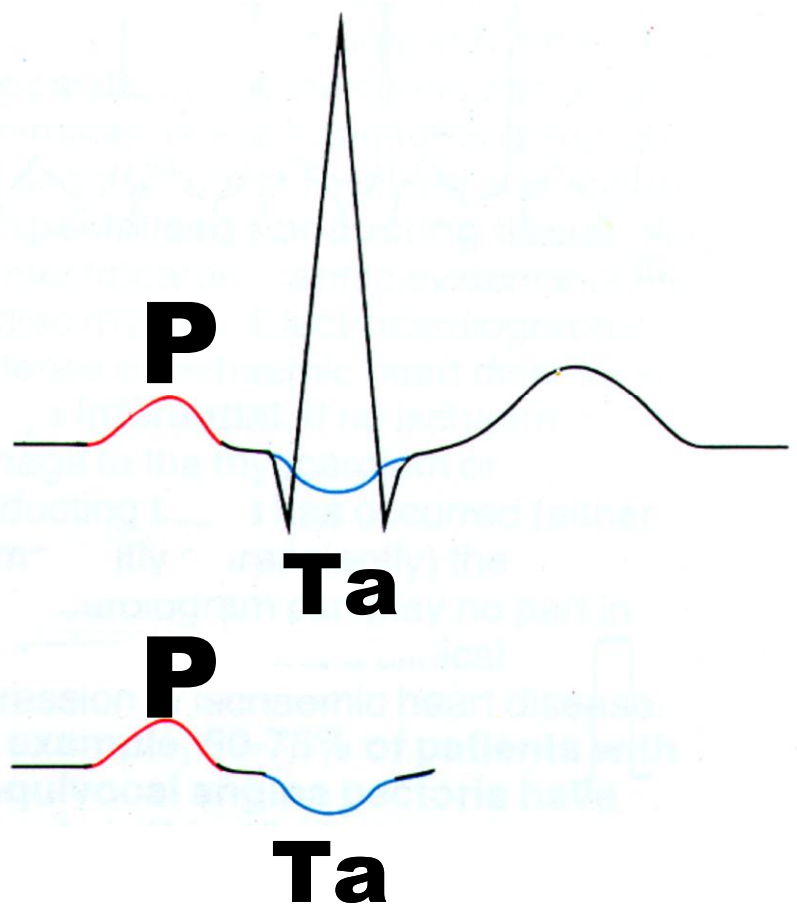
Ja point & J point



J Point: of junction between the end of the QRS complex and the onset of ST-segment.

Ja Point: junction between the end of the P wave and the onset of PRs.

Ta or TP wave



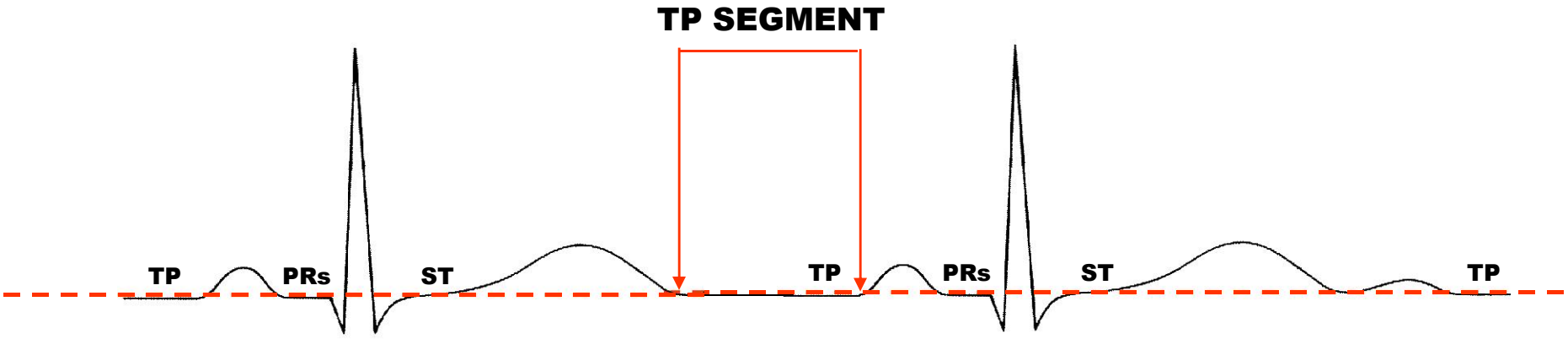
Normal location of atrial repolarization (Ta or TP wave). It coincides with ventricular depolarization (QRS complex), what explains its absence for being concealed by the ventricular phenomenon.

Its polarity is opposite to the P wave and its magnitude is 100 to 200 mμV. Sometimes it may appear in the ST segment and the T wave.
During exercise, it may in theory, cause ST segment depression and resemble myocardial ischemia **1**

1) Kapin PM, et al. J Am Coll Cardiol. 1991; 18: 127-135.

CORRELATION OF LEVEL BETWEEN PRs, ST & TP

From the end of the T wave up to the onset P wave of the following cycle



The PR segment is leveled when it is at the same level of the PR segment of the beat being studied.

Usually, PRs (end of P wave up to QRS complex onset), ST (from J point or the end of QRS up to the beginning of the T wave) and TPs (from the end of the T wave up to the onset P wave of the following cycle) segments ***are at the same level***. The figure shows a normal ECG and a line of dots pointing out the level of the three segments: PRs, ST and TPs.

ATRIAL INFARCTION

ECG CRITERIA

1) Depression of the STa segment alone is not a reliable sigh unless the degree of depression is marked.
2) P shape with M or W morphology during the acute MI episode.
3) Frequently atrial arrhythmias (35% of cases): Higher incidence of supraventricular arrhythmias in acute atrial fibrillation compared with ventricular infarction, atrial flutter, supraventricular tachycardia, changing pacemaker, junctional rhythm, sinus bradycardia, and AV conduction disturbances. Ischemia of the sinus node due to coronary occlusion proximal to the origin of the sinus node artery is a likely cause of arrhythmias[1].

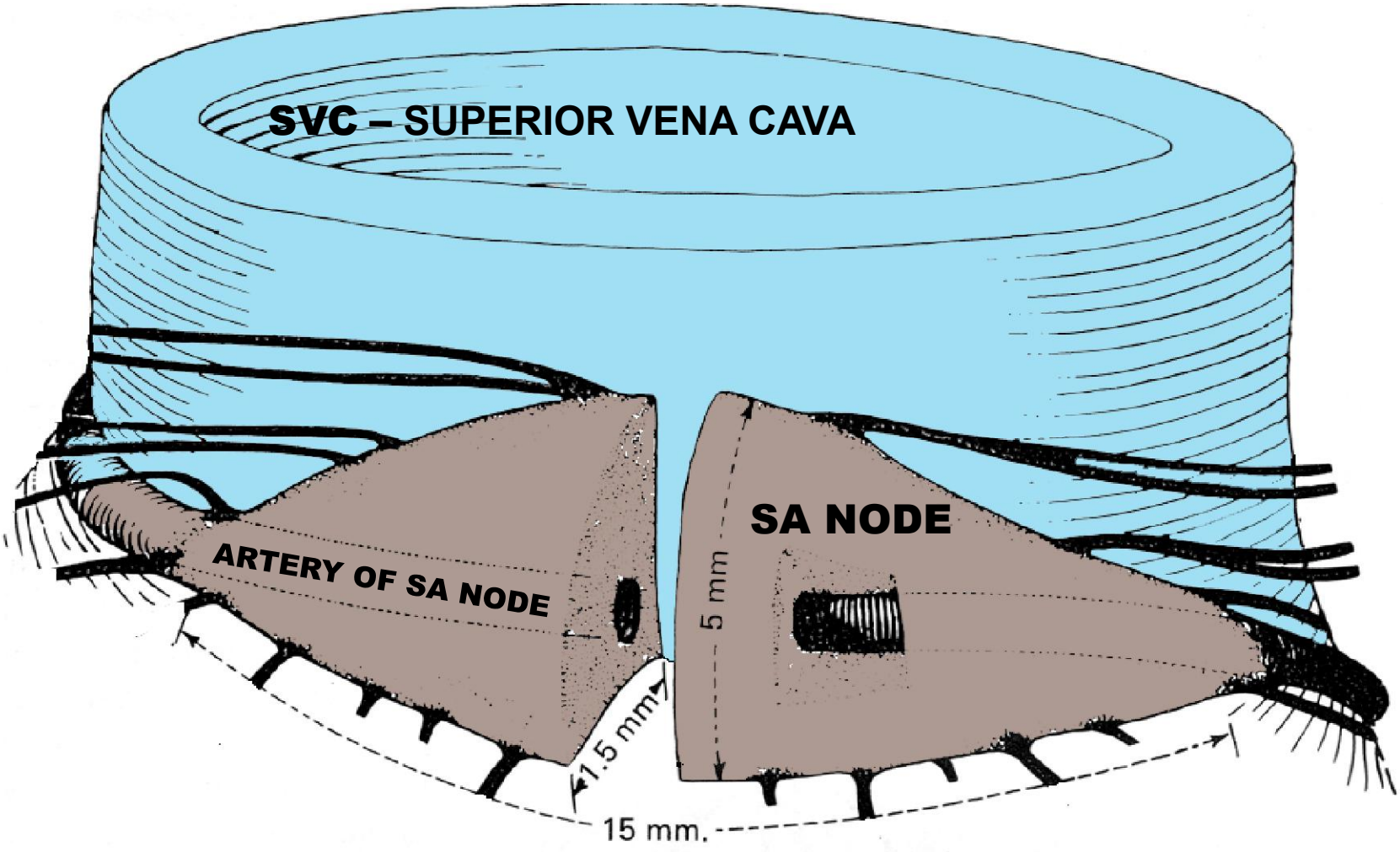
1) Kyriakidis M. Chest. 1992;101:944-947.

ATRIAL INFARCTION
COMPLICATIONS

1) Atrial arrhythmias (present in 35% of cases): ischemia of the sinus node due to coronary occlusion proximal to the origin of the sinus node artery is a likely cause of arrhythmias[1]. (Figure 5)
2) Pump failure of the right and left ventricle
3) Atrial wall rupture
4) Thromboembolization[2]

1) Kyriakidis M. Chest. 1992;101:944-947
2) Neven K, et al. J Cardiovasc Electrophysiol. 2003;14:306-308.

FIGURE 5
RIGHT CORONARY ARTERY ORIGIN



RA – RIGHT ATRIUM

The Right coronary artery supplies the SA node artery in 60% of patients. The other 40% of the time, the SA nodal artery is supplied by the left circumflex artery.

ATRIAL INFARCTION

CRITERIA1

I) MAJOR CRITERIA

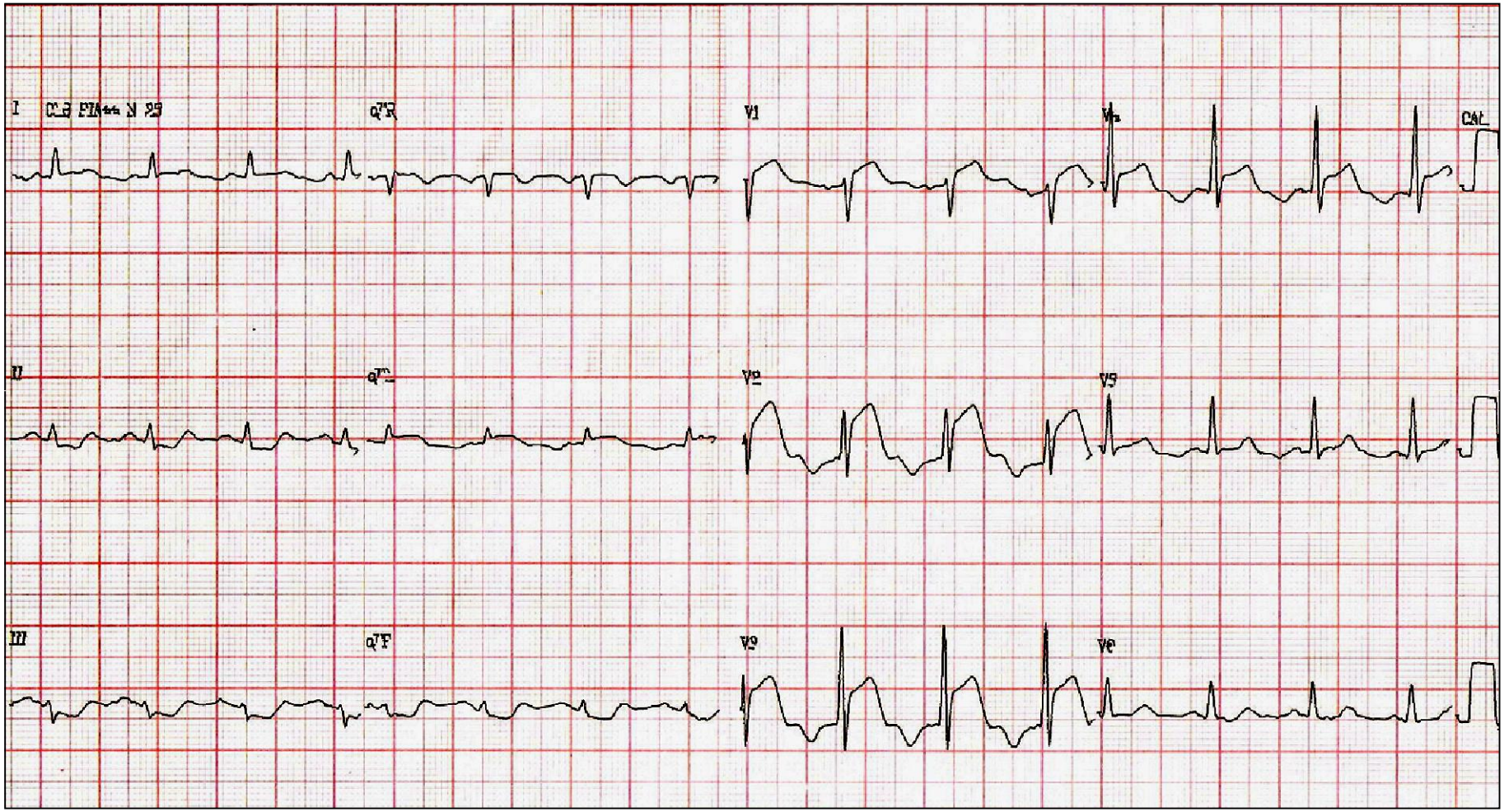
1) PRs elevation >0.5mm in leads V5 and V6 with reciprocal depression of PRs in V1 and V2 leads.
2) PRs elevation >0.5mm in leads I with reciprocal depressions in II and III.
3) PRs depression >1.5mm in precordial leads an 1.2mm in I, II, associated with any atrial arrhtymia.

II) MINOR CRITERIA

1) Abnormal P waves, flattening of P-wave in M, flattening of P-wave in W, irregular or notched P wave.

1) Liu CK, et al. Circulation 1961;23:331-338.

INTRA-STENT ACUTE THROMBOSIS IN LAD ARTERY



Acute subepicardial Injury in anteroseptal wall. “Mirror image” in inferior leads.
Abnormal shape inverted P wave followed by PR segment depression in V2 and V3.