Infarto agudo de miocardio em idoso complicado com choque cardiogénico por severa disfunção sistólica e distúrbio de condução intraventricular mutável

Acute Myocardial Infarction in elderly man complicated with cardiogenic shock consequence of severe systolic dysfunction and changeable intraventricular conduction disturbance

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Portuguese

Homem de 74 anos admitido com quadro de infarto agudo do miocardio de parede anterior submetido à angioplastia sem sucesso (no reflow) evoluindo com choque cardiogênico e distúrbio de condução intraventricular.

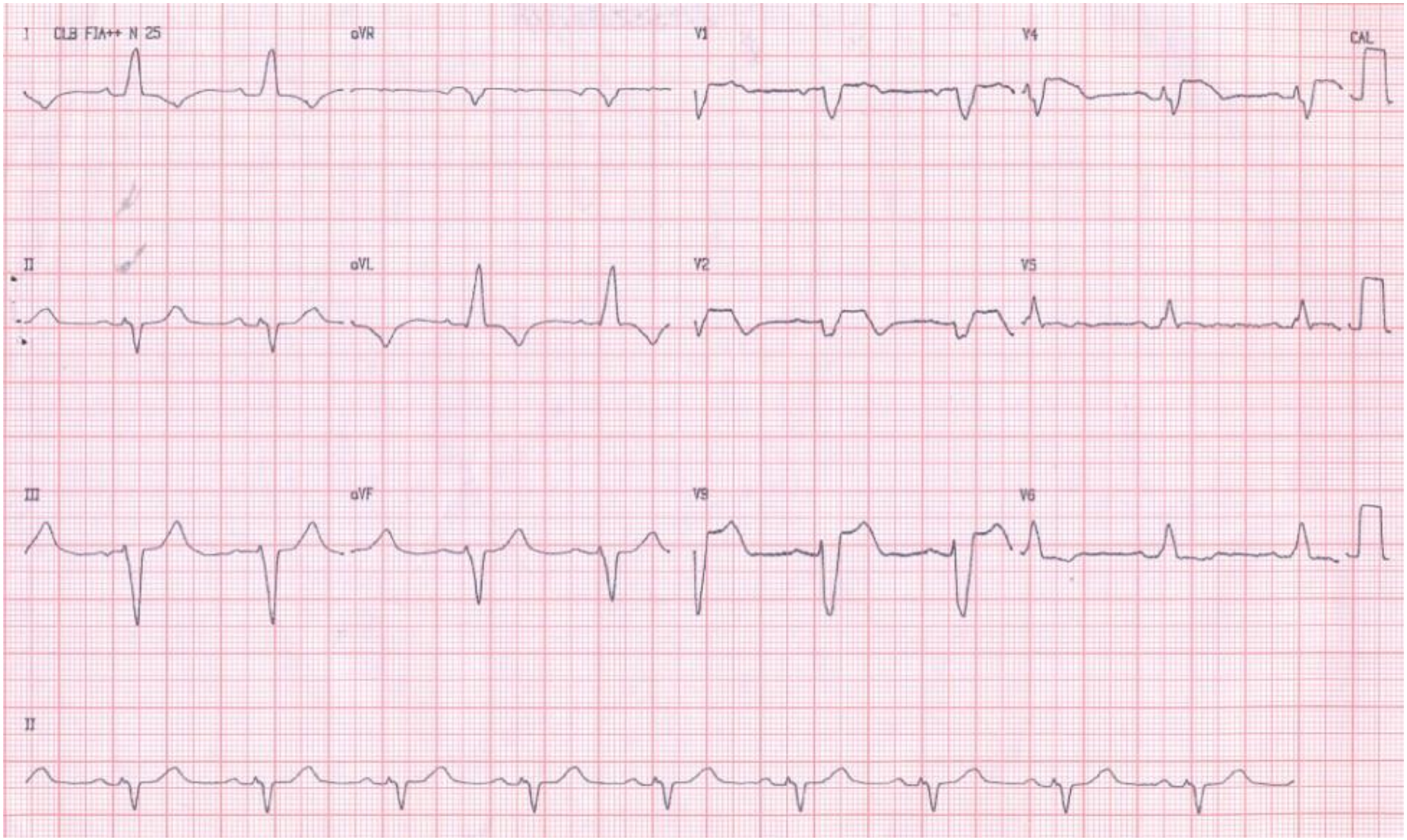
Cateterismo cardiaco revelaba oclusão total proximal da DA antes da primeira perfurante septal.
ECO = disfunção sistólica severa do ventrículo esquerdo com FE= 30%.
Gostaria de ouvir opiniões sobre a evolução destes ECG1, ECG2 e ECG3

Raimundo Barbosa-Barros

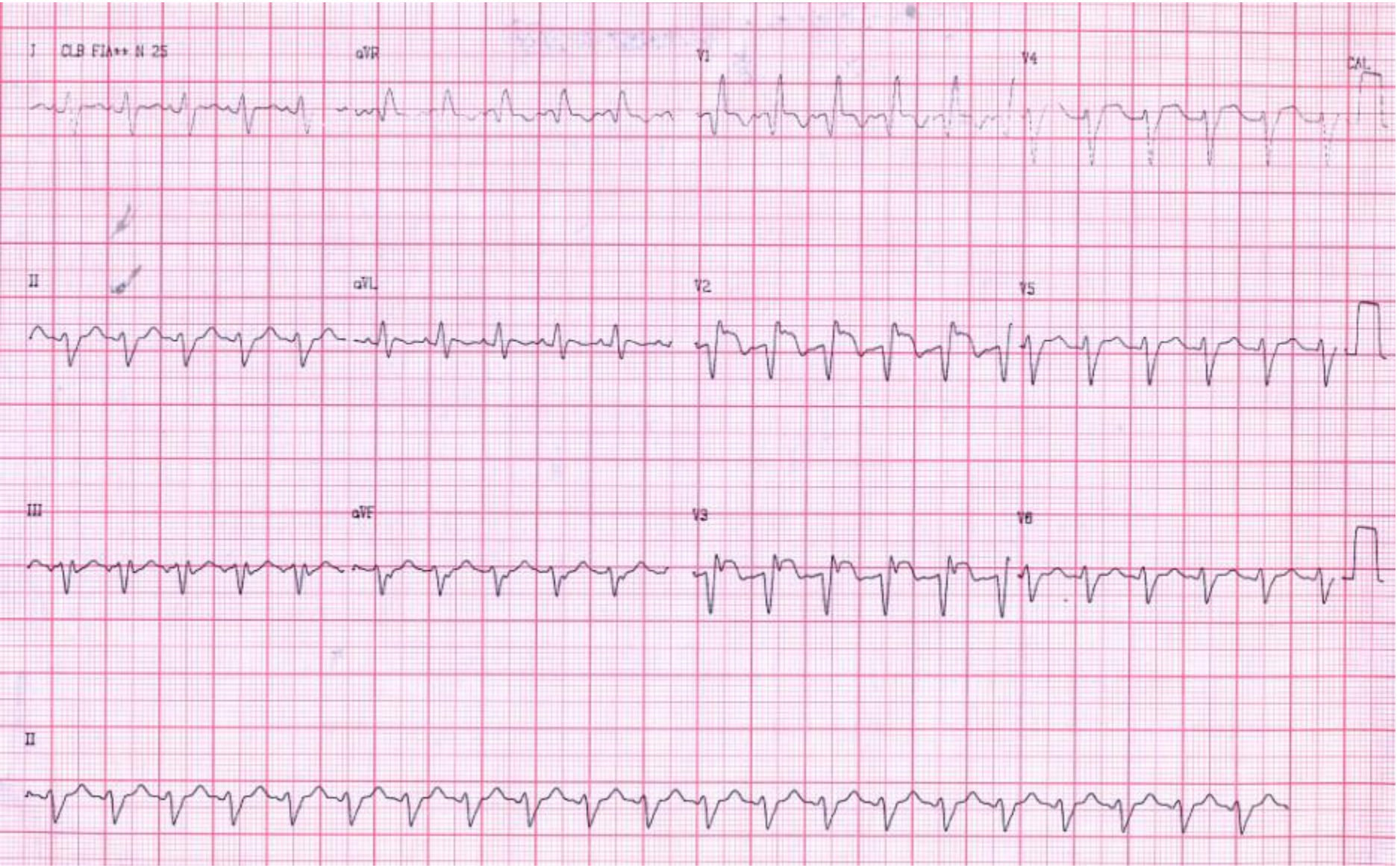
English
Man of 74 years admitted with acute anterior myocardial infarction underwent angioplasty without success (no reflow). He develops cardiogenic shock and changeable intraventricular conduction disturbance.

Cardiac catheterization: total proximal occlusion of LDA before the first septal perforator.
ECO = severe systolic dysfunction of the left ventricle LVEF = 30%.
Would like to hear opinions on the evolution of these ECG 1, ECG 2 and ECG 3
What electrocardiographic diagnostic features of each?
Raimundo Barbosa-Barros MD Fortaleza-Ceará-Brazil

Primeiro ECG1 realizado às 20:30 em outro hospital (05:30min após o início da dor retroesternal) 07-04-2013/First ECG1 performed at another hospital at 20:30 (5h:30 min after the onset of retrosternal pain) April 07/2013

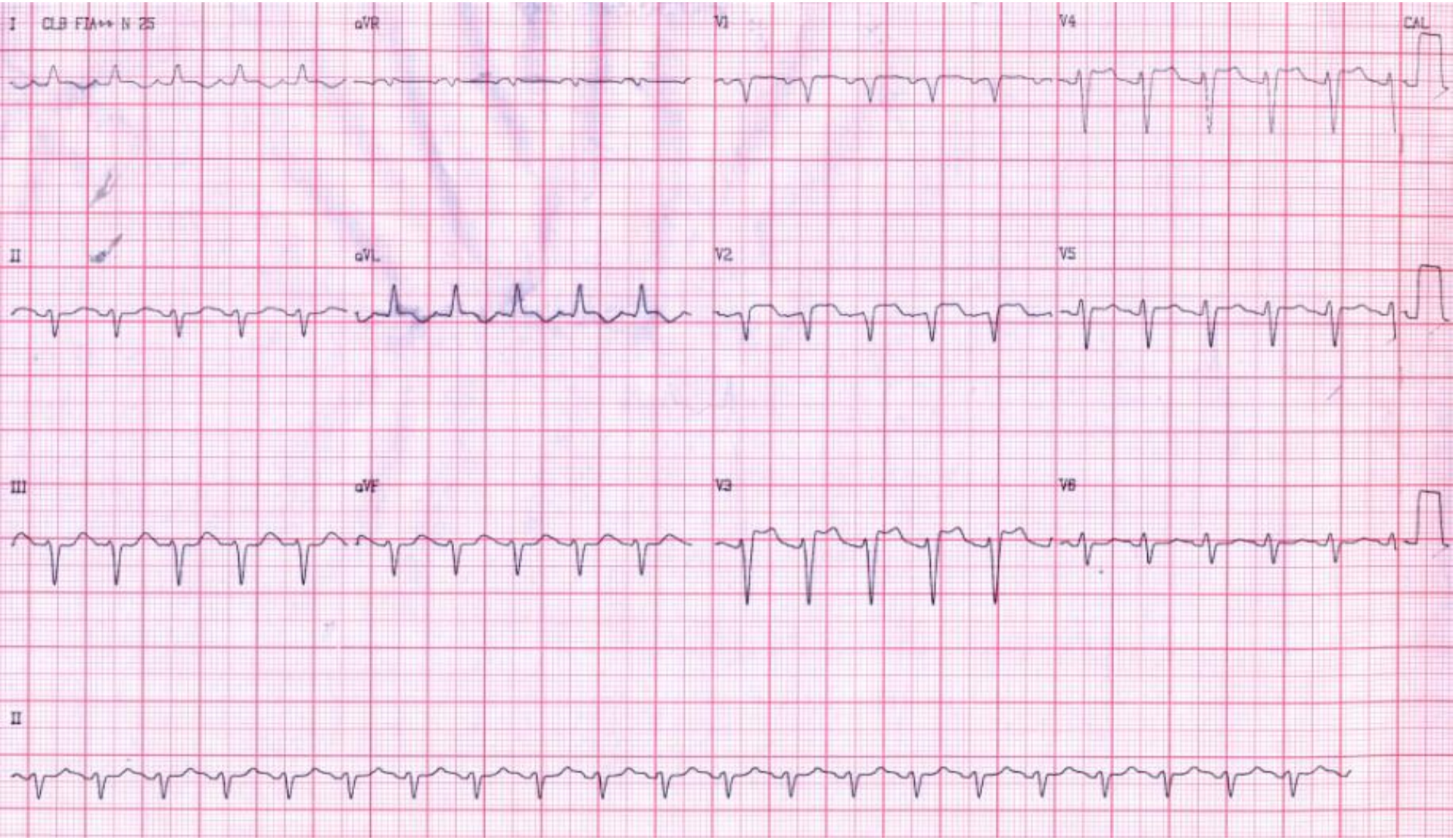


ECG 2 realizado às 22:30 07 04 2013/ ECG2 preformed at 22:30 P.M. April 07/2013



ECG 3 realizado após CATE(ATC com stent para DA): “no reflow” 00:15 08-04-2013

ECG3 performed immediately after unsuccessful angioplasty procedure “no reflow” 00;15´AM April 08/20012



Colleagues opinions

Dear friends Professor Andrés and Raimundo:

ECG 1: suggests anteroseptal myocardial infarction in presence of a left blockage in S-wave width wide and deep and positive T waves in III, high R wave in aVL and inverted T wave. This pattern suggests pre-existing chronic hypertensive cardiomyopathy. Persistent low voltage r waves in the precordial leads indicates still not transmural infarction. Positive T-waves and ST segment elevation in anterior leads indicate that the anterior wall of the left ventricle is not perfused.

ECG 2: sinus tachycardia (HR 150lpm) suggests severe heart failure due to depletion of adenosine receptors and the acetylcholine-dependent potassium. The right bundle branch block is dependent upon the elevated heart rate (it is no ischemic.). When right bundle branch block is consequence of ischemia it has left axis deviation in the frontal plane (RBBB + LFAB). The pattern, suggests re-estenosis of LAD. Decreased voltages of QRS ventricular complexes suggest severe left ventricular dilatation.

ECG 3: Heart rate is 120lpm and disappears right bundle branch block, however persistent pattern of severe acute dilatation without left ventricular myocardial reperfusion. Although it could open the LAD previous reperfused myocardium not continue due to severe injury microcirculation in the extensive area of anterior infarction.

This patient is at high risk, very severe with severe left ventricular dilatation and very low ejection fraction (around 20%).

Samuel Sclarovsky M.D. From Israel.

The discussion is open!

Queridos amigos Profesor Andrés y Raimundo

ECG 1: sugiere infarto anteroseptal en presencia de un bloqueo izquierdo ancho con onda S anchas y ondas T positiva y profunda en DIII y R alta con onda T invertida en aVL. Este patrón sugiere una miocardiopatia hipertensiva crónica pre-existente. La persistencia de ondas r de bajo voltaje en las precordiales indica que el infarto no es todavia transmural. Las ondas T positivas con ST elevado en las precordiales indican que la pared anterior del ventriculo izquierdo no está perfundida.

ECG 2: La taquicardia sinusal de 150lpm sugiere ser consecuencia de insuficiencia cardiaca severa con agotamiento de la adenosina y de los receptores de potasio dependiente de la acetilcolina. El bloqueo de rama derecha es dependiente de la frecuencia cardiaca elevada (no es isquémico.). Los bloqueos de rama derecha isquémicos vienen acompañados de extremo desvio del eje a la izquierda en el plano frontal (RBBB+LFAB)\ Sugiere re-estenosis de la coronária descente anterior izquierda. La disminución de los voltajes de los complejos ventriculares se debe a a severa dilatación del ventrículo izquierdo

ECG 3: La frecuencia cardiaca es de 120lpm y desaparece el bloqueo de rama derecha, no obstante persiste el patrón de dilatación aguda severa del ventrículo izquierdo sin reperfusion miocárdiaca. A pesar que se pudiera abrir la coronária izquierda descente anterior el miocardio continuará no reperfundido debido a lesion severa de microcirculación en la extensa area del infarto

Este paciente es de alto riesgo, muy severo con dilatación severa del ventrículo izquierdo y muy baja fracción de eyección (en torno de 20%).

Samuel Sclarovsky Israel.

La discusión esta abierta

Portuguese

ECG 1: BRE + Lesão subepicárdica antero-septal (correspondente ao IAM antero-septal).
ECG 2: Padrões de BDAS, desaparece BRE: lesão sub epicárdica antero-septal + aparecimento de BRD.
ECG 3: Padrões de BDAS, lesão sub epicárdica antero-septal, desaparece BRD.
Melhoria progressiva dos distúrbios de condução estariam relacionados a melhoria da perfusão miocárdica do sistema de condução, na evolução do IAM.
Att.
Dr. Severiano Atanes Netto.

English

ECG 1: LBBB + anteroseptal subepicardial injury current (corresponding to the acute anteroseptal subepicardial myocardial infarction.).

ECG 2: LAFB pattern. LBBB disappears. Subepicardial anteroseptal injury + onset of RBBB.

ECG 3: LAFB pattern, subepicardial anteroseptal injury. CRBBB disappears.

Progressive improvement of conduction disturbances were related to improvement of myocardial perfusion in the conduction system, during the evolution of AMI.

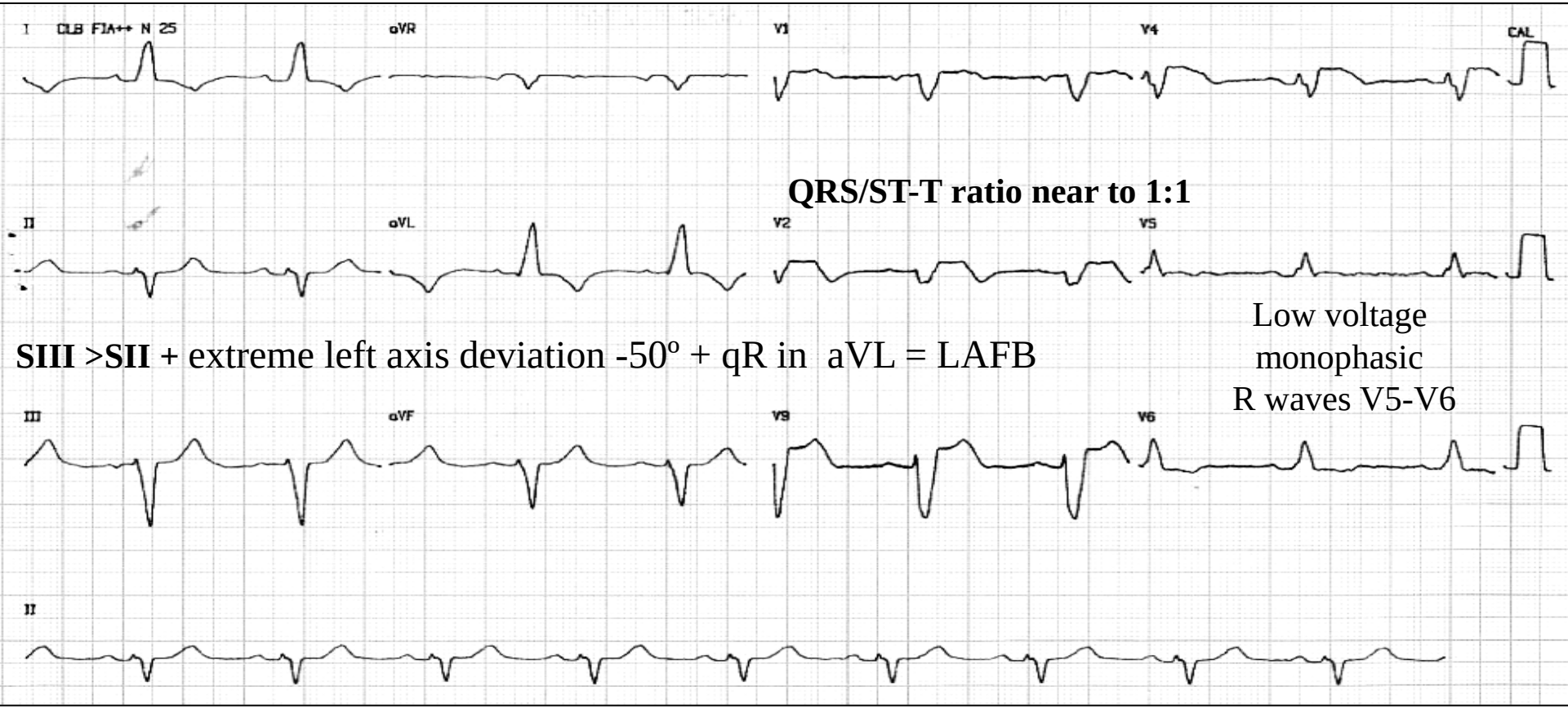
Att

Severiano Atanes-Netto M.D. from Brazil

Final comments

by Andrés Ricardo Pérez-Riera MDPhD

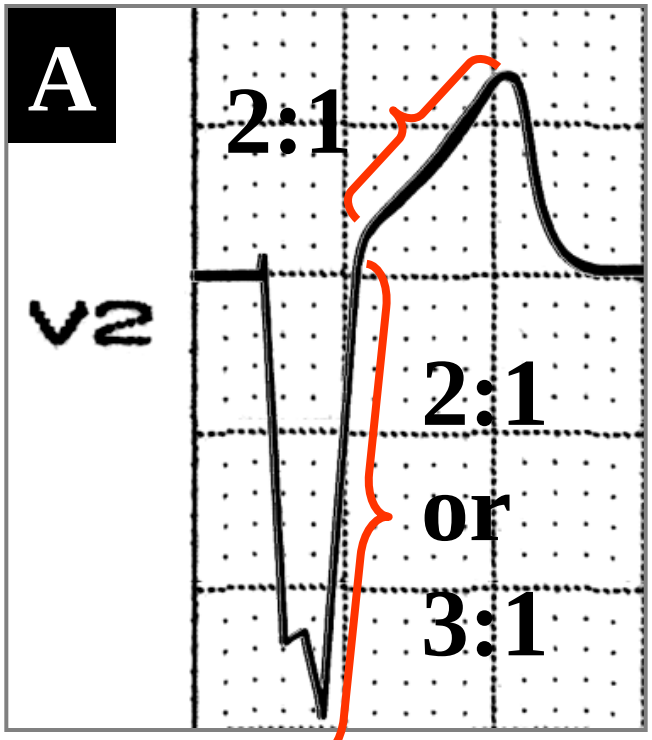
Primeiro ECG1 realizado às 20:30 em outro hospital (05:30min após o início da dor retroesternal) 07-04-2013/First ECG1 performed at another hospital at 20:30 (5h:30 min after the onset of retrosternal pain) April 07/2013



Sinus rhythm, normal heart rate (HR=63bpm), P axis + 40º in FP and to front on HP, PRi =200 ms, QRSd 150ms(prolonged), QRS axis – 50º, (extreme left axis deviation) low voltage monophasic R waves in left leads I, V5-V6 and qR pattern with embryonic initial q wave in aVL SIII>SII: LAFB + LBBB associated with electrically inactive anterolateral wall and diminution of QRS/ST-T ratio in V1-V2(see significance in the next slide)

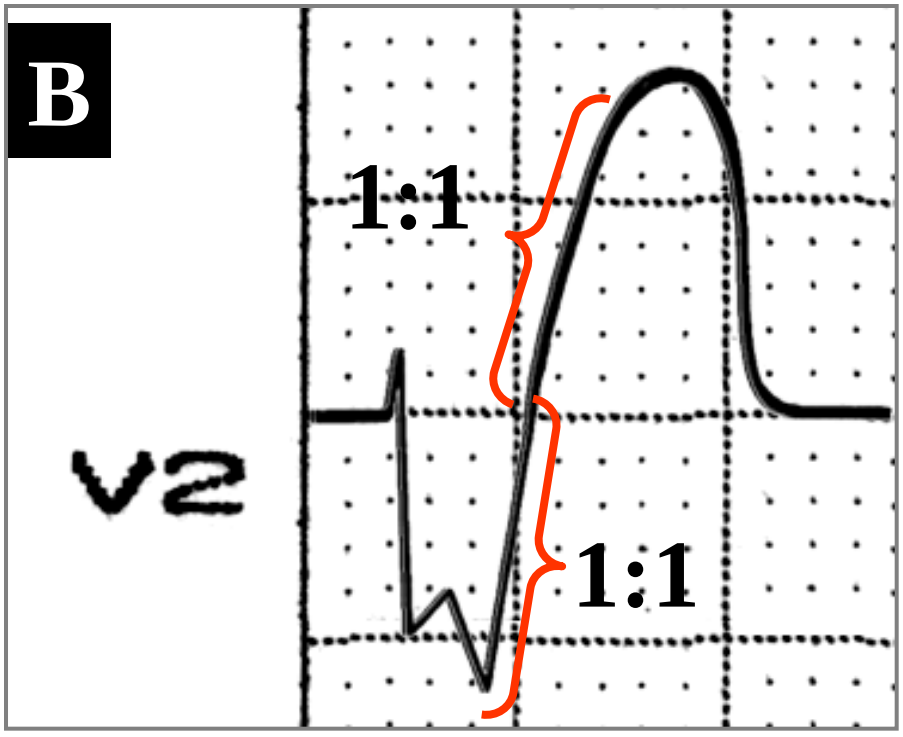
Others ECG criteria in LBBB complicated with acute myocardial infarction

Uncomplicated LBBB



A: Ratio of $^{QRS}/_{ST\text{-}T}$ amplitude, 2:1 ST upwardly concave.

LBBB complicated with anterior MI

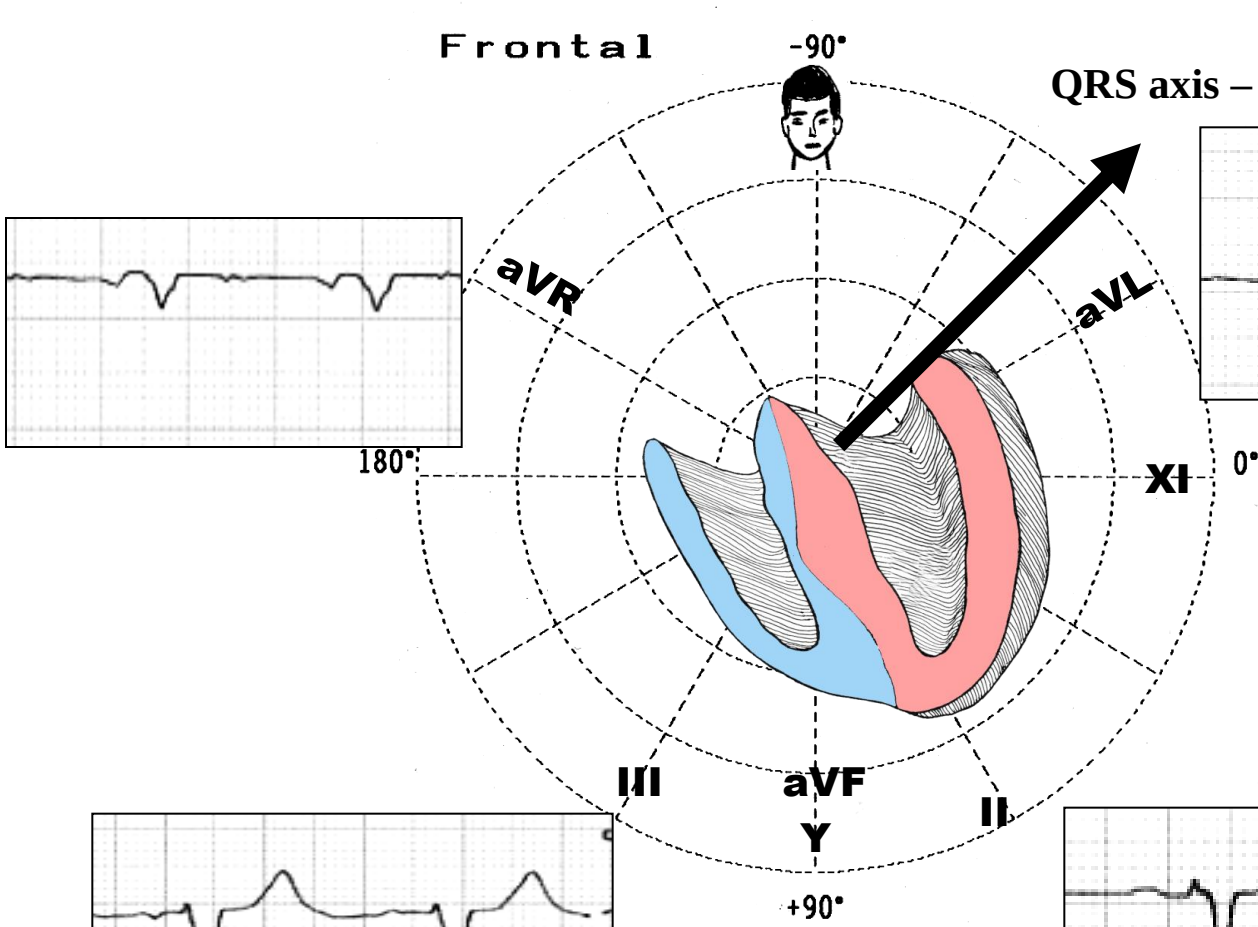


B: Ratio of QRS/ST-T amplitude 1:1. ST upwardly convex

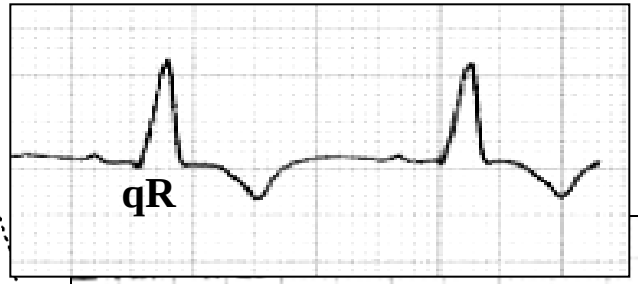
Diminution of $^{QRS}/_{ST\text{-}T}$ ratio in lead V2: In uncomplicated LBBB, the ratio of QRS voltage to the ST segment voltage is always greater than 1. Usually 2:1 or 3:1 in V2 lead[1]. During AMI the elevation of ST segment with concomitant eventual reduction in the QRS voltage results in a $^{QRS}/_{ST\text{-}T}$ ratio near to 1:1.

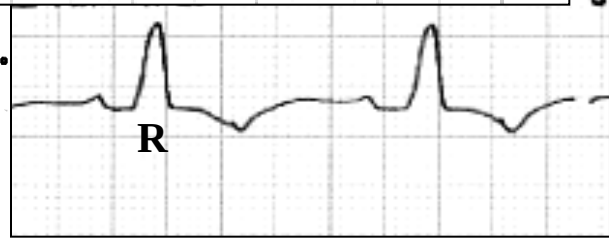
1) **Schamroth L. The Electrocardiology of Coronary Artery Disease Myocardial Infarction Associated with Left Bundle Branch Block 1975; Chapter 10 pp: 93 Blackwell Scientific Publications.**

Frontal Plane

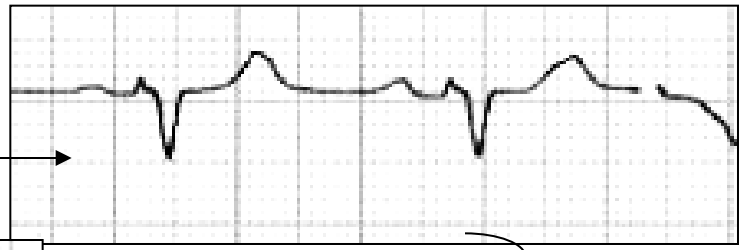


QRS axis – 50º: extreme left axis deviation



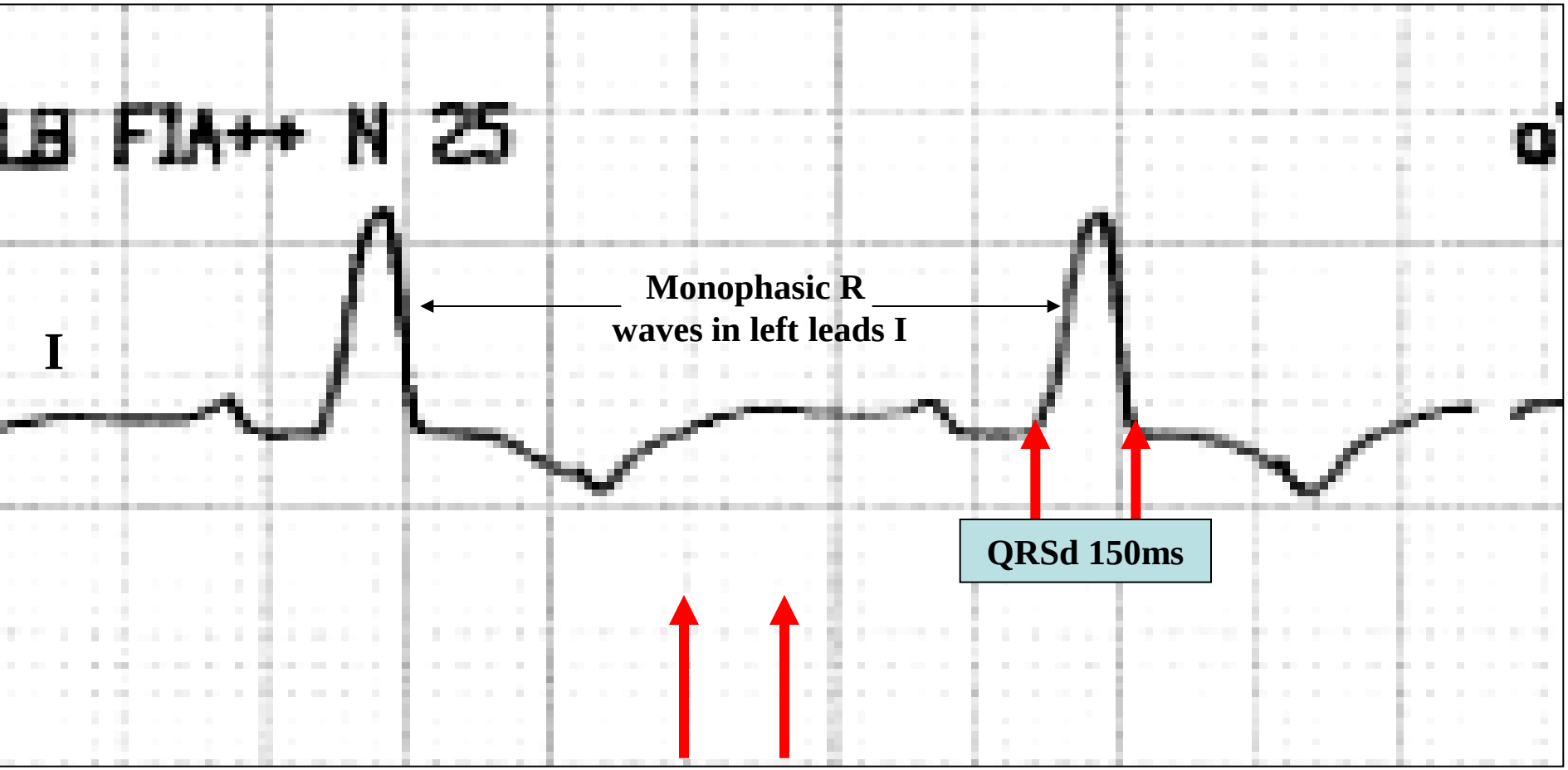


SIII>SII



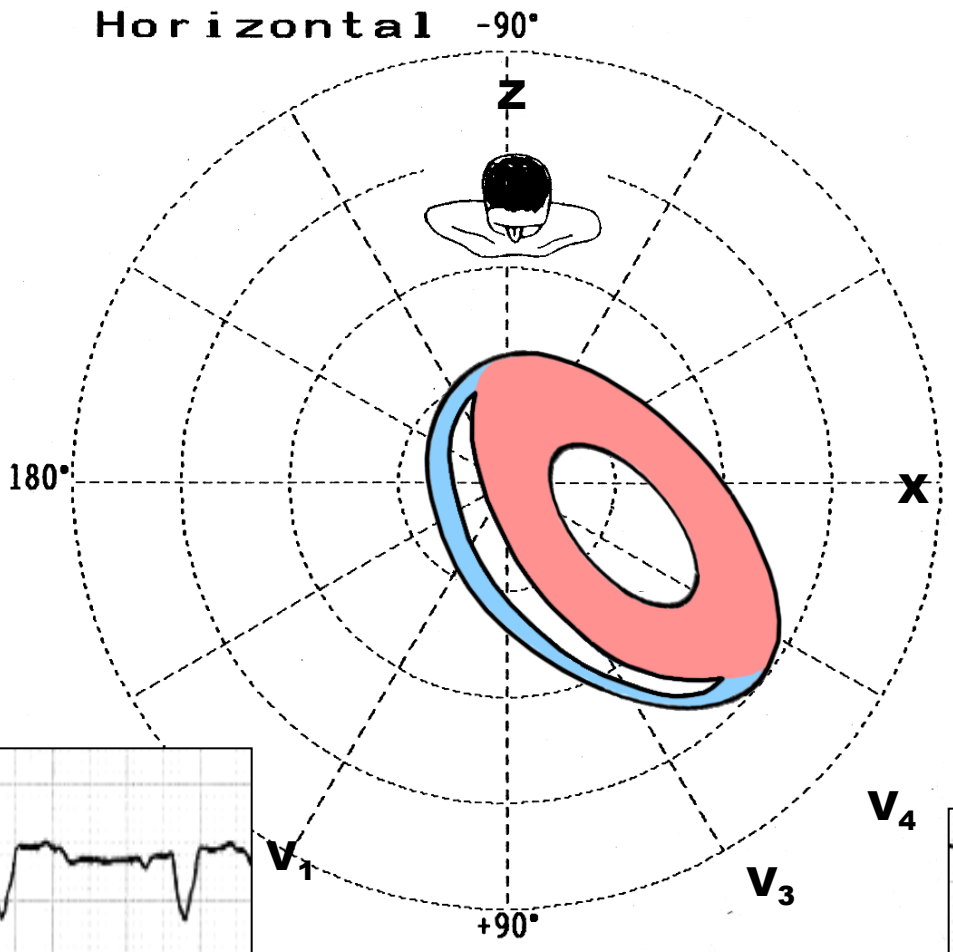
QRS axis – 50º
+
SIII>SII
+
qR in aVL

LAFB



Monophasic R wave in I + QRSd = 150ms: criteria of LBBB

Horizontal Plane

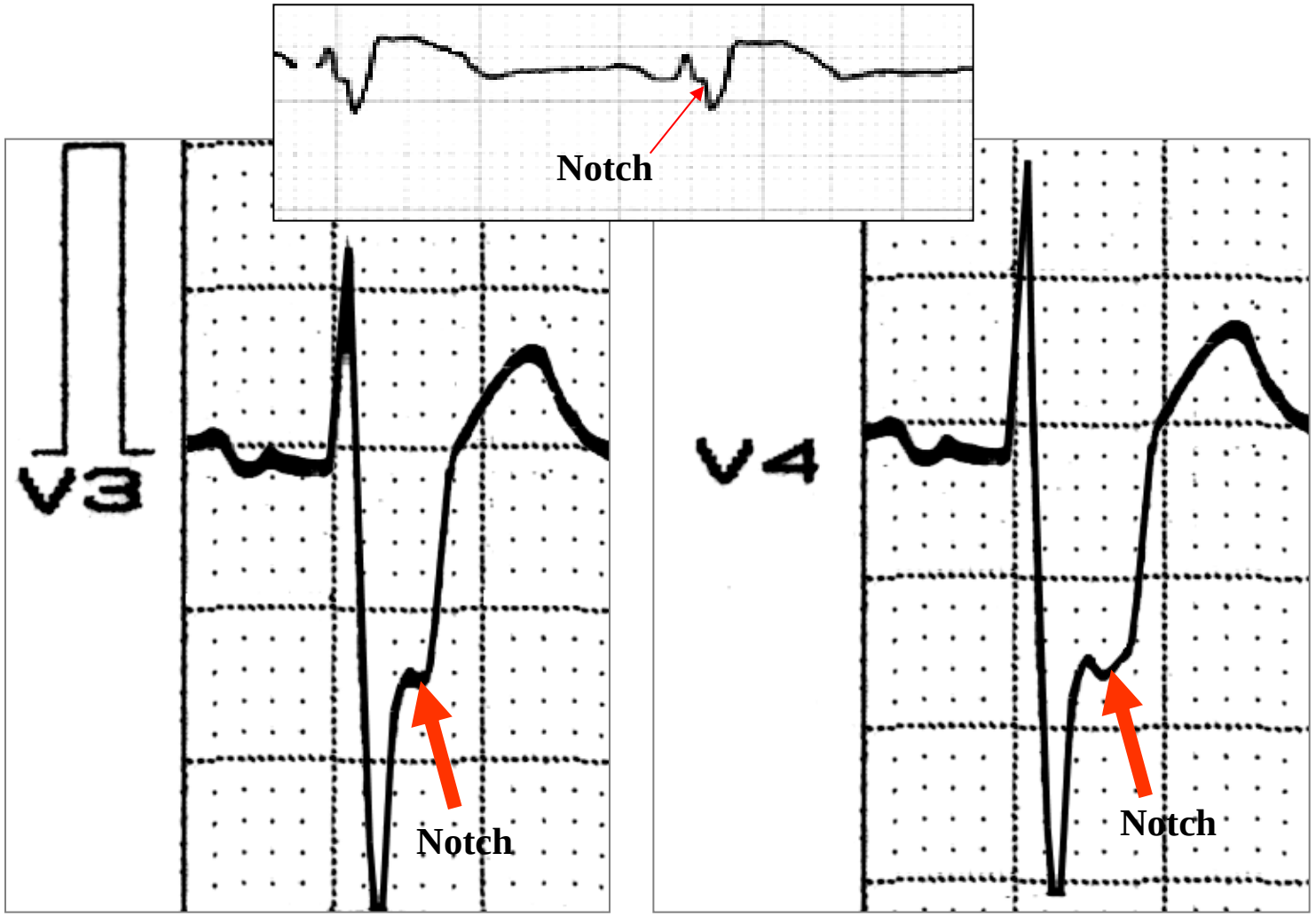


Very low voltage momophasic R wave in V5-V6 = LBBB + electrically inactive area

Diminution of $^{QRS}/_{ST-T}$ Ratio in V1-V2

Electrically inactive extensive anterolateral wall

Cabrera's sign: LBBB complicated with anterior infarction

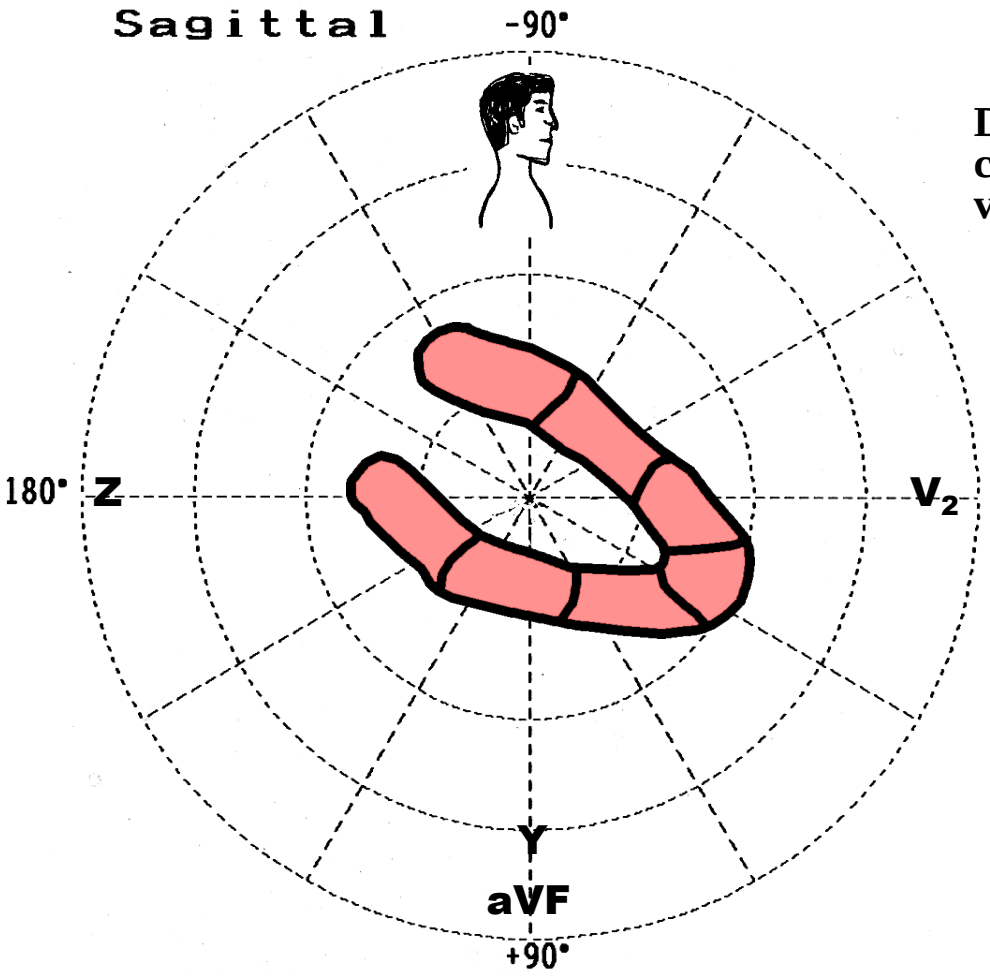


Notch of 50 ms in the ascending ramp of S wave of V_3 and V_4. It is seen more often with MI than without (anterior more often than inferior), and the left axis increased its sensitivity[1;2].

1) Kindwall KE, Brown JP, Josephson ME.Predictive accuracy of criteria for chronic myocardial infarction in pacing-induced left bundle branch block. Am J Cardiol. 1986; 57:1255-1260.

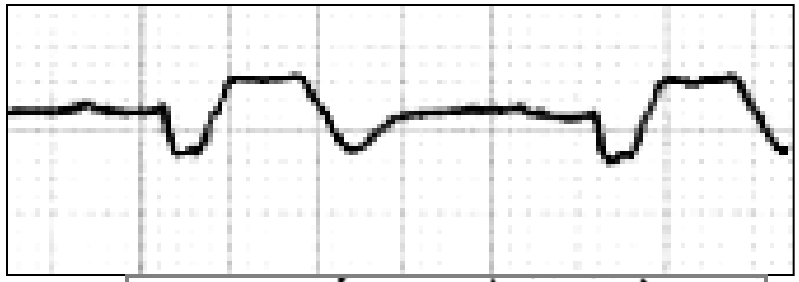
2) Cabrera E, Friedland C. Wave of ventricular activation in left bundle branch block with infarct; a new electrocardiographic sign. Gac Med Mex. 1953; 83:273-280.

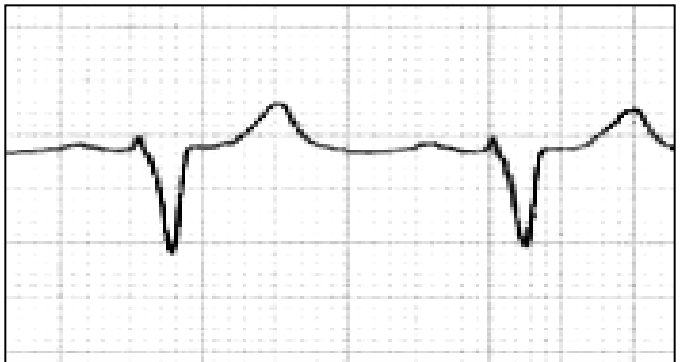
Rigth Sagittal plane



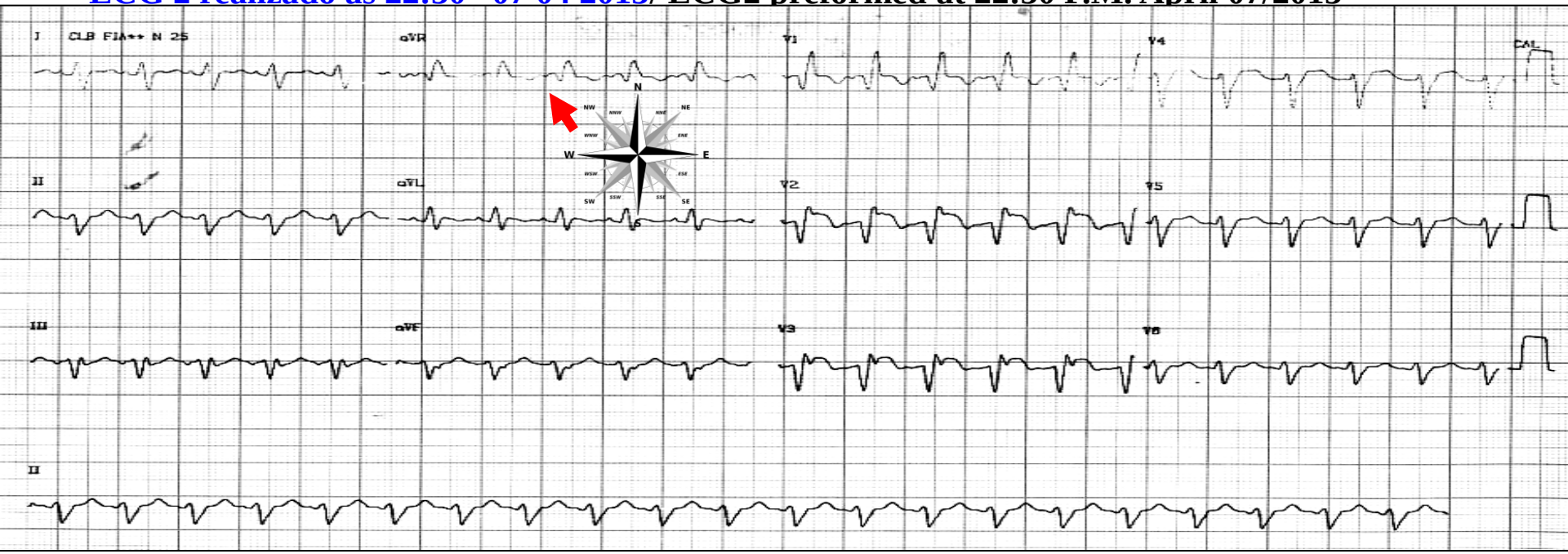
During AMI the elevation of ST segment with concomitant eventual reduction in the QRS voltage results in a $^{QRS}/_{ST-T}$ ratio near to 1:1.

Ratio of $^{QRS}/_{ST-T}$ amplitude 1:1





ECG 2 realizado às 22:30 07 04 2013/ ECG2 preformed at 22:30 P.M. April 07/2013

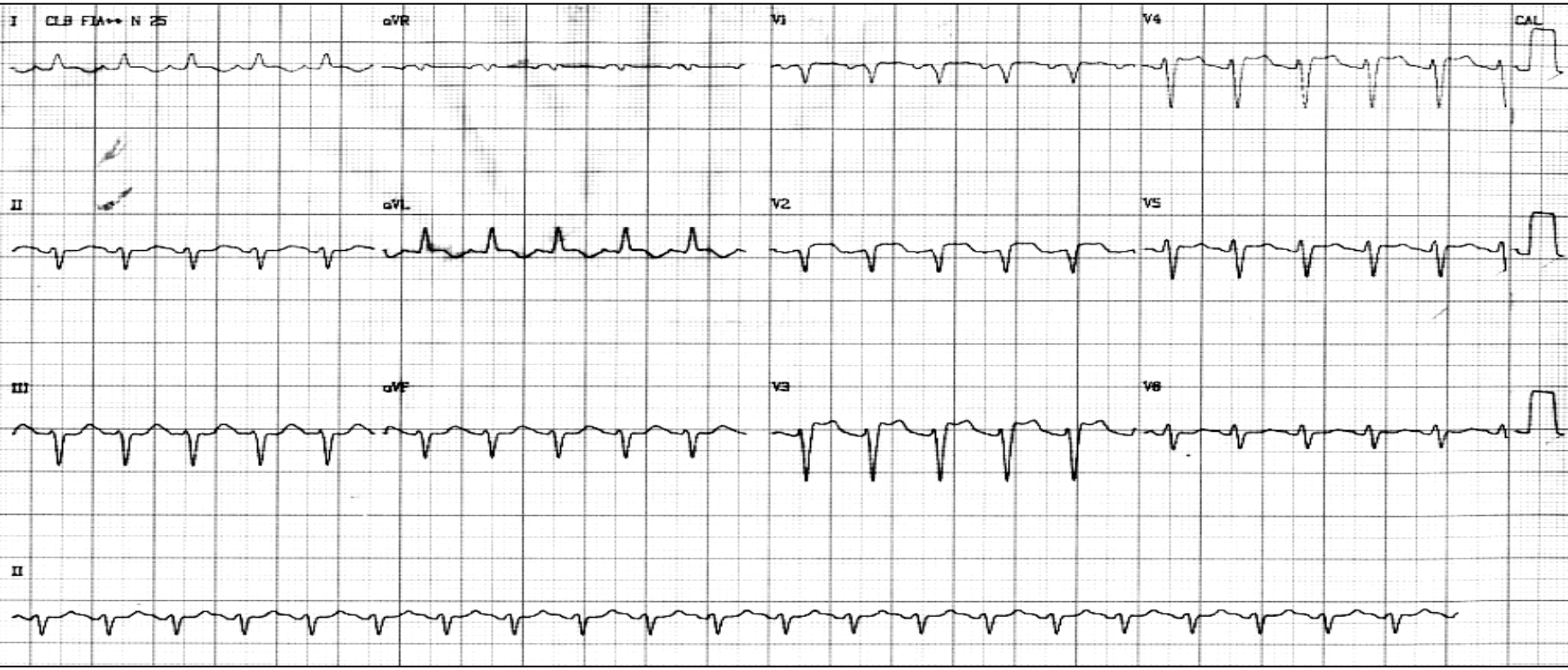


Sinus tachycardia HR= 136bpm, QRS axis -110º(QRS axis located on north-west (NW) cardinal direction or right superior quadrant), QR pattern from V1-to V3: Right bundle branch block associated with LAFB + anterior myocardial infarction. The initial QRS 40ms vector points away from the site of infarction and so produce abnormal Q waves in the right precordial leads. The terminal QRS loop points rightward and anteriorly, which produces a final wide S loop in left leads and a terminal R´ loop in V1 The orientation and configuration of the first portion of the QRSsÊ loop is affected only by the myocardial infarction, while the right bundle branch block did not interfere with this portion of the loop. However, the terminal deflection of the QRSsÊ loop is typical of right bundle branch block.

1. **Doucet P, Walsh TJ, Massie E. A vectorcardiographic study of right bundle branch block with the Frank lead system. Clinical correlation in myocardial infarction.Am J Cardiol. 1965 Sep;16:342-351.**

ECG 3 realizado após CATE(ATC com stent para DA): “no reflow” 00:15´ 08-04-2013

ECG3 performed immediately after unsuccessful angioplasty procedure “no reflow” 00;15´AM April 08/20012



Sinus tachycardia HR= 136bpm, QRS axis -60º (isodiphasic QRS in aVR: QRS axis with extreme left axis deviation o left superior quadrant), and SIII>SII= LAFB. RBBB disappear consequently the QRS axis from -110° dislocated to left (-60°) because right final forces of CRBBB now there are no more. Diffuse low QRS voltage with rS pattern from V3 to V6(subepicardial MI) and QS in V1-V2.(transmural IM) extensive anterior myocardial infarction

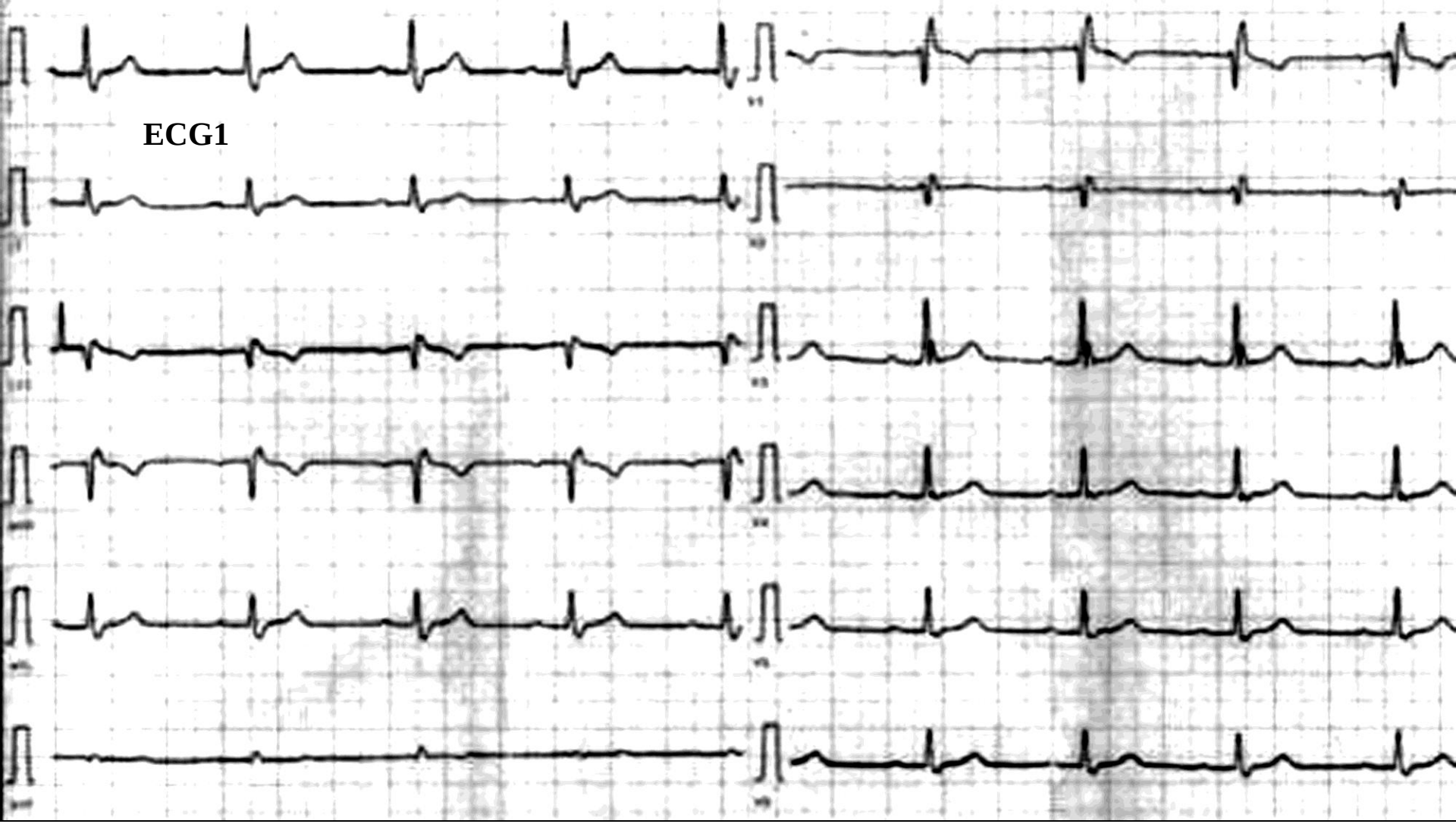
Conclusion

In the present case we have LBBB and RBBB in different moments. It is sequential alternating bundle branch block. Alternating bundle branch block (ABBB) is an unusual conduction disturbance where both bundle branch patterns are observed beat to beat.

Mechanisms postulated for alternating bundle branch block are incomplete- and cycle-length-dependent-block in both the right and left bundle branches.

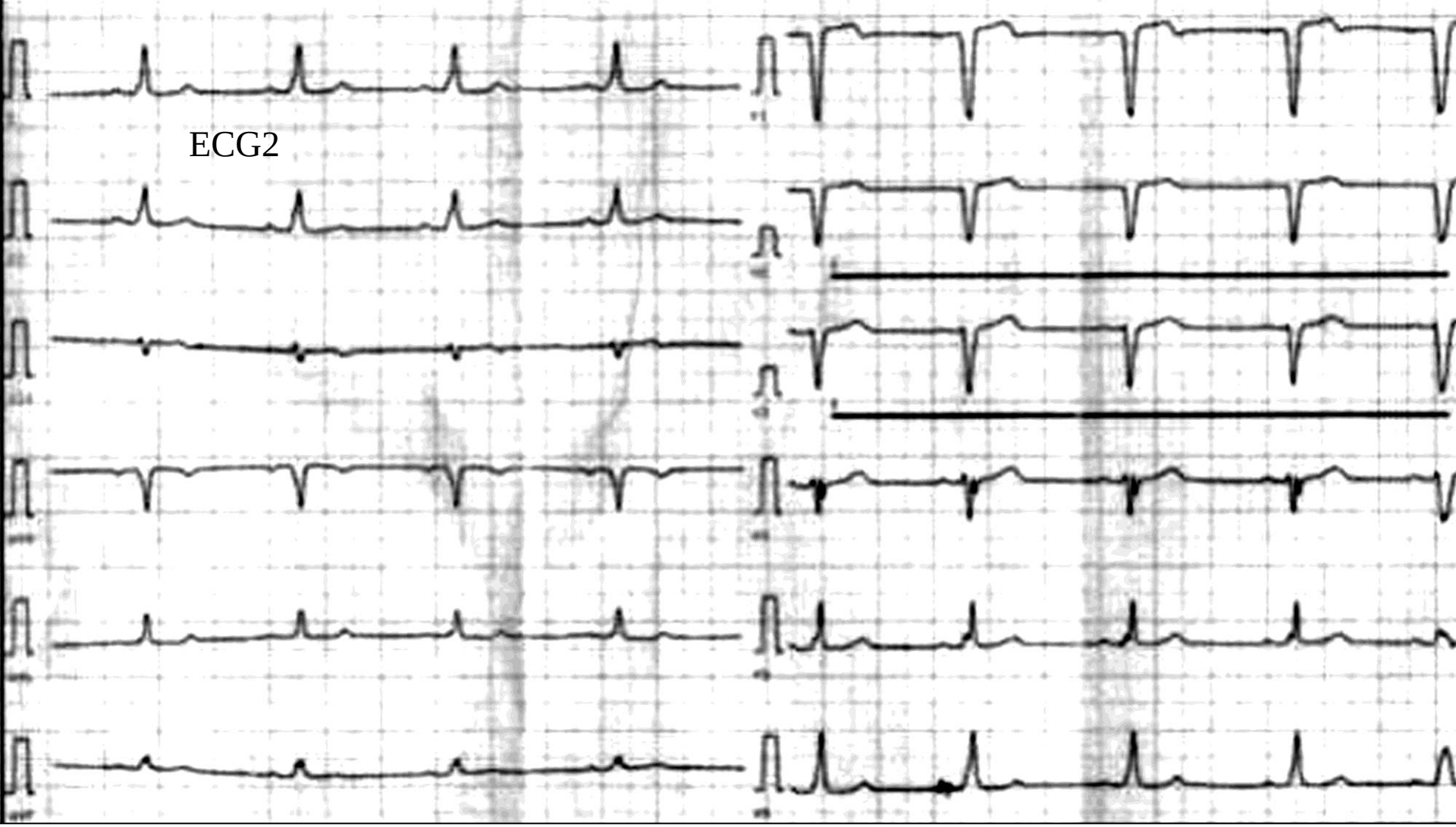
Aberration did not occur with a constant configuration, but in consecutive ECGs showing left bundle branch block and right bundle branch block conduction disturbances. These patterns are explained by concealed retrograde conduction into the anterogradely blocked bundle branch. This caused 2 distinct effects: (1) shifting "to the right" of the refractory period of the affected bundle branch, resulting in maintenance of aberration with the same configuration, if consecutive atrial impulses were conducted to the ventricles, and (2) shortening of the effective cycle of the affected bundle branch, resulting in aberration due to block of the controlateral bundle branch. Alternating right and left bundle branch block aberration was described during atrial tachycardia.(1)

1. **Calabrò MP, Cerrito M, Luzza F, Oreto G. Alternating right and left bundle branch block aberration during atrial tachycardia.J Electrocardiol. 2009 Nov-Dec;42:633-635.**

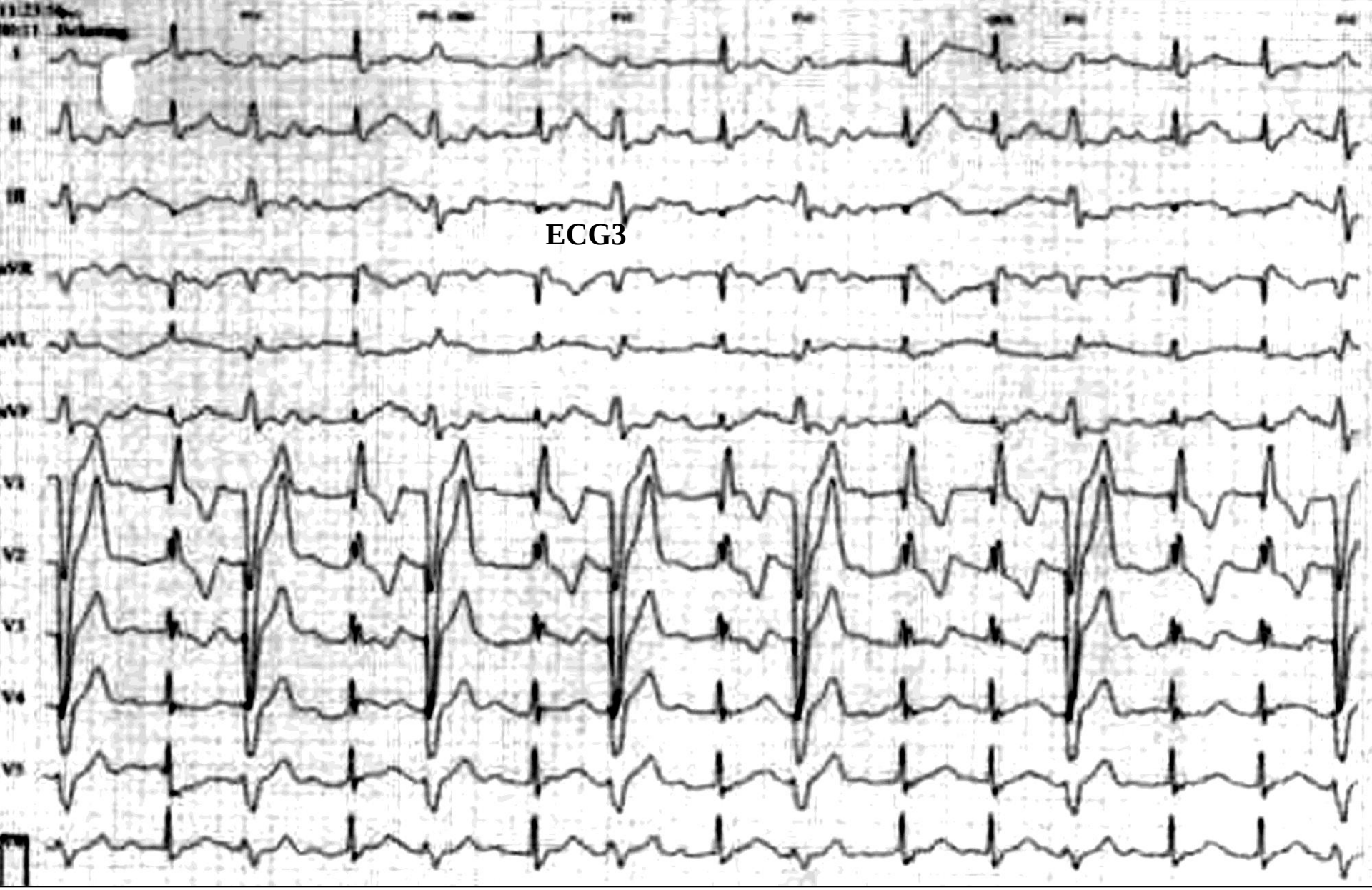


A 63 year-old male came to out patient clinic for a routine control three years after CABG procedure. He was asymptomatic and taken aspirin 100m+ lisinopril 10mg+ atorvastatin 10mg+ cisapride 10mg and omeprazole 10mg. ECG1 **First degree AV block + Right Bundle Branck Block**

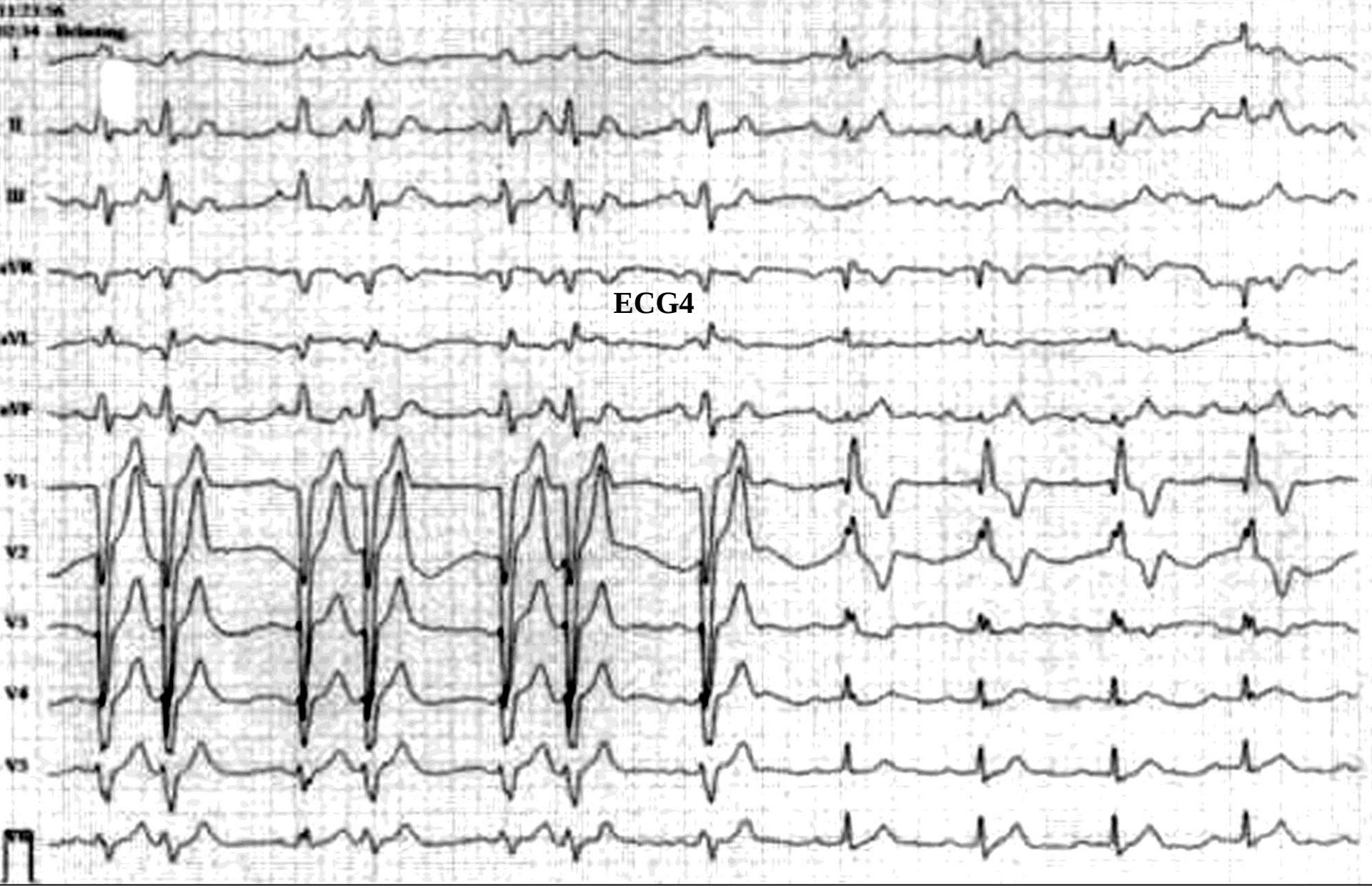
1. **Wagenaar LJ, van Gelder IC, van Veldhuisen DJ Alternating bundle branch block Neth. Heart J. 2002 May; 10: 250–251.**



Because his resting ECG showed LBBB one year ago was indicated ergometer test and Holter monitoring/24 hours.



ECG during exercise(ECG3) showed alternating LBBB and RBBB. First-degree AV block was more outspoken.



Second degree AV block(Mobitz type II) at peak of exercise.