

ASYMPTOMATIC CHAGASIC MAN WITH INTRAVENTRICULAR DROMOTROPIC DISORDERS

HOMEM CHAGÁSICO ASSINTOMÁTICO COM DISTÚRBIOS DROMÓTROPIS INTRAVENTRICULARES

Andrés Ricardo Pérez Riera, MD

**Chief of Electovectorcardiography Sector - Cardiology Discipline - ABC
Faculty – ABC Foundation – Santo André – São Paulo – Brazil**

riera@uol.com.br

Dear colleagues, I would like to know your valuable opinion about this ECG.

The tracing belongs to a man, mulatto, 44 years, 82kg, 1,76m of height, strong, manual worker (he works as a garbage man running beside the trucks), of low social condition, functional illiterate, coming from endemic area for Chagas disease (interior of Minas Gerais). Lived at home of wattle-and-daub. He confirms that in that region passed regularly SUCAM's Men (organ that resulted from coalition of the Brazilian National Department of Rural Endemic) cleaning the homes to eliminate the "kissing bugs". He is living São Paulo just 6 months ago where he came searching a better luck. Interrogatory: He refers that in the last week he went to donate blood for a relative, having been warned to be serologic positive for Chagas disease. Asymptomatic. His father died suddenly at young age (39 yo). Negative physical exam.

ECG in the next slides.

Question: What is ECG diagnosis? Where is located the electric axis?

Prezados colegas gostaria saber a opinião do ECG adjunto.

Pertence a um homem, mulato, 44 anos, 82kg, 1,76m de altura, forte, trabalhador braçal (trabalha como lixeiro correndo do lado dos caminhões), de baixa extração social, analfabeto funcional, procedente de área endêmica (interior de Minas Gerais). Morou em casa de pau-a-pique. Confirma que na região passavam regularmente os "homens" da SUCAM (órgão que resultou da fusão do Departamento Nacional de Endemias Rurais, da Campanha de Erradicação da Malária e da Campanha de Erradicação da Varíola) limpando os lares para eliminar o barbeiro. Está radicado em São Paulo apenas há 6 meses onde veio em procura de melhor sorte.

MC: Refere que na semana passada foi a doar sangue para um parente tendo sido advertido ser soro positivo para doença de Chagas. Assintomático. Pai faleceu jovem de doença de Chagas. Exame físico negativo.

ECG em slides seguintes.

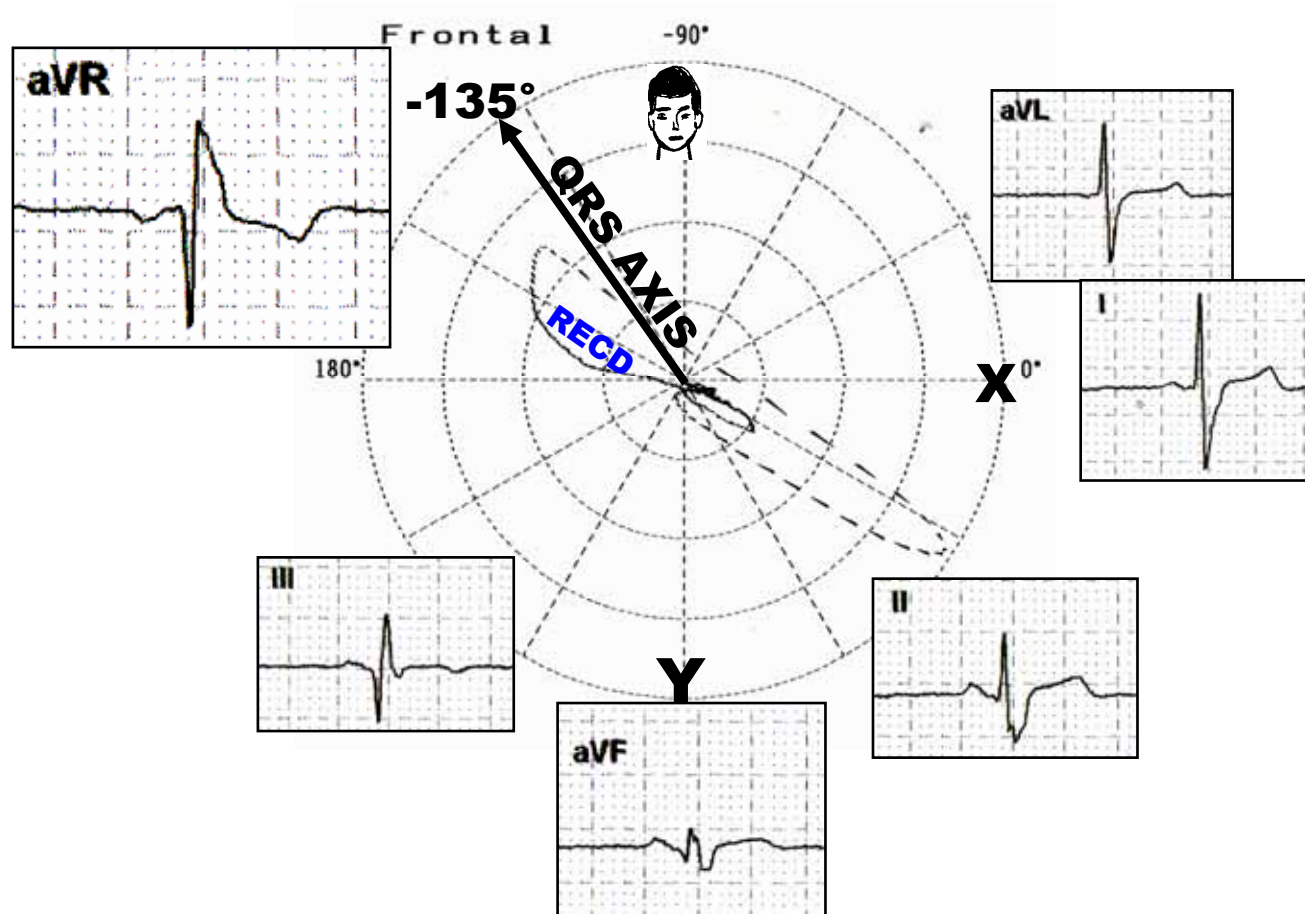
Pergunta: Qual é o diagnóstico ECG?

Onde está localizado o eixo elétrico?

Andrés

ECG/VCG CORRELATION FRONTAL PLANE

Name: VFO; Age: 44yo; Gender: Male; Weight: 82 kg; Height: 1,76m
Ethnic Group: Mulatto; Date: 12/15/2010

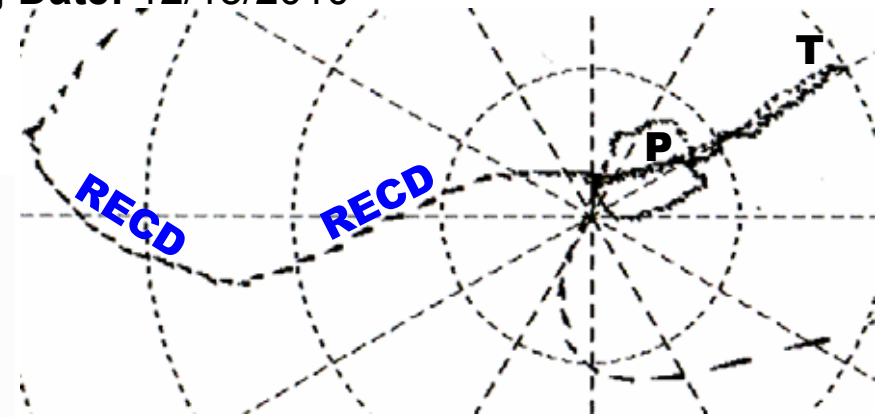
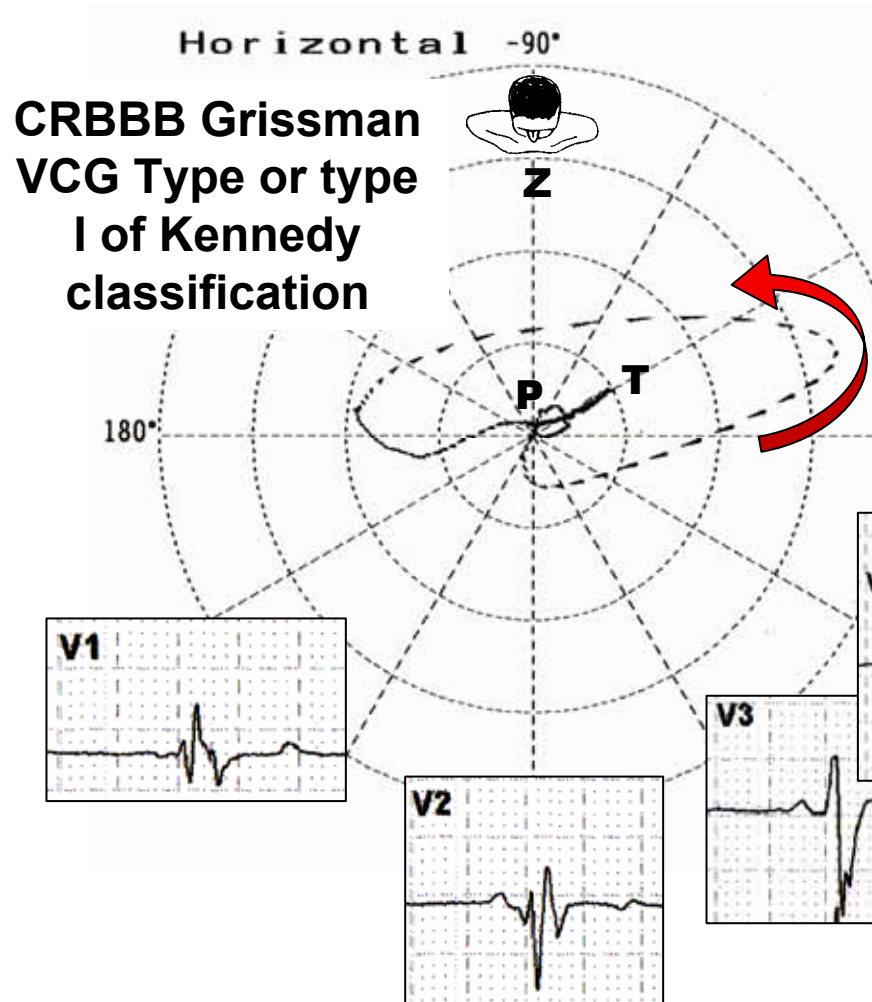


It is hard to determinate the QRS axis. Significant Right End Conduction Delay (**RECD**) located on top right quadrant, territory of right ventricular outflow tract (RVOT) manifested by broad final R wave in aVR lead. **Resulta difícil a determinação do eixo elétrico. Existe importante atraso final de condução, localizado no quadrante superior direito, correspondente a via de saída do VD, que se manifesta por uma onda R final larga em aVR.**

ECG/VCG CORRELATION HORIZONTAL PLANE

Name: VFO; Age: 44yo; Gender: Male; Weight: 82 kg; Height: 1,76m

Ethnic Group: Mulatto; Date: 12/15/2010

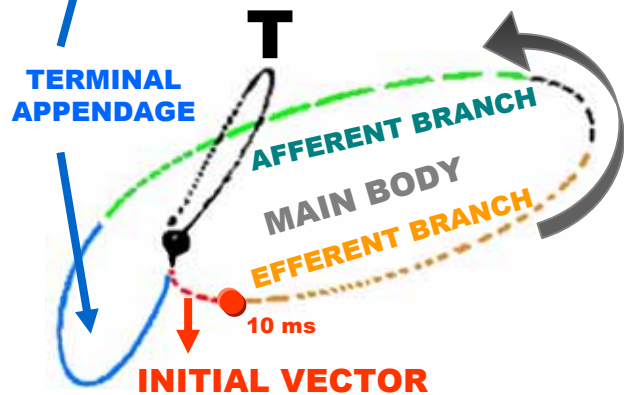
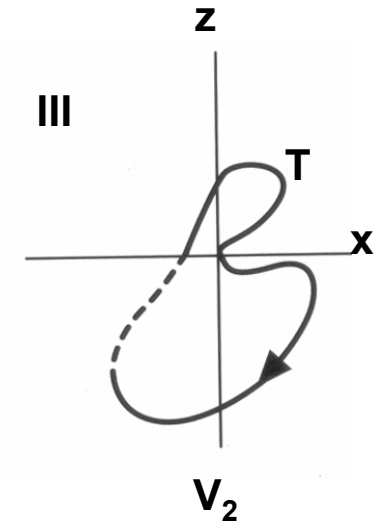
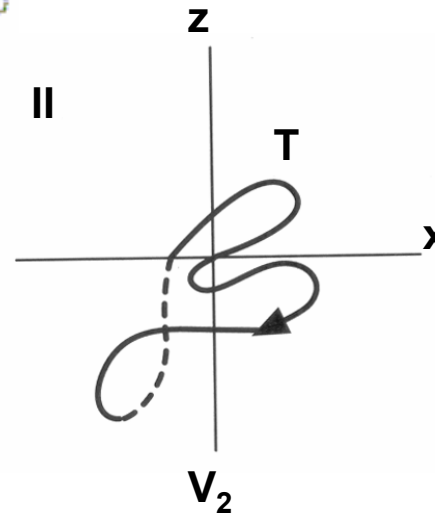
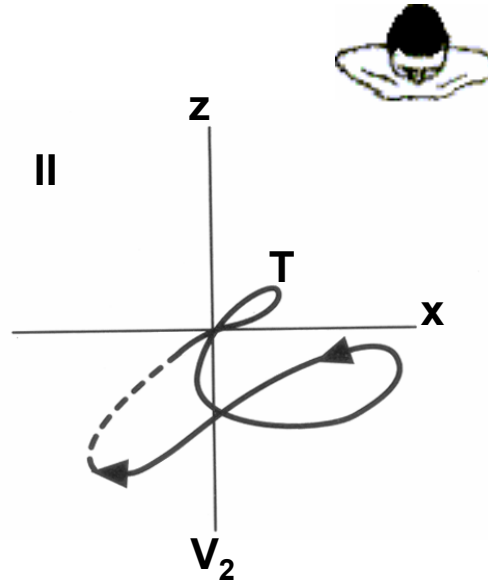
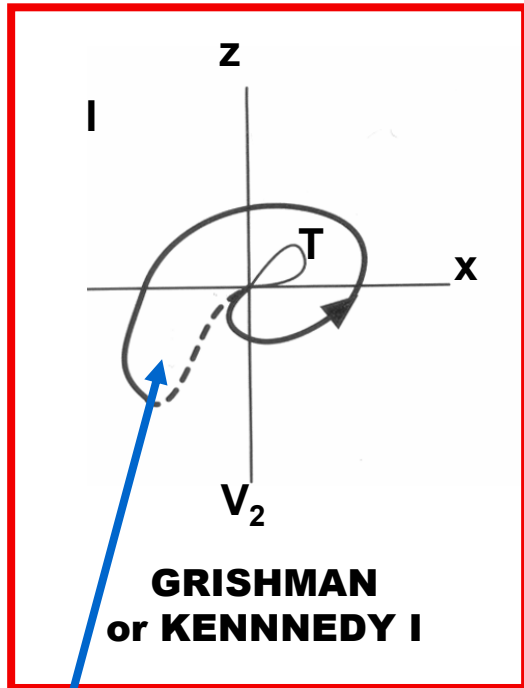


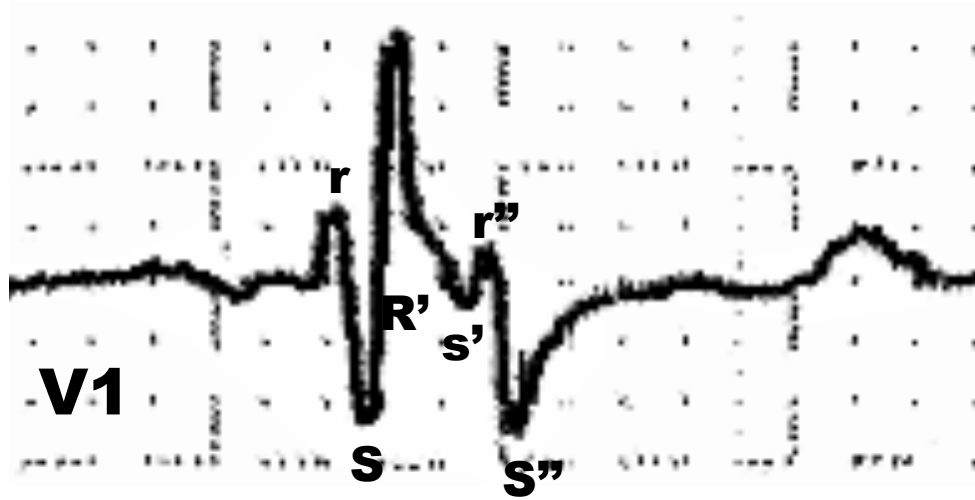
QRS Duration: 128ms (64 dashes)
CRBBB Grissman Type

RECD: Right End Conduction Delay (Atraso Final de Condução)

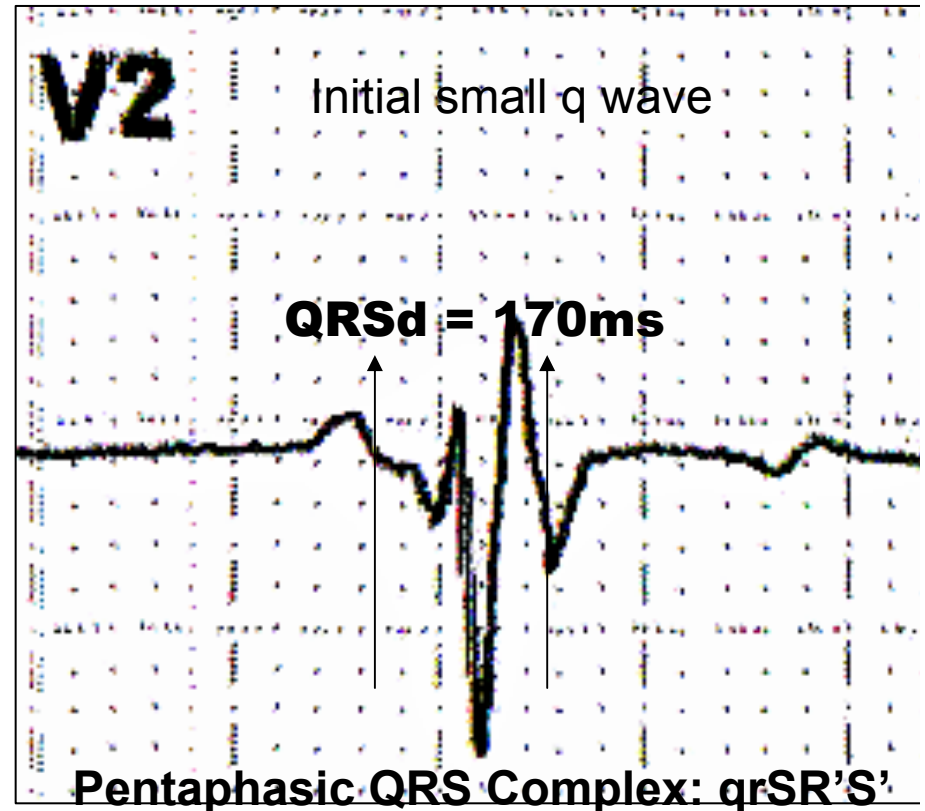
VCG CRBBB TYPES

QRS LOOP PATTERNS ON HORIZONTAL PLANE





Hexaphasic QRS Complex: rsRs'r'S''

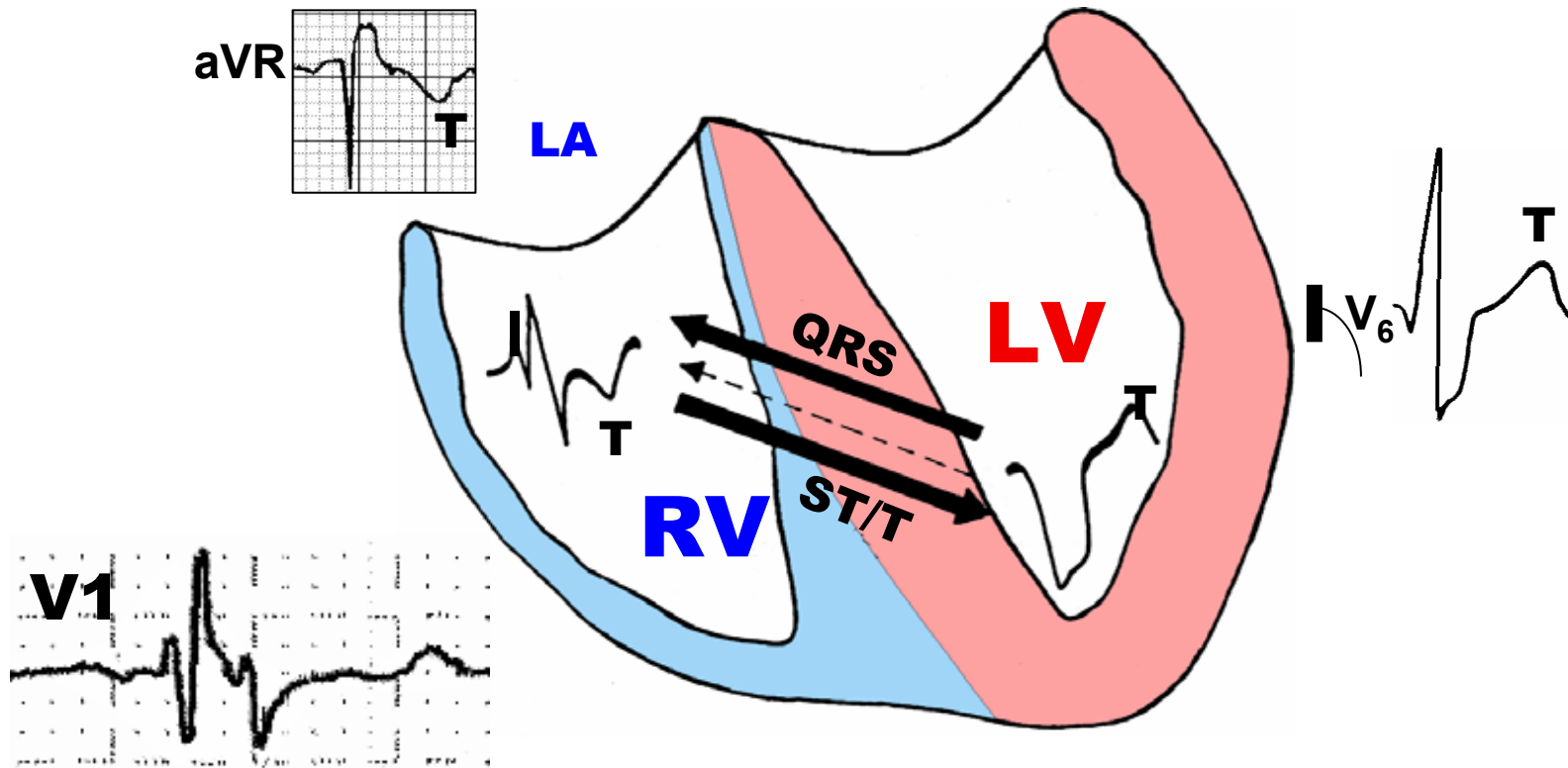


Pentaphasic QRS Complex: qrSR'S'

An abnormal Q wave is usually defined as an initial depression of the QRS complex having a duration of ≥ 40 ms and amplitude exceeding 25% of the following R wave in any contiguous leads on the ECG. However, smaller Q waves are sometimes recorded on the ECG. A small Q wave defined as any negative deflection preceding the R wave in V(2) or V(3) with < 40 -ms duration and < 0.5 -mV amplitude, with or without a small (< 0.1 -mV) slurred, spiky fragmented initial QRS deflection before the Q wave (early fragmentation). A small Q wave (< 40 -ms duration and < 0.5 -mV amplitude) in V(2) or V(3) with or without early fragmentation significantly predicted the presence of CAD and, especially, significant stenosis in the LAD. Chagas disease is considered a coronary heart disease.

1. Katsuno T, Hirao K, Kimura S, Komura M, Haraguchi G, Inagaki H, et al. Diagnostic significance of a small Q wave in precordial leads V(2) or V(3). *Ann Noninvasive Electrocardiol.* 2010 Apr;15(2):116-23.

UNIPOLAR MORPHOLOGIES IN CRBBB

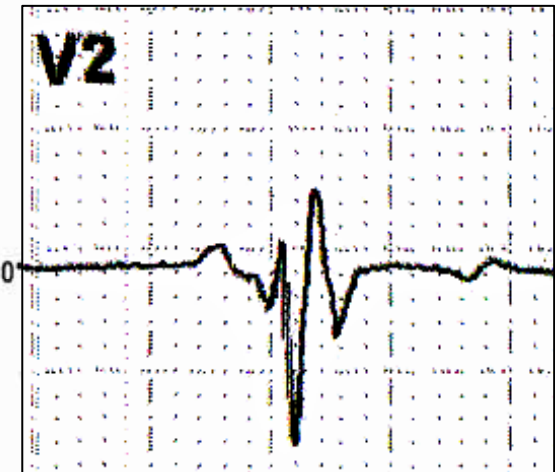
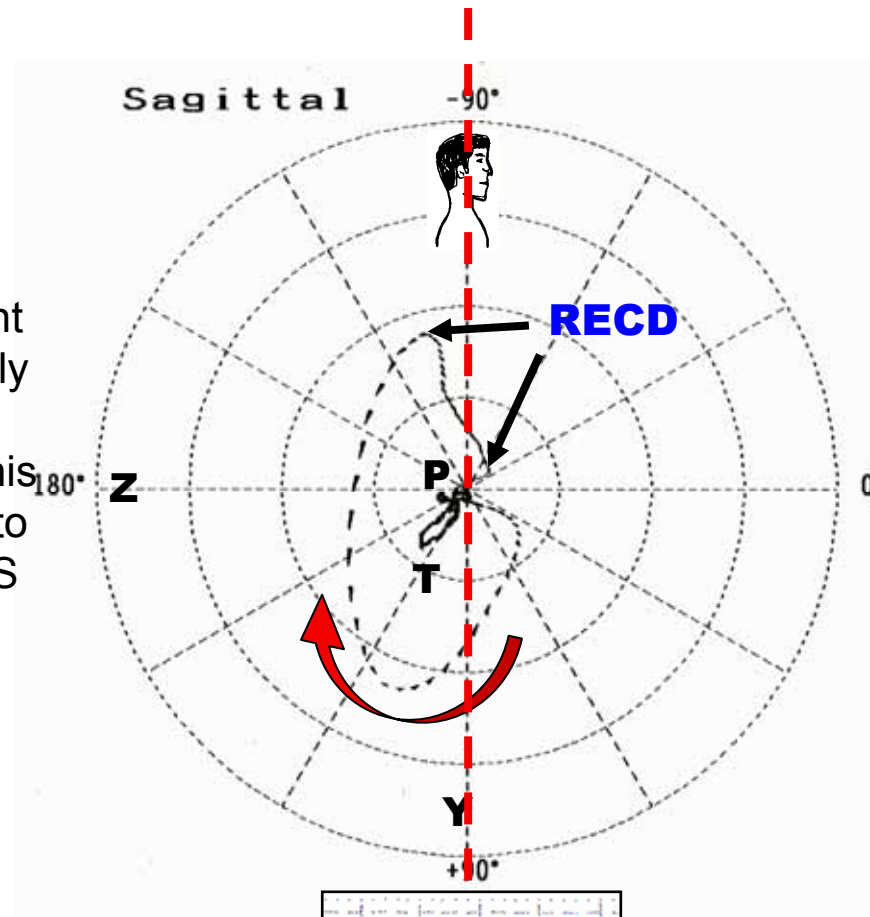


This patient shows in V_1 a polyphasic QRS complex (rSR'sr''S'') indicative that the electrode of V_1 registers the intracavitary pattern of RV (see the figure), this feature is suggestive of a degree of right ventricular overload.

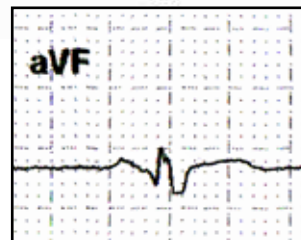
ECG/VCG CORRELATION RIGHT SAGITTAL PLANE

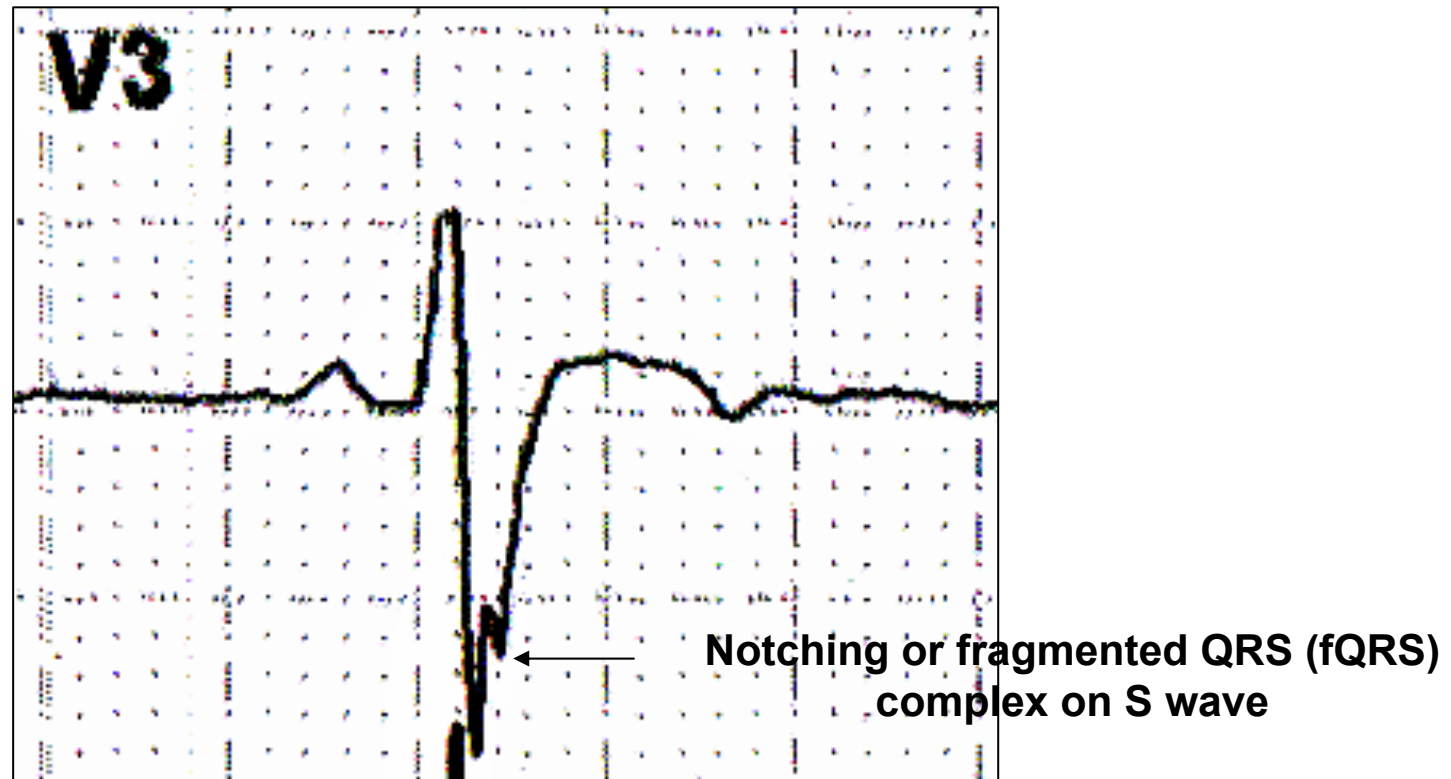
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The QRS loop in right sagittal plane is nearly perpendicular to orthogonal lead Y. This explain the difficulty to determinate the QRS axis on horizontal plane.



Pentaphasic QRS Complex: qrSR'S'





Notching of R and S waves in the QRS complex can result from MI.

The 'fragmented QRS' (fQRS) showed high sensitivity and specificity for the presence of myocardial scar as imaged by myocardial perfusion scanning in participants studied for ischemic heart disease. To day Chagas disease is considered an ischemic heart disease. Unfortunately, The utility of fQRS varies with the incidence of ventricular disease in the population studied. This ECG sign is commonly associated with ventricular abnormalities with and without demonstrable myocardial scar, but also occurs in the absence of clinical heart disease.

1. MacAlpin RN. The fragmented QRS: does it really indicate a ventricular abnormality? J Cardiovasc Med (Hagerstown). 2010 Nov;11:801-809.

fQRS, defined as changes in QRS morphology with different RSR' patterns: additional R waves, notched S wave, or > 1R' wave, has recently been linked with various cardiac conditions and even been postulated to be predictive of outcomes in certain pathologies¹.

fQRS may be of value in determining the risk for SCD and guiding selection for device therapy in patients with structural heart disease and Brugada syndrome(BrS). f-QRS appears to be a marker for the substrate for spontaneous VF in BrS and predicts patients at high risk of syncope³. It is possible that the predictive value of fQRS for SCD can be enhanced further by combining a marker of repolarization abnormality such as microwave T wave alternans². f-wQRS on a ECG is a moderately sensitive and highly specific sign for myocardial scar in patients with known or suspected CAD. f-wQRS is also an independent predictor of mortality⁴.

Presence of fQRS independently of Q waves is not associated with increased risk of recurrent events in the general population of patients after MI. However, among patients with resolved Q waves, fQRS is associated with increased risk of cardiac events. fQRS complex should not be neglected in patients with transient Q waves after MI⁵. In CAD patients, the fQRS on a 12-lead ECG is a marker of a prior MI, defined by regional perfusion abnormalities, which has a substantially higher sensitivity and negative predictive value compared with the Q wave⁶.

1. Chatterjee S, Changawala N. Fragmented QRS complex: a novel marker of cardiovascular disease. *Clin Cardiol.* 2010 Feb;33:68-671.
2. Das MK, El Masry H. Fragmented QRS and other depolarization abnormalities as a predictor of mortality and sudden cardiac death. *Curr Opin Cardiol.* 2010 Jan;25:59-64.
3. Morita H, Kusano KF, Miura D, Nagase S, Nakamura K, Morita ST, et al. Fragmented QRS as a marker of conduction abnormality and a predictor of prognosis of Brugada syndrome. *Circulation.* 2008 Oct 21;118:1697-1704.
4. Das MK, Suradi H, Maskoun W, Michael MA, Shen C, Peng J, Fragmented wide QRS on a 12-lead ECG: a sign of myocardial scar and poor prognosis *Circ Arrhythm Electrophysiol.* 2008 Oct;1:258-268.
5. Pietrasik G, Goldenberg I, Zdzienicka J, Moss AJ, Zareba W. Prognostic significance of fragmented QRS complex for predicting the risk of recurrent cardiac events in patients with Q-wave myocardial infarction. *Am J Cardiol.* 2007 Aug 15;100:583-586.
6. Das MK, Khan B, Jacob S, Kumar A, Mahenthiran J. Significance of a fragmented QRS complex versus a Q wave in patients with coronary artery disease. *Circulation.* 2006 May 30;113:2495-501.

fQRS complexes on an ECG are a marker of higher stress myocardial perfusion imaging (MPI) perfusion and functional abnormalities. Regional fQRS patterns denote the presence of a greater corresponding focal regional myocardial scar on stress MPI¹.

1. Mahenthiran J, Khan BR, Sawada SG, Das MK. Fragmented QRS complexes not typical of a bundle branch block: a marker of greater myocardial perfusion tomography abnormalities in coronary artery disease. J Nucl Cardiol. 2007 May-Jun;14:347-353.