Paciente de 39 anos, asiático, hipertenso de longa data, mal controlado, brevelineo, 1,68 m, 104 kg, obeso centrípeto grau III, pressão arterial 17/12, na vigencia de uso continuo de anlodipino 5, hidroclorotiacida 25, olmesartana 20mg.

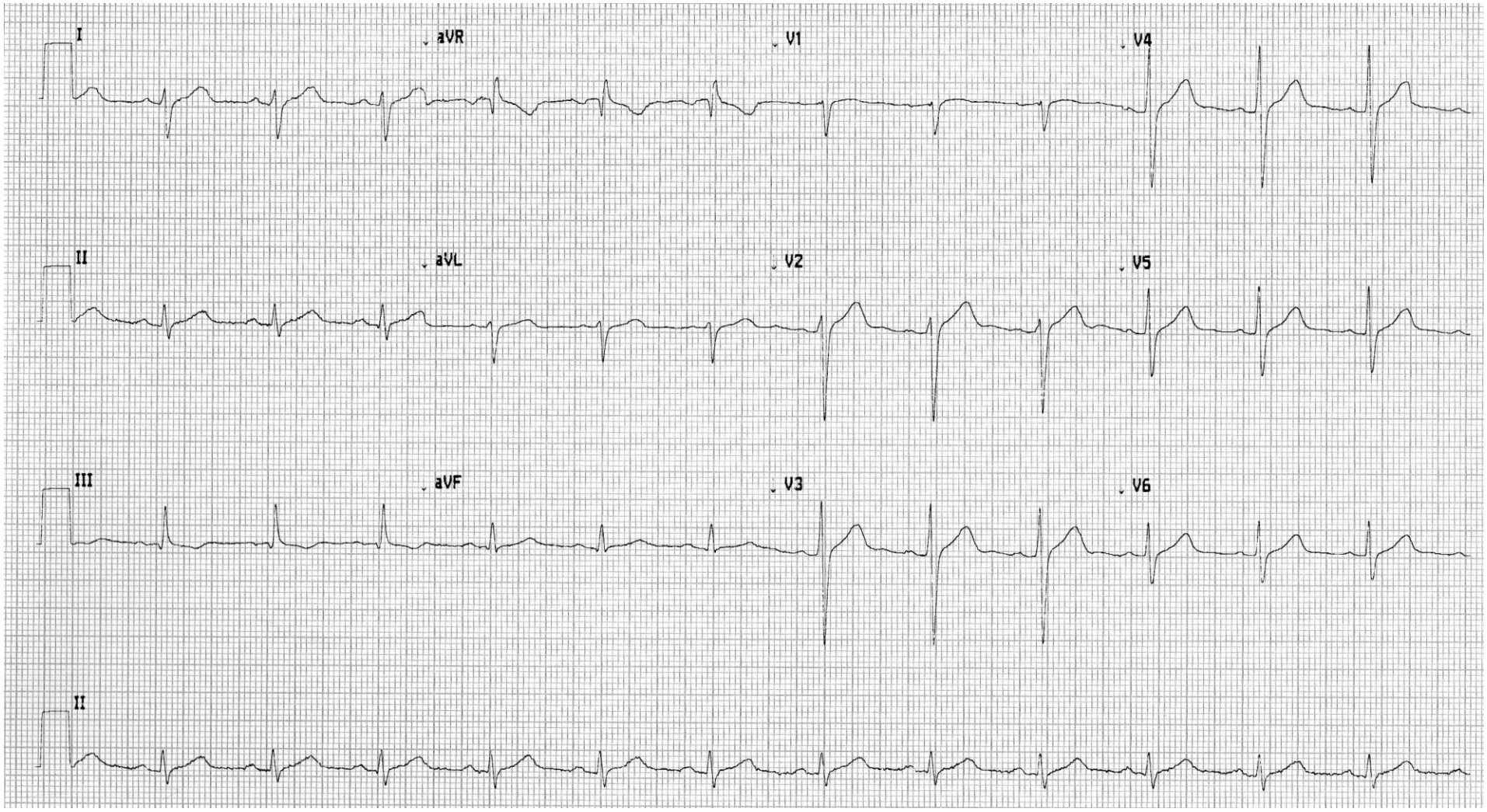
Realizamos este ECG que mostrou um eixo elétrico desviado a direita +137º. Este desvio do eixo aparentemente é contraditório num paciente pícnico, obeso centrípeto e hipertenso.

Ecocardiograma: septo e parede livre do VE = 13 mm

Perguntas:

1. Como explicamos a aparente paradoxa do desvio do eixo a direita num obeso pícnico, hipertenso com hipertrofia concêntrica do VE?
2. Qual o diagnóstico eletrocardiográfico?

Andrés


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
II

Yo observo un ritmo sinusal, en el plano frontal el eje de la onda P se ubica en los +30º con un componente +/- en DIII por lo cual afirmo que su rotación es antihoraria, su amplitud y voltaje están dentro de valores considerada como normales.

El complejo QRS tiene una duración de 80 mseg y el primer vector se orienta hacia arriba, a la izquierda y adelante, el vector R se encuentra alrededor de los 120º, orientados hacia atrás a la derecha y abajo con rotación horaria en el plano frontal, con una onda T ubicada entre los 0º y 30º, formando un ángulo obtuso con el complejo QRS.

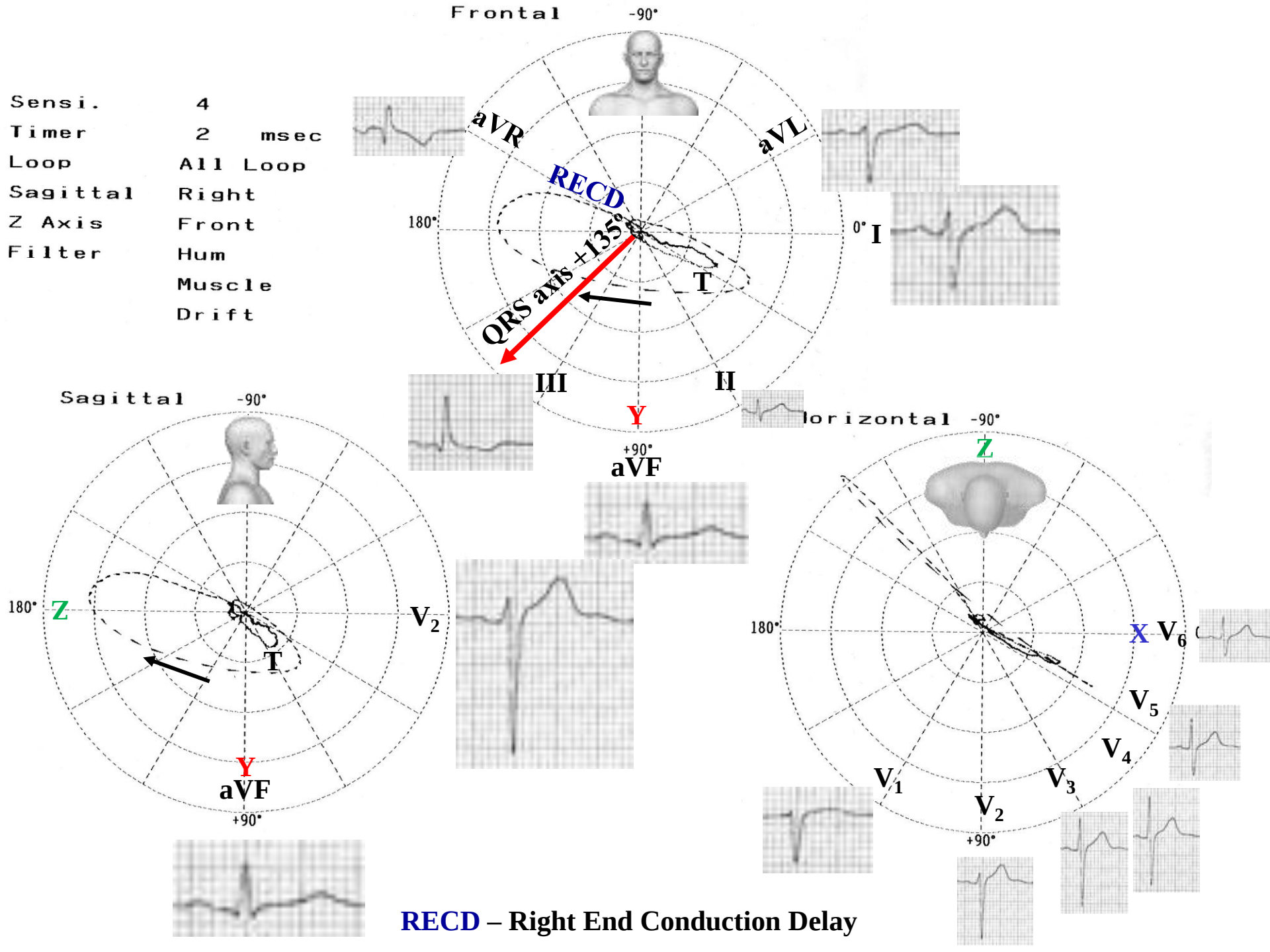
¿ Como se puede justificar estas características electrocardiográficas?:

1. **¿Posicional?:** Debería existir una correlación con el eje de la onda P; como esto no es así, a mí no me gusta.
2. **¿Aumento de fuerzas?:** se justificaría por un agrandamiento del VD. No observo agrandamiento de la aurícula derecha por lo cual tampoco me gusta
3. **¿ Disminución de fuerzas de fuerzas?:** necrosis inferoposterior; las ondas T son asimétricas y el segmento ST no parece ser secundarios a una cardiopatía isquémica.
4. **¿Trastornos de conducción cardíaca?:** en este ítem tenemos que considerar a los bloqueos de fascículo póstero-inferior. Si fuese un bloqueo del fascículo postero-inferior izquierdo sin onda Q en DI en un paciente con hipertrofia septal le tendría que agregar el bloqueo de fascículo medio; en estos casos el complejo QRS aumentaría su duración. Por lo cual yo lo asociaría a un bloqueo del fascículo postero inferior derecho que para mi sería la primera opción diagnóstica.

Supongo que nuestro querido Andrés podrá iluminarnos en este caso.

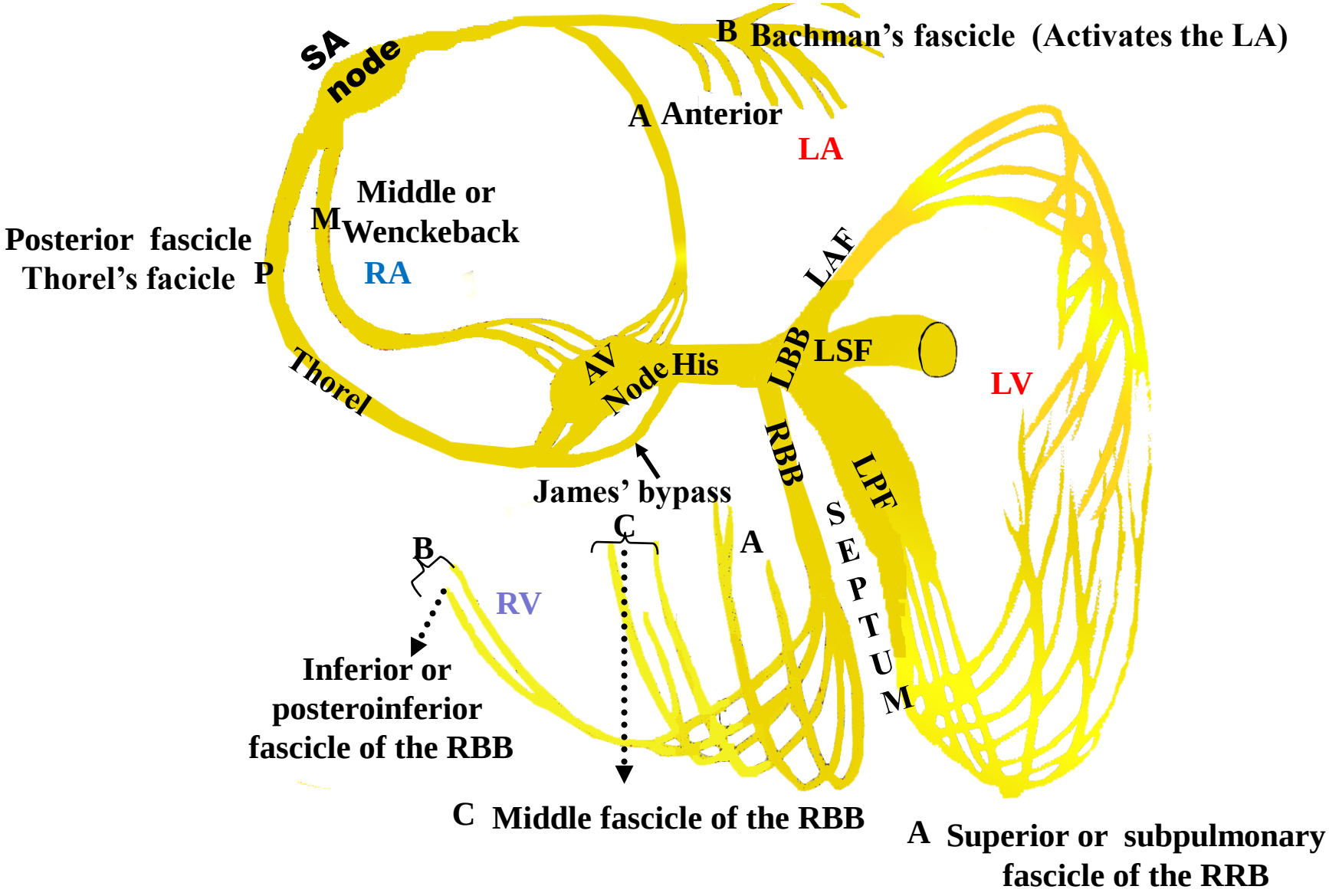
Cordialmente Julia Pons.

Final diagnosis by Andrés Ricardo Pérez-Riera



RECD – Right End Conduction Delay

Components of the cardionector system of sinoatrioventricular & intraventricular conduction system



You can see the SA node, atrial internodal bundles (anterior, middle and posterior), AV node, His bundle and its divisions (3 left and 3 right) (1).

Components of the Right His System (RHS)

The Right His System is constituted by:

A) c:

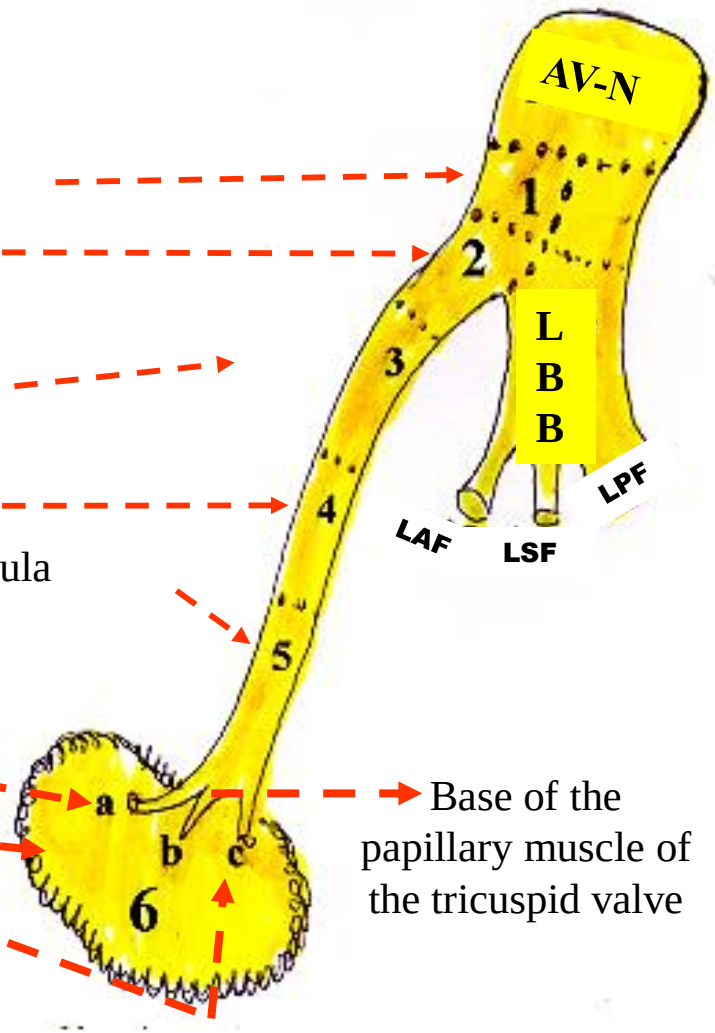
1) Right penetrating portion of the His Bundle Branch.
2) Branching portion of the His Bundle Branch

B**) Pre-divisional or troncular Right Bundle Branch :**

3) Proximal or membranous of RBB
4) Middle, intramyocardical or mimetic of RBB
5) Inferior, distal, moderator band, or septomarginal trabecula

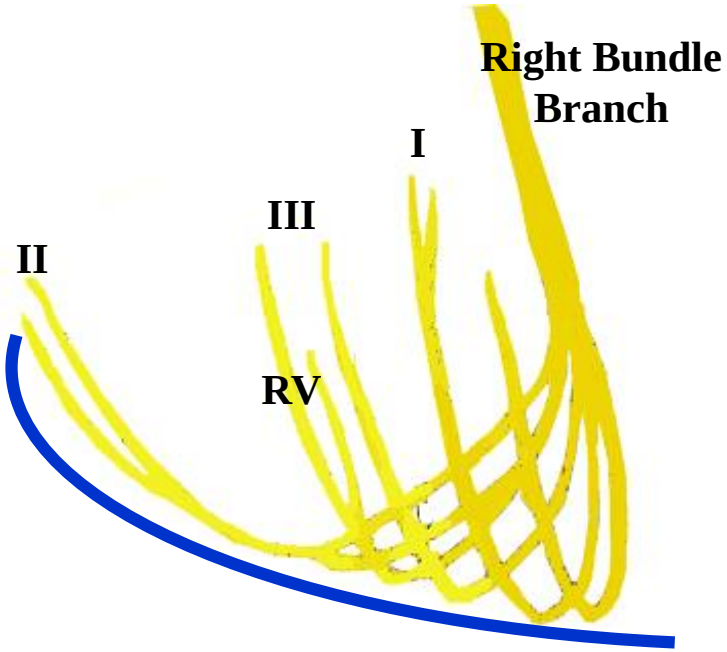
C) Right Bundle Branch Fascicles of RBB on RV free wall

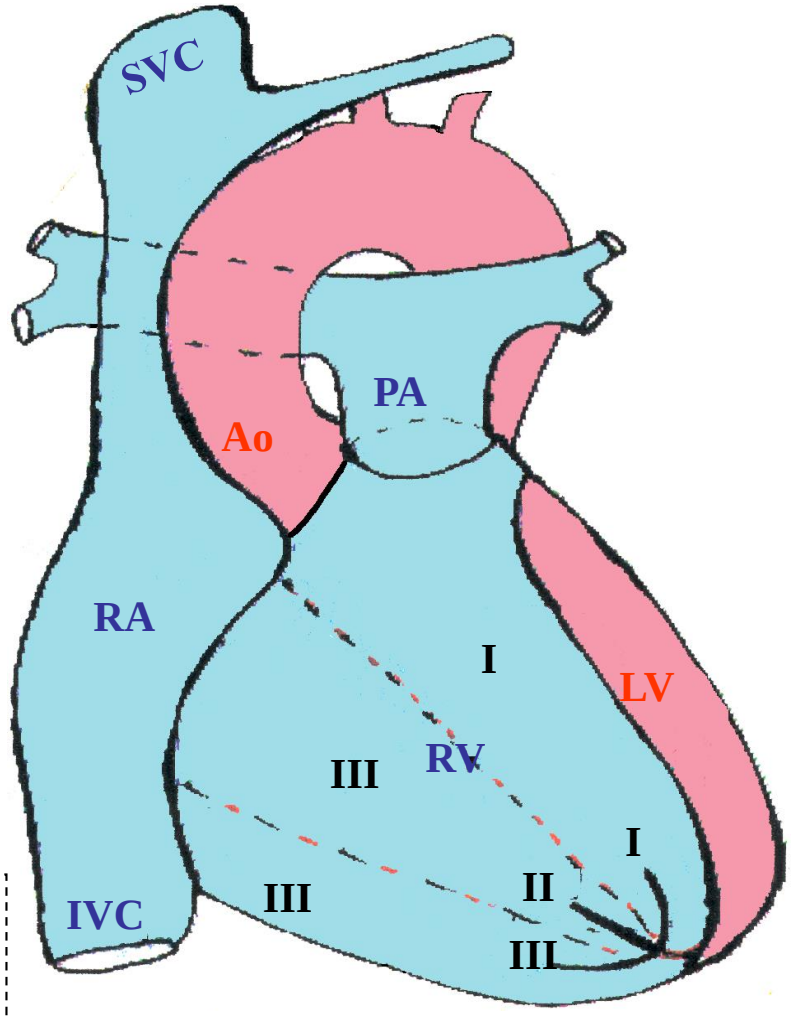
a) Superior, anterosuperior or subpulmonary division;
b) Middle, septal or anteroinferior division of RBB;
c) Inferior, posterior or posteroinferior division of RBB



Components of the right his system, divided into three parts: two predivisional, and one division either terminal or divisional in the RV free wall)

Distribution of the three fascicles of the right branch of the His bundle in the RV free wall (2;3;4;5)

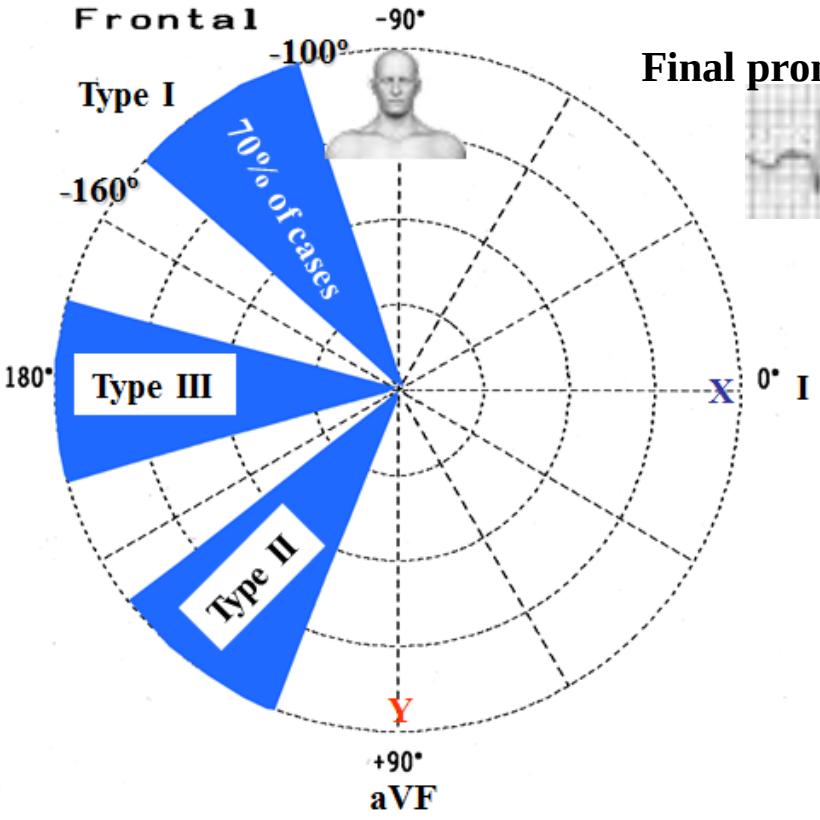




I - Territory of superior or subpulmonary fascicle
II – Territory of inferior or posteroinferior fascicle
III – Territory of middle fascicle

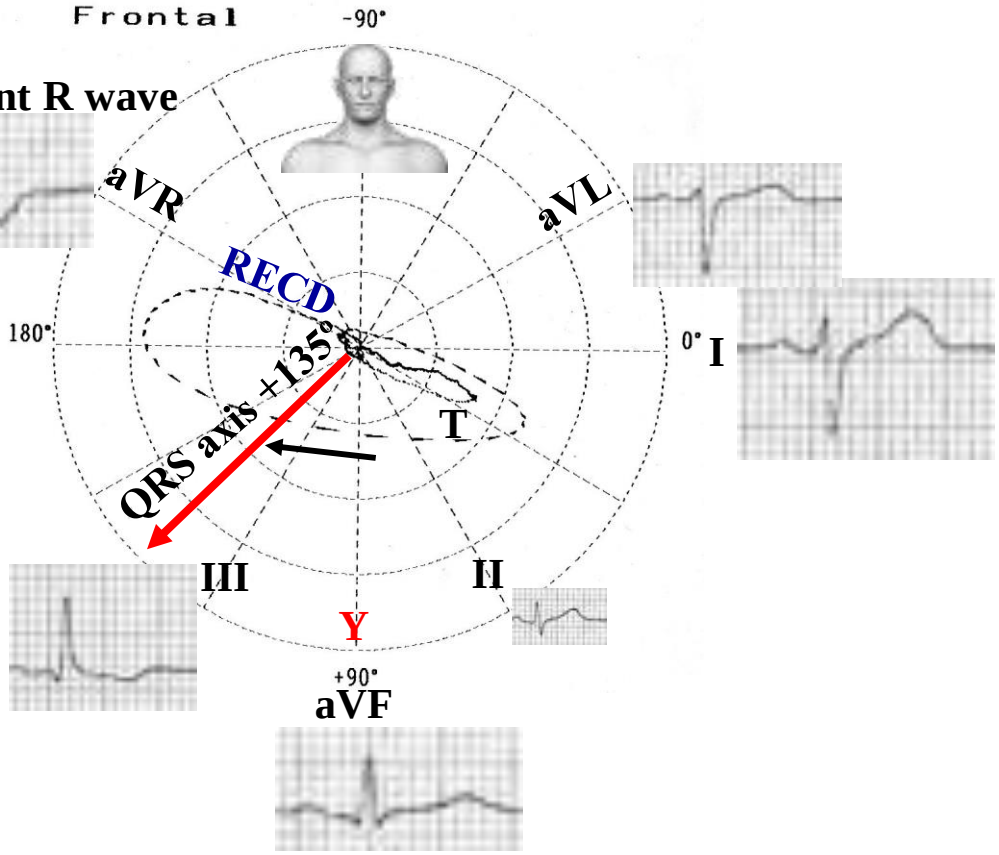
Distribution of three divisions of the right branch in the RV free wall.

Frontal Plane: Location of Right End Conduction Delay (RECD) in the 3 types



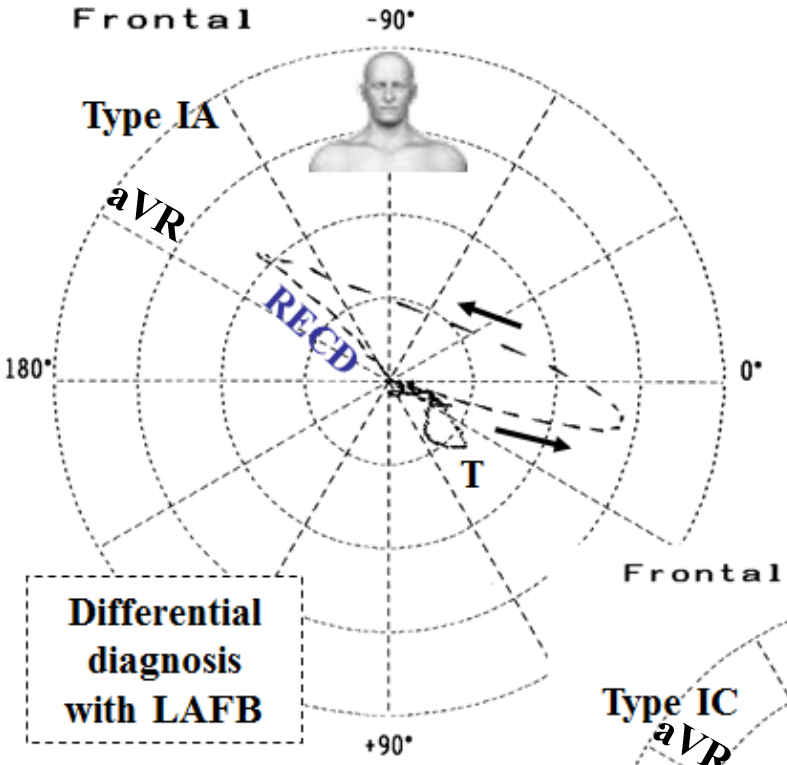
ECG/VCG correlation in the present case:
RECD near RVOT (type I of my classification)

Final prominent R wave

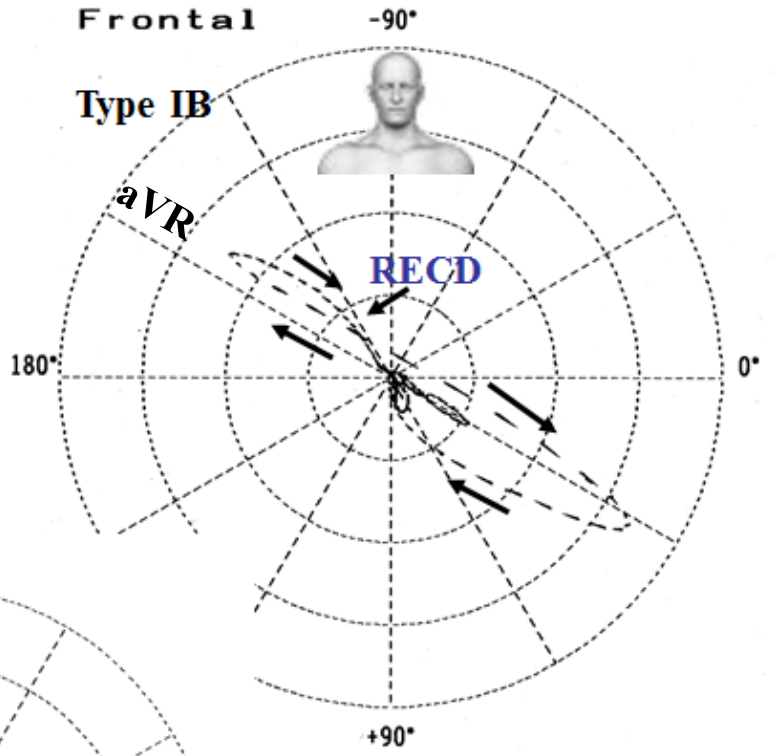


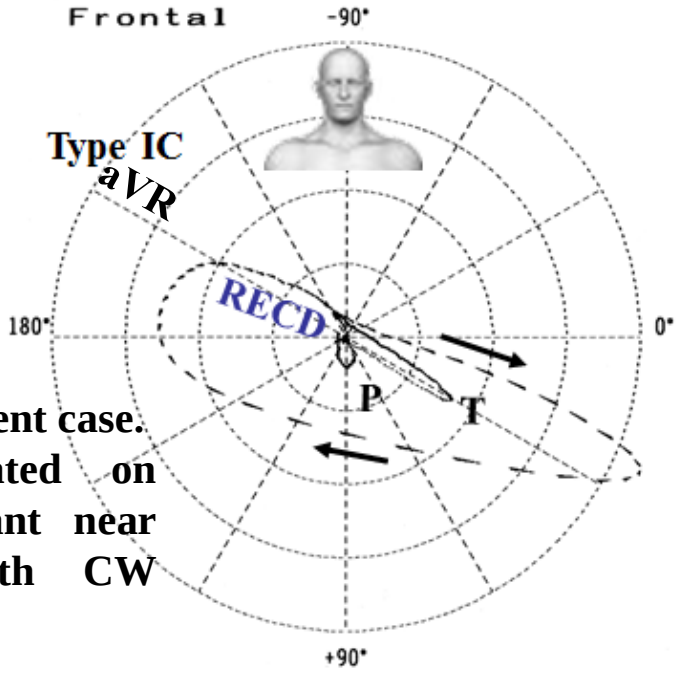
Classification of RECD, taking into account the location of the end delay of the QRS loop in the frontal plane in Type I, II and III. New proposal of VCG classification.

VCG type I RECD variants according to QRS rotation on FP



Differential diagnosis with LAFB





This variant is our present case. Because RECD located on superior right quadrant near aVR or RVOT with CW rotation of QRS loop.

Vectorcardiographic loop in the frontal plane of the three subtypes of Type I. It is clear that only type IA may be confused with LAFB.

New proposal of VCG classification of RECD according to QRS loop in the FP

1) Type I or right anterior subdivision block (**6**)

a) Type IA: QRS loop predominantly located in the left superior quadrant, (SÂQRS with extreme deviation to the left), counterclockwise rotation and RECD located in the right superior quadrant. Very similar to LAFB;

b) Type IB: QRS loop pointed, clockwise or in eight, with the initial portion located in the left inferior quadrant and RECD located in the right superior quadrant. SÂQRS difficult to determine or shifted to the right;

c) Type IC: QRS loop of clockwise rotation with SÂQRS with no deviation or with a mild shift to the right. In the three types with RECD located in the right superior quadrant; **This is the diagnosis.**

Classification of Type I in subtypes IA, IB and IC.

Why this case is not RECD type II, Right Posterior Subdivision Block or Right Inferior Fascicular Block? Because the criteria of this right fascicular block are:

RECD type II, Right Posterior Subdivision Block or Right Inferior Fascicular Block (Julia's hypotesis)

Characterized by presenting RECD located in the right inferior quadrant in the territory of the inferior fascicle of the right branch. It corresponds to the territory of the right inferior fascicle (RIFB).

The differential diagnosis occurs with left posterior fascicular block (LPFB). Many of the cases described in literature as LPFB are, the way we see it, RECD Type II, and since their electro-vectocardiographic differences are very subtle, the diagnosis must always be clinico-electrovectocardiographic.

A) Electrocardiographic criteria:

- ✓ SÂQRS between + 70° and + 110°;
- ✓ QRS duration normal;
- ✓ SI – RII - RIII pattern, with RII and RIII of voltage not increased (usually ≤10 mm), never reaching 15 mm (essential element for the differential diagnosis with LPFB);
- ✓ RII ≥ RIII (in LPFB RIII > RII);
- ✓ Prolonged ventricular activation time on V5R, V3R and V4R (and aVF in horizontal hearts). This is because these leads are located opposite the blocked area;
- ✓ aVR of the QS type;
- ✓ Possible notch in the descending ramp on inferior leads;
- ✓ S wave of V_2 and/or V_3 of increased depth;
- ✓ Persistent with notched S wave in V_5 and/or V_6;
- ✓ V_1: rS, RS or rSR' with S of V_1 and V_2 possibly broadened.

B) VCG criteria: Right End conduction delay in the three planes located to the right and below.

Frontal Plane:

1) Initial vectors always to the left, above and below;
2) Clockwise rotation;
3) Predominant location in the inferior quadrants;
4) Rapid change from left to right between 30ms and 50ms;
5) RECD to the right and below between $+120^{\circ}$ and $+150^{\circ}$.

Horizontal Plane:

1) QRS loop of counterclockwise rotation;
2) Marked posterior dislocation;
3) Rapid change from left to right between 40 and 50 ms;
4) RECD to the right and behind.

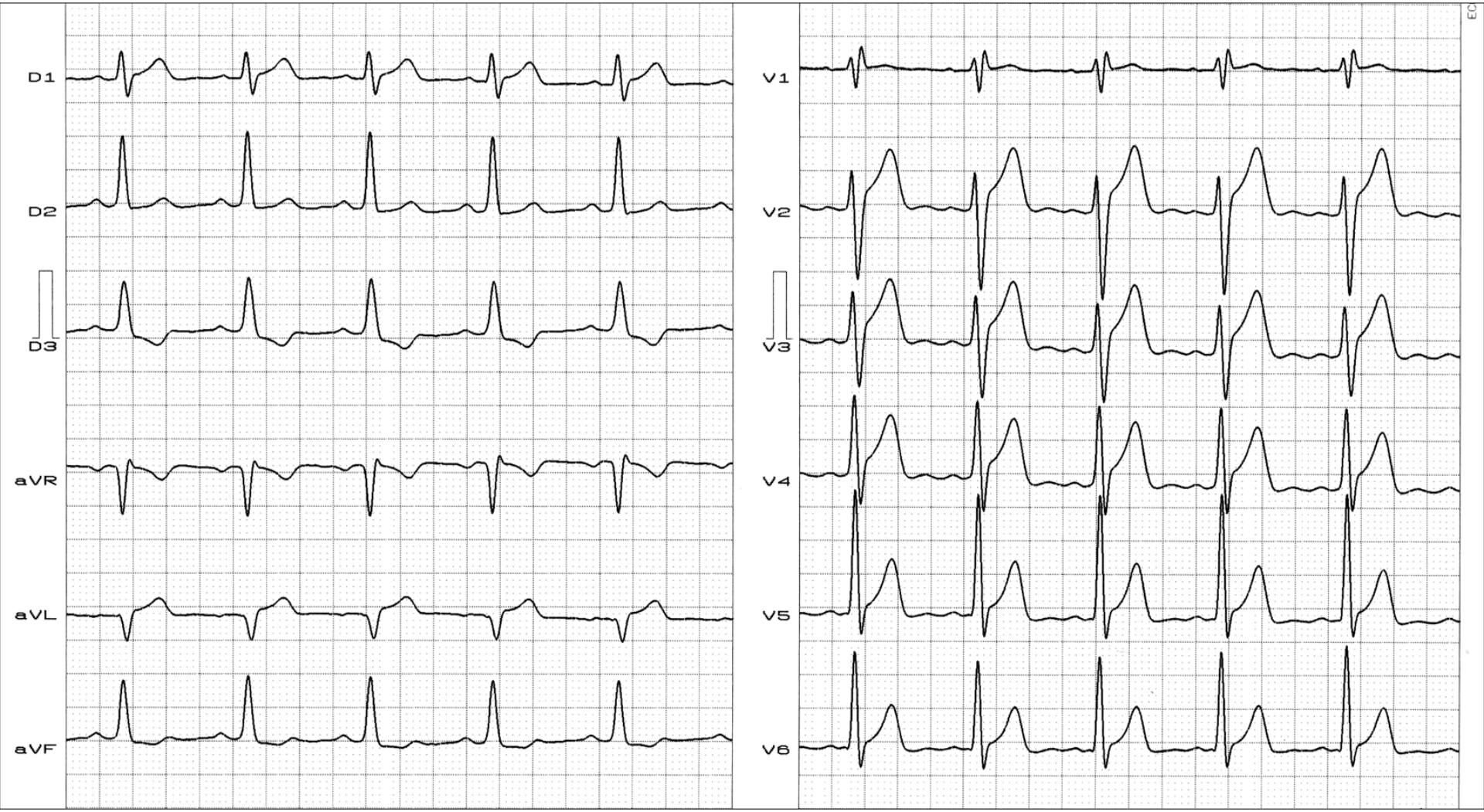
Right Sagittal Plane:

1) Initial vectors upward or downward;
2) Clockwise rotation;
3) Marked posterior/inferior dislocation;
4) RECD downward and backward.

Differential diagnosis between RECD type II and Left Posterior Fascicular Block (LPFB)

	RECD type II or Right Posterior Subdivision Block	LPFB
PR interval	Normal.	Frequent prolongation.
Association with inferior infarction	No.	Frequent.
Voltage of RII and RIII	≤ 10 mm.	≥ 15 mm.
RII/RIII voltage ratio	RII >RIII.	RIII > RII.
Notch in the descending ramp of R wave of inferior leads	Absent.	Constant middle-final notch.
Ventricular activation time in aVF, V5 and V6	Normal.	Increased: up to 30 ms.
Ventricular activation time in aVL	Normal.	Decreased: up to 15 ms.
QRS loop in the FP	Clockwise rotation and with characteristic rapid passage from left to right between 30 and 50 ms. RECD on inferior right quadrant.	Clockwise, aspect of “fat” loop and maximal vector close to + 120°.

Name: BMB; **Sex:** M; **Age:** 20 yo; **Race:** White; **Weight:** 78 Kg; **Height:** 1.81 m; **Biotype:** Athletic;
Date: 18/09/2004; **Medication in use:** nothing stated

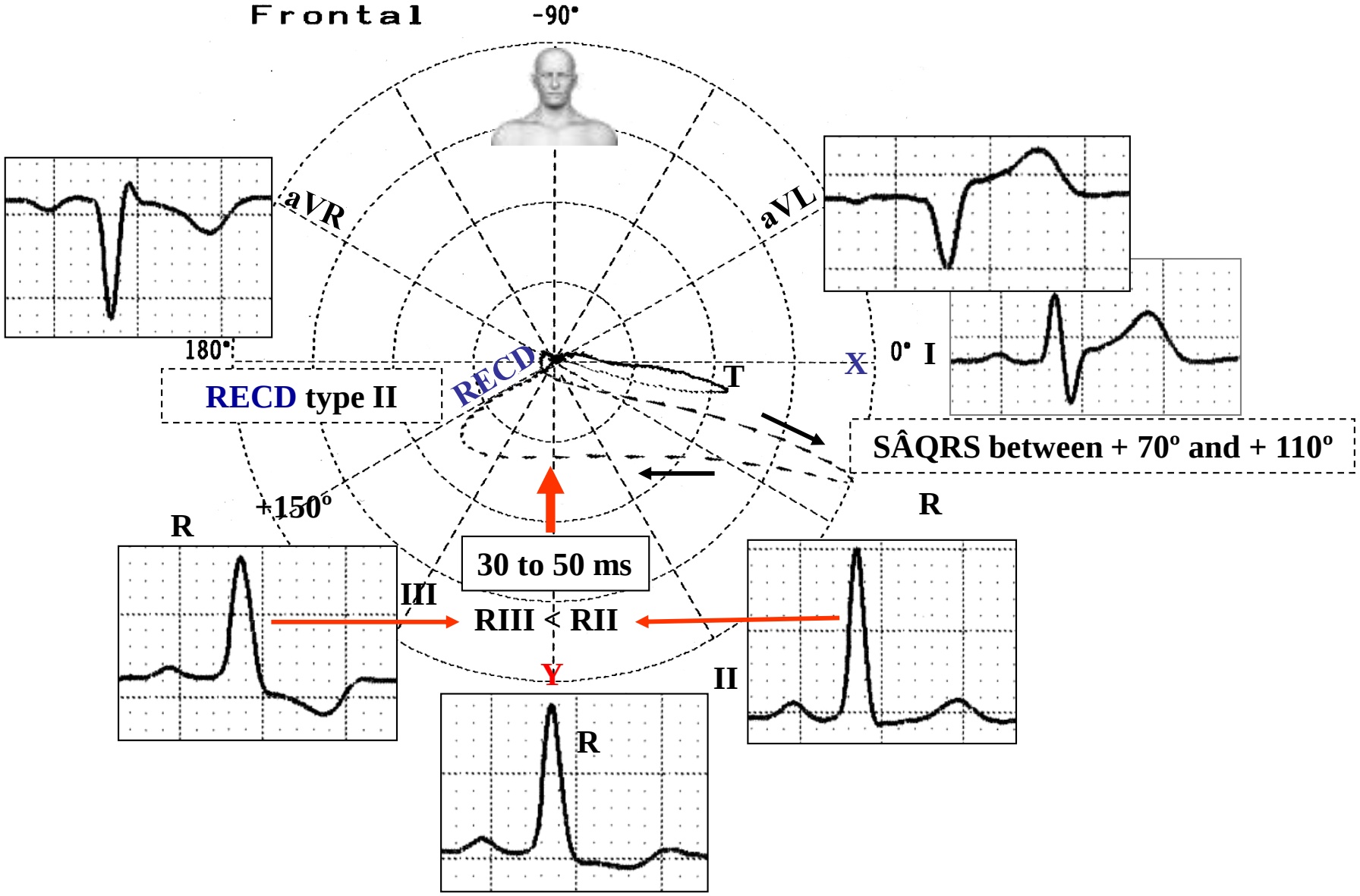


Clinical diagnosis: Healthy patient. He came to the office to have his aptitude for the practice of sports evaluated.

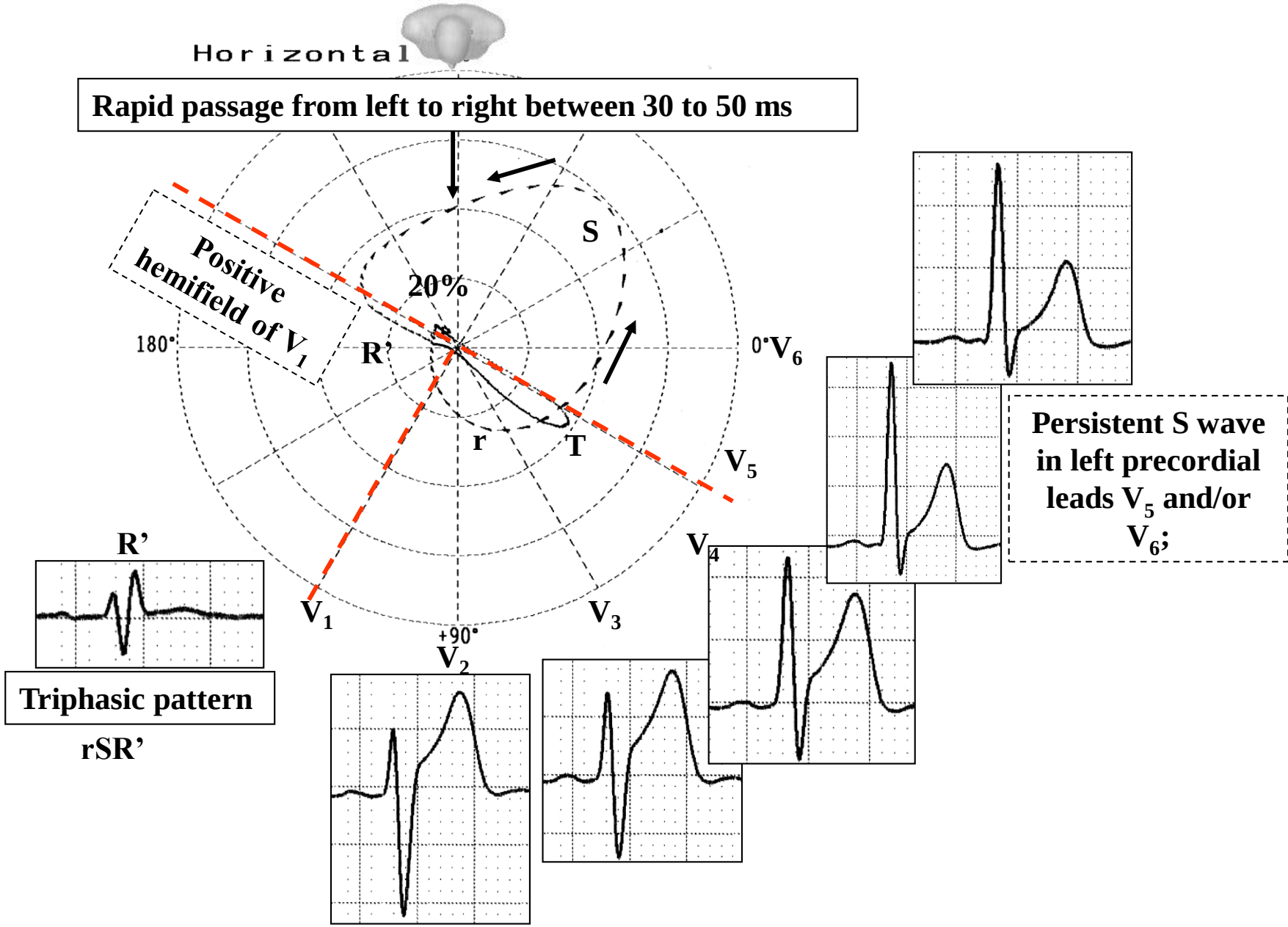
ECG diagnosis: SÂQRS: + 85º. RII > RIII. SAT: + 5º to the front and the left. Morphology of IRBBB: rSR' in V1.

Conclusion: ECG of RECD type II. Why? Because patterns are observed on next slide.

ECG/VCG correlation on Frontal Plane



QRS loop located on inferior quadrants with CW rotation, rapid passage from left to right between 30 to 50 ms and RECD located on inferior right quadrant



ECG/VCG correlation in horizontal plane of RECD type II or posterior inferior RBBB

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