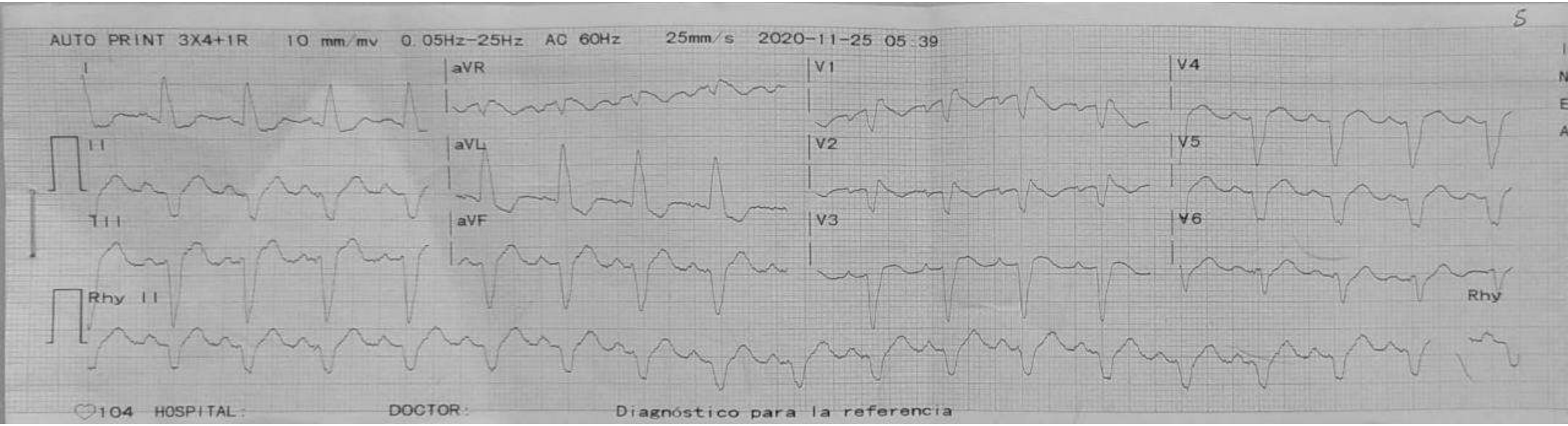
Buenas tardes Dr. Andrés Pérez Riera, recibe un saludo cordial desde Perú, los Electrocardiogramas (ECG) adjuntos son de una paciente de 30 años con antecedente de Esclerosis Sistémica Progresiva que acude a urgencias por palpitaciones, disnea, náuseas y vómitos, queríamos conocer su opinión sobre los ECG que sería de bastante ayuda para nosotros, de antemano las gracias del caso. ECG 2 post cardioversión farmacológica.

Good afternoon Dr. Andrés Pérez Riera, a cordial greetings from Peru, the Electrocardiograms (ECG) belong to a 30-year-old patient with a history of Progressive Systemic Sclerosis who arrives to the emergency room for palpitations, dyspnea, nausea and vomiting. We wanted to hear your opinion on the ECG that would be of great help to us, thank you in advance. ECG 2 was performed post pharmacological cardioversion.



ECG diagnosis: "Standard type" Masquerading Right Bundle Branch Block *Extreme QRS left axis deviation (SÂQRS -50º), SIII>SII: LAFB. The limb leads show a LBBB-like pattern, but the precordial leads show a RBBB. SIII > 15mm: Type IV Rosembaum LAFB: association of LAFB + LVH*

Explanation: The ECG complex coined since Richman as "**Masquerading Bundle-branch Block**"(**Richman 1954**) to day we know that is essentially a complete RBBB and high degree LAFB, with further modifications of the initial and final QRS vectors, so that standard leads, and at times the left precordial leads, resemble left bundle–branch block (**Schamroth 1975**). Masquerading BBB is not a specific entity but is an electrocardiographic complex the result of RBBB with varying combinations of LAFB, intramural left ventricular block, left ventricular enlargement/hypertrophy and anterior myocardial infarction or fibrosis. Since the pioneer Rosembaum´s et al studies (**Rosembaum 1968; Rosembaum 1973**) we know two ECG types of "Masquerading" Bundle-Branch Block. There are a third type that is the association of both:

1. ***The "Standard Type" or Standard Masquerading Bundle-Branch Block:*** *consisting of the pattern of left bundle-branch block (LBBB) in the limb leads and right bundle-branch block (RBBB) in the unipolar precordial leads (This is the present case).*
2. ***The "Precordial Type" or Precordial Masquerading Bundle-Branch Blockand***
3. ***The Standard and Precordial Masquerading Bundle-Branch Block in Association.***

I. The “standard type” (*“standard masquerading right bundle-branch block”)*

In *“standard masquerading right bundle-branch block* the presence of a high degree left anterior fascicular block (LAFB) obscured totally or partially the diagnosis of right bundle branch block (RBBB) only on frontal plane by abolishing (or becomes very small) the final broad S wave in the leads I and aVL (**Ortega-Carnicer 1986**). Consequently, the limb leads may resemble left bundle branch-block (LBBB) although the precordial ECG remain typical for CRBBB. The precordial leads reflect the feature of RBBB. Figure 2

Conditions necessary for the presence of standard masquerading right bundle –branch block

1. High degree of left anterior fascicular block
2. Right Bundle-Branch Block
3. Bilateral bundle-branch lesions of considerable intensity, which do not completely disrupt the continuity of the branches (**Unger 1958**)
4. Left Ventricular Enlargement or Hypertrophy (LVE/LVH) and marked biventricular hypertrophy
5. Localized block in the left ventricle.
6. Frequent severe fibrosis, or truly massive myocardial infarction mainly in anterior wall.

Etiologies

1) Coronary heart disease
2) Long standing systemic hypertension
3) Cardiomyopathy Ex. Chronic Chagasic myocarditis
4) Lev´s disease
5) Association of previous one.

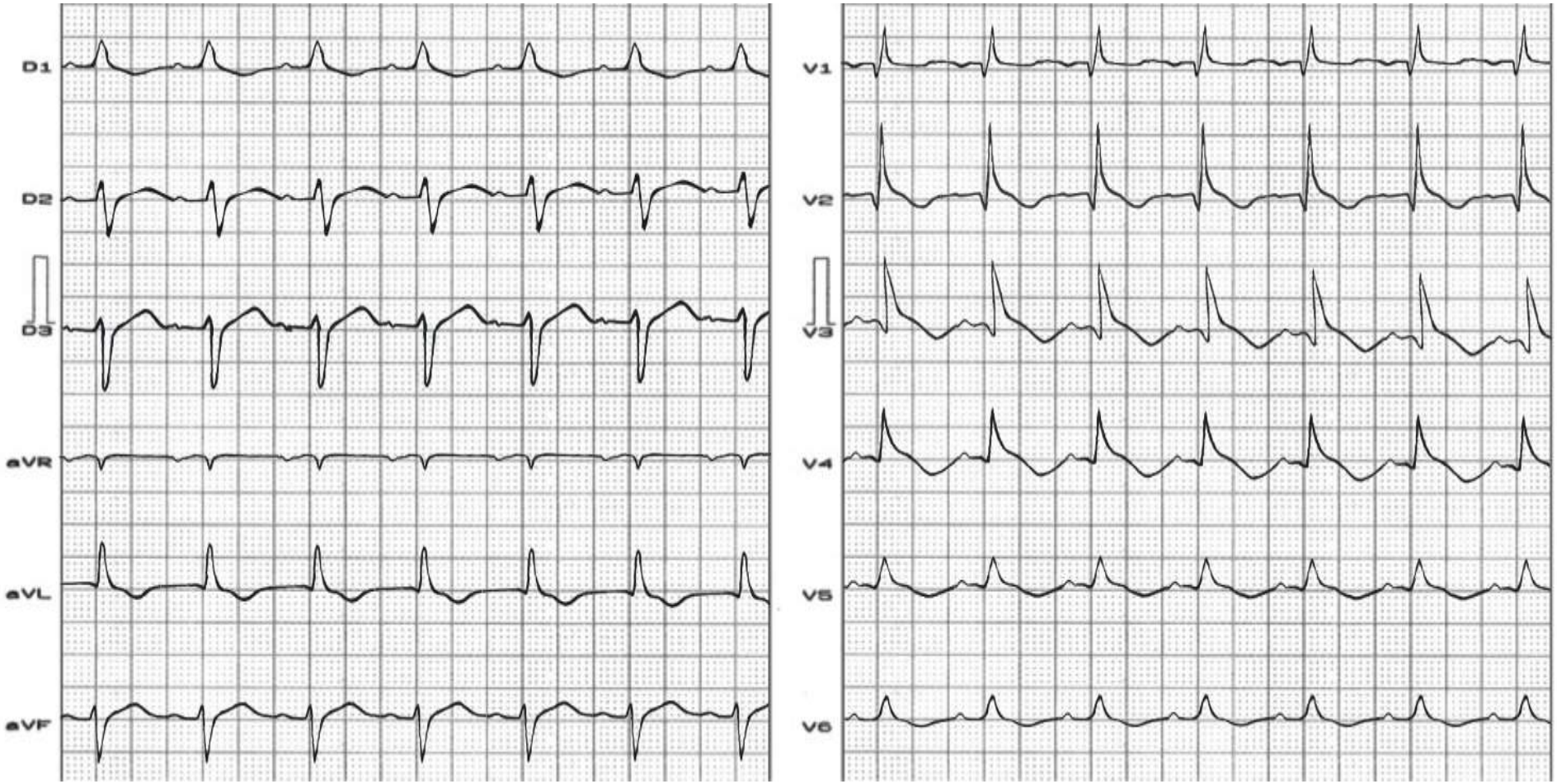
Prognosis: always poor.

The four main developmental ECG patters of standard masqueranding type

	aVL	I	II	III
1. Uncomplicated LAFB: QRS duration <120ms	qR	qR	rS	Rs (SIII>SII)
2. LAFB with CRBBB: QRS duration ≥120ms	qRS	qRS	rS with notch on ascending ramp of S	Rs with notch on ascending ramp of S
3. LAFB with CRBBB and diminution of the final QRS vectors. QRS duration≥120ms	qR	qR	rS	rS
4. LAFB with CRBBB and diminution of the final QRS vectors and diminution of the initial QRS vectors	R	R	QS	QS

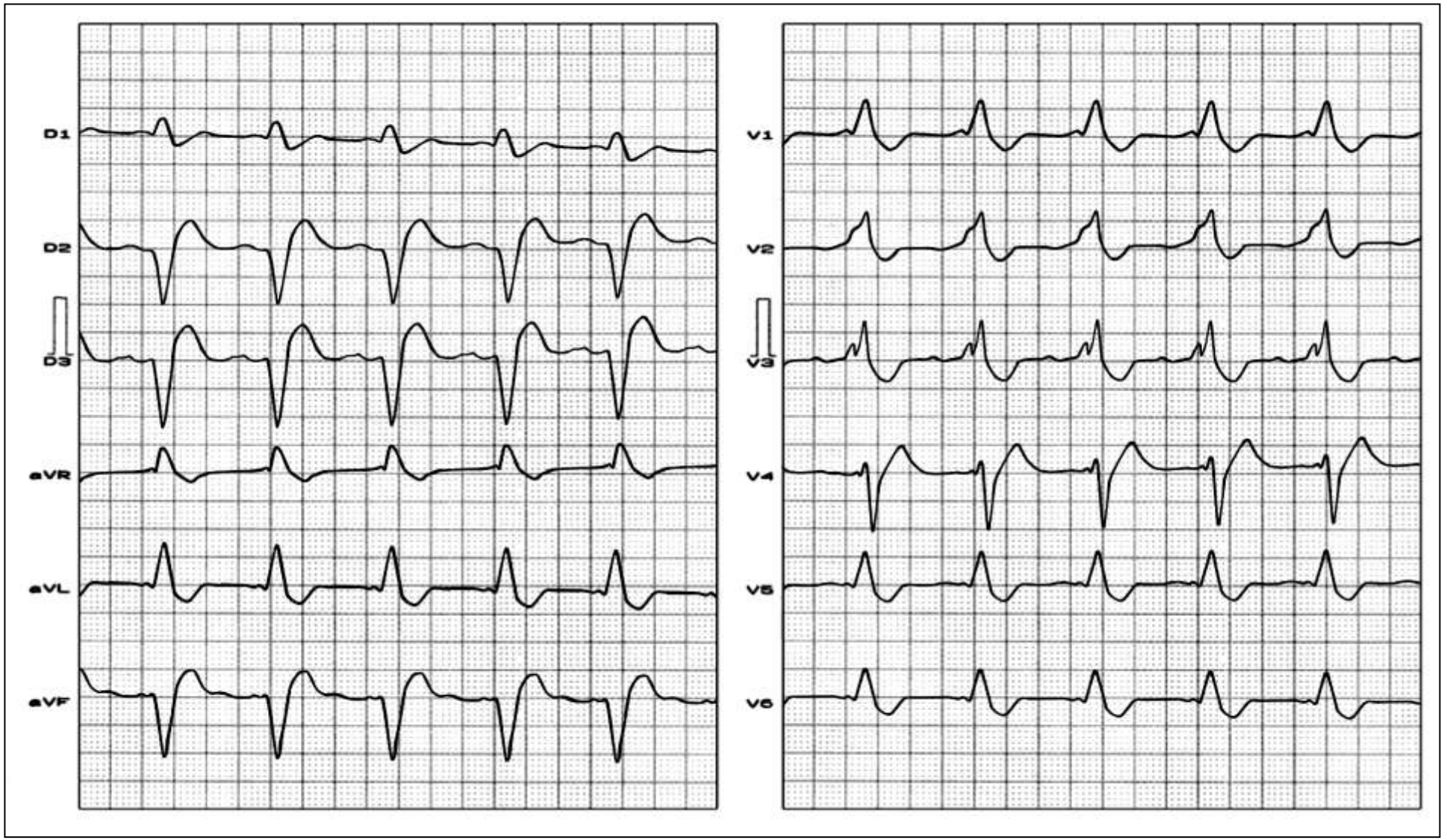
The precordial type (*"precordial masquerading right bundle-branch block"*

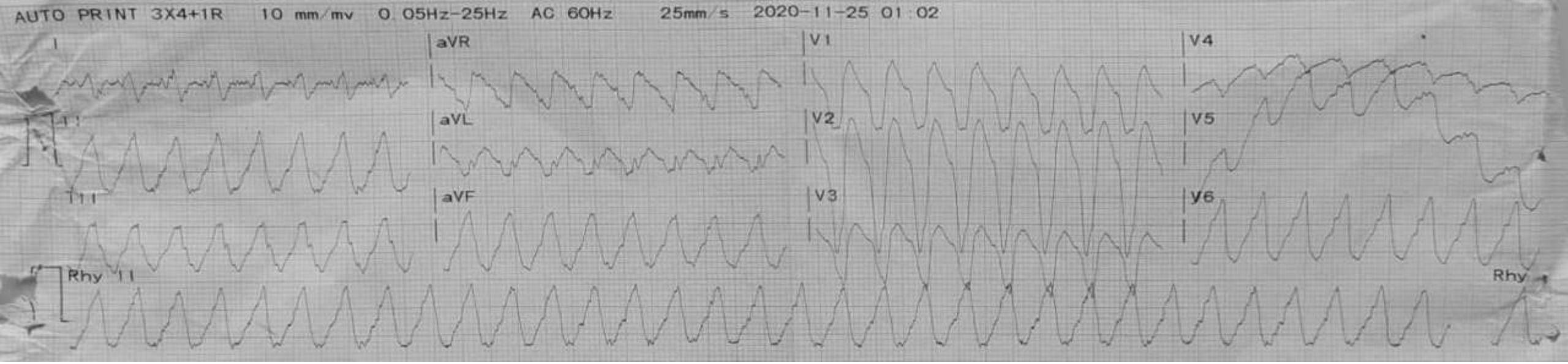
This type shows the pattern of CRBBB in the right precordial leads and complete left branch block pattern (CLBBB) in the left-side precordial leads. This result from CRBBB associated with severe left ventricular hypertrophy/enlargement (LVH/LVE), a localized block in the anterolateral wall of the left ventricle often due to myocardial infarction, and usually LAFB. Presumably, the intramural left ventricular block, together with the LVH or the LAFB, or both, produce predominant leftward forces which tend to cancel out the late rightward forces of the RBBB in the left precordial leads. Finally, masquerading bundle-branch block can be associated with severe and diffuse conduction system disease, and that patients with this finding may require permanent pacemaker implantation, especially if they are symptomatic (**Kowey 1989**).



III. The Standard and Precordial masquerading bundle-branch block in association

In this case the limb leads show an apparent Left bundle-branch block pattern with extreme left axis deviation (LAFB) and the precordial leads exhibit the pattern of CRBBB in the right precordial leads and LBBB pattern in left precordial leads V5-V6. Additionally, an abnormal Q waves are frequently present on right precordial leads





Sustained Wide Monomorphic Complex Tachycardia **(WCTs)** with LBBB pattern and inferior axis(Positive QRS complexes in the inferior leads II, III and aVF and negative in aVR and aVL

Causes of wide complex tachycardias (WCTs) in patients without structural heart disease

Monomorphic configuration

Supraventricular tachycardia (SVT)

• Bundle branch block

- functional (RBBB more often than LBBB)
- pre-existing
- rate related

• Antidromic (i.e. retrograde conduction over AV node; node)

• Non-specific conduction delay

- class I or class III antiarrhythmic drugs
- electrolyte imbalance

Ventricular tachycardia (VT): LBBB, inferior axis: idiopathic right ventricular VT and RBBB, superior axis: idiopathic left ventricular VT

• Pacemaker mediated VT

Polymorphic configuration

Supraventricular tachycardia

• Atrial fibrillation with pre-excitation

Ventricular tachycardia

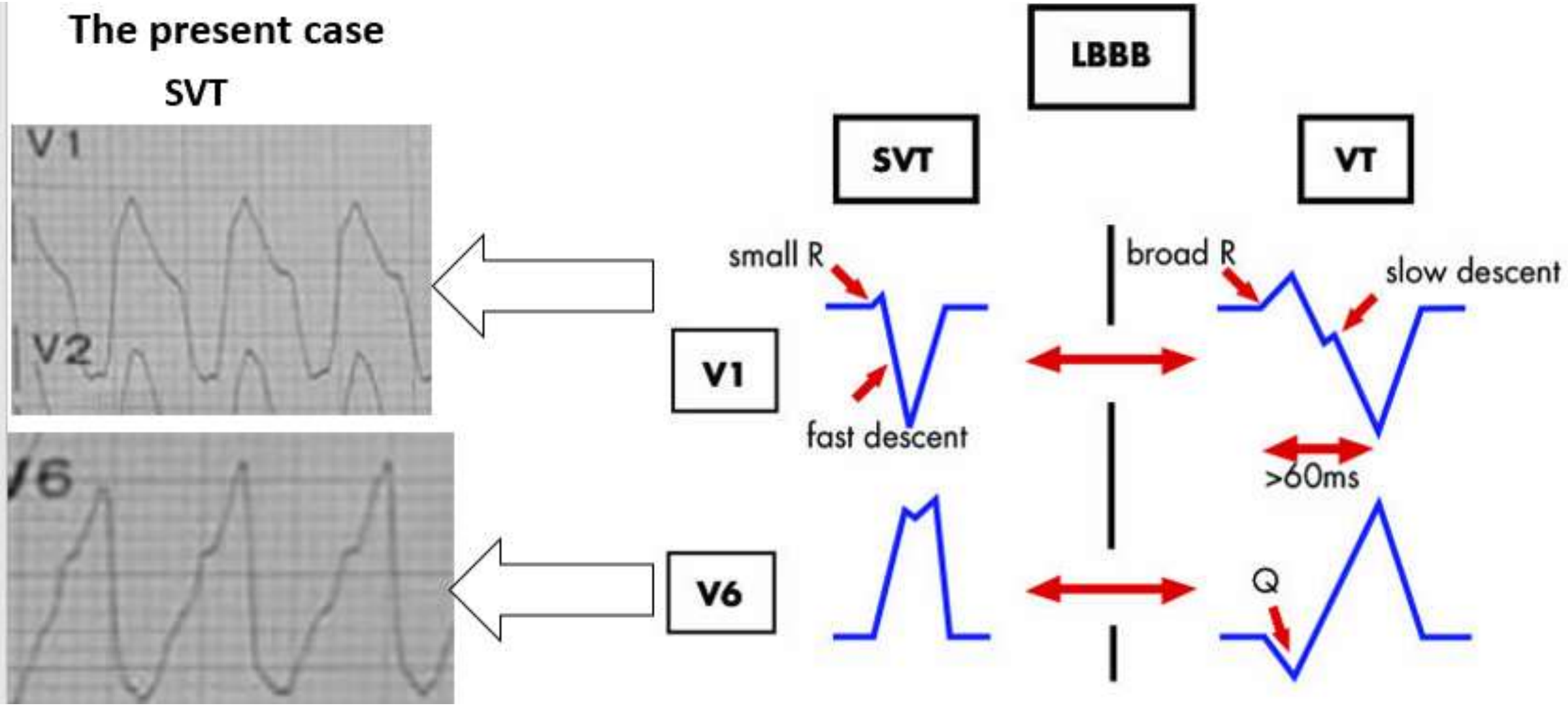
• Torsade de pointes (long QT syndrome)

• Brugada syndrome

• Catecholaminergic polymorphic VT

• Short QT syndrome

Broad categories of WCTs include VT, SVT with abnormal intraventricular conduction, and ventricular paced rhythms. A lack of underlying structural heart disease does neither exclude a VT nor imply a benign prognosis. If the patient has had similar episodes during previous years, SVT is more likely than VT. Termination of the event by the Valsalva maneuver or IV adenosine suggests a SVT, although fascicular VT can also be terminated by these maneuvers. A hemodynamically stable WCT is not necessarily has supraventricular origin. The clinical presentation depends on the hemodynamic consequences it produces. These depend partly on a) heart rate, b) the degree of myocardial dysfunction, c) the circumstances and suddenness of initiation, and d) autonomic factors. Physical examination during WCT may indicate hemodynamic distress (hypotension, heart failure or cardiogenic shock). When cardiac output and blood pressure are maintained and/or when the tachycardia is short lived, the arrhythmia may present as palpitations, breathlessness or just discomfort. Patients with pre-existing or "fixed" (present during the normal baseline rhythm) BBB, any SVT results in a WCTs. However, rate related and/or "functional" (present only during tachycardia) BBB may also result in WCT. Functional aberration results from sudden increases in cycle length when parts of the His-Purkinje system are partially or wholly inexcitable. Functional RBBB occurs more frequently than functional LBBB because of the longer refractoriness of the former. Sometimes, discrete variations in cycle length change a broad to a narrow complex tachycardia and thereby facilitate the correct diagnosis. A sudden short long cycle length variation lengthens the refractoriness of the His-Purkinje system and an abrupt long-to-short cycle length change shortens the refractoriness of the His-Purkinje system refractoriness.Functional BBB may persist for several successive impulses because the bundle branch that is blocked antegraded may be activated transseptally via its contralateral counterpart, (linking phenomenon). As the duration of the refractory period is a function of the immediately preceding cycle length (the longer this cycle length, the longer the subsequent refractory period), abrupt cycle length variations (that is, long-to-short or short-to-long) predispose to the occurrence of functional BBB—for example, in AF, (Ashman phenomenon)



Atrioventricular dissociation is one of the most useful criteria for distinguishing VT from SVT. It occurs in 20–50% of VT and almost never in SVT. Absent in this case

Conclusion **supraventricular Wide QRS tachycardia**