

PREMATURE VENTRICULAR CONTRACTIONS: CLINICO-MORPHOLOGICAL CLASSIFICATION

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Exactly 34 years ago (1977), the school of the great master Rosenbaum and his favorite student, Marcelo Elizari, analyzed thoroughly the diagnosis and management of active ventricular rhythms, especially premature ventricular contractions. This legendary group of investigators divided monomorphic PVCs (premature ventricular contractions) into the following types:

a) Narrow PVCs: QRS duration <120 ms. These PVCs could originate in the His bundle, branches, or the main fascicles or divisions of the His system. The authors differentiate seven patterns within this group:

- 1) PVCs originating at the penetrating portion of the His bundle: QRS with pattern identical to the base complex (normal).
- 2) PVCs that originate in the right bundle: QRS with ILBBB pattern.
- 3) PVCs that originate in the left branch truncus: CRBBB pattern + minimal degree of LAFB.
- 4) PVCs that originate in the contact area between the right branch and the left anterior fascicle: QRS with IRBBB pattern.
- 5) PVCs that originate in the antero-superior fascicle: pure LPFB pattern.
- 6) PVCs that originate in the left posterior fascicle: QRS complex with ILAFB pattern with IRBBB.
- 7) PVCs that originate in the left anterior fascicle: QRS with ILPFB and IRBBB pattern.

Clinical notes: all narrow PVCs are characterized by a variable coupling, that could be confused with parasystole. This coupling could reach 100 ms. The constant pattern of beats rules out aberrancy. Such variable coupling suggests that the mechanism is not reentry, but variations in Purkinje cells automatism by a variation in phase 4 slope (variable diastolic depolarization of rapid fibers). The narrow PVCs are observed in healthy young

individuals, without heart disease, and they are nearly always asymptomatic. They should not be treated. There was scant therapeutic response in those who did receive medications.

b) Broad PVCs: when $QRS \geq 120$ ms.

Among these we have:

- 1) PVCs from the base of the ventricles or Wolffian: They are characterized by displaying positive QRS complexes in the precordial leads from V1 through V6, thus making them similar to Wolffian beats. The initial part of the QRS complex is broad, resembling a delta wave. This initial broadening indicates its basal origin, where there are few Purkinje cells and conduction is slower. SAQRS could be either superior or inferior, depending on whether the source is on the anterior or posterior wall. They appear in healthy individuals. They should not be treated.
- 2) PVCs from the tip of the ventricles or PVCs of the tip: They have a CLBBB pattern.
- 3) PVCs that originate in the base of the anterior papillary muscle of the right ventricle: They appear in healthy individuals. They should not be treated!!!! All of those that originate in the RV are considered to appear to healthy individuals and display a CLBBB pattern, with inferior axis between +60 and +120 degrees, except for the rare Arrhythmogenic Right Ventricular Dysplasia (ARVD). In these PVCs there are certain atypical features worthy of note: initial forces from 10 to 20 ms heading to the front in the horizontal plane and of slow inscription; VCG with clockwise rotation in the HP, unlike the typical counterclockwise rotation of typical CLBBB; and frequent variable coupling. In 50% of the cases, there is no underlying structural heart disease. Probably the papillary muscle stretching by the tendinous chords during the mechanical activity of the heart, participates in the genesis of these PVCs. The rest of the PVCs that originate in the right ventricle, except the Wolffian ones, have a CLBBB pattern with SAQRS between -30 and +30 degrees.
- 4) PVCs that originate in the left ventricle.
They show CRBBB pattern and duration, with QRS electrical axis with extreme superior shift of the LAFB type or with inferior shift of the LPFB

type, depending on whether they originate in the postero-inferior wall or antero-superior wall respectively.

In brief, if the PVC originates in the postero-inferior region of the left ventricle, it will have a CRBBB pattern associated to LAFB, with QRS axis close to -60 degrees, Q waves in DI and aVL, V4-V6, and QRS >130 ms.

If the PVC originates in the antero-superior region of the left ventricle, it will have a CRBBB pattern associated to LPFB, with axis in +120 degrees, rS in DI and aVL, and QRS duration >130 ms.

A third form is the pure CRBBB pattern. In this case the PVC is born in the free wall of the LV or the septum in equidistant points of the septal or the free wall territories of the Purkinje network. Finally, a pattern of CRBBB is possible, with minimal degrees of LAFB or LPFB.