Journal of Advanced Life Sciences and Technology
ISSN 3095-1724
Volume 13 Issue 1
January-March 2025
Impact Factor: 8.11
Enquiry: contact@continentalpub.online
Published by Continental Publication | https://cspjournals.org/index.php/life-sciences

UNDER THE RADAR: THE CLINICAL IMPORTANCE OF MINOR ECG ANOMALIES IN MAJOR CARDIAC EVENTS

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Abstract:
In 2008, Professor Breijo-Márquez identified a distinct electrocardiographic pattern featuring a short PR interval and a short QT interval in the same individual, termed the "Decreased Cardiac Electrical Systole." Since then, this pattern has gained clinical relevance, often observed in isolation or in conjunction with other cardiac abnormalities. The PR interval reflects atrial-to-ventricular conduction, with values below 0.120 seconds considered short. The QT interval spans ventricular depolarization and repolarization; while normal ranges vary by source, values below 0.350 seconds are typically considered pathologically short. Both short PR and QT intervals can destabilize cardiac electrical activity, increasing susceptibility to life-threatening arrhythmias, particularly tachyarrhythmias. Despite its clinical importance, the pattern is frequently misinterpreted as normal due to its subtle presentation at standard heart rates and inconsistency in diagnostic criteria. Genetic mutations have been implicated in some cases of short QT syndrome, though definitive identification remains rare. Due to its association with sudden cardiac death and diagnostic ambiguity, heightened awareness and thorough evaluation—including family history—are essential. The current standard of care for high-risk individuals remains the implantation of a cardioverter-defibrillator.

Keywords: *Short PR interval, Short QT interval, Cardiac arrhythmia, Sudden cardiac death*

INTRODUCTION

Consequently, the standard values for us -and for most authors- are:

PR interval: From 0.120 milliseconds to 0.200 milliseconds,

Corrected QT interval: 0.360 milliseconds to 0.450 milliseconds (in healthy women up to 0.460 milliseconds is considered normal) **[3].** We speak of a corrected QT interval because a calculation must be made between the value of the QT interval obtained and the value of the RR interval measured prior to the QT interval obtained. Whenever there is a disturbance in the heart's electrical system - in this case, in the duration of the different intervals of the ECG tracing - the heart becomes much more vulnerable and electrical instability manifests itself, leading to numerous serious types of cardiac arrhythmias, some of which could be fatal (as we have written above).

In this case, a shortening of the PR interval together with a shortening of the QT interval in the same individual, the vulnerability discussed above and electrical instability could be much greater and even highly lethal.

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DOI: https://doi.org/10.5281/zenodo.15848779
But, in addition, when the patient suffering from this type of alterations is in baseline and asymptomatic conditions, the electrocardiographic tracing can be considered as "within normality", and go unnoticed and, therefore, misdiagnosed, when in reality both intervals are short and, therefore, the patient is highly susceptible to severe alterations of the cardiac electrical system, including sudden cardiac death.
The typical patient with this electrocardiographic pattern is a woman in the third decade of her life, with multiple visits to the emergency services, with mild symptoms of palpitations, profuse sweating (which usually disappears on arrival at the hospital), somewhat agitated, with vital signs within average values, and with laboratory values also within the norm, except for blood lithium values which are always below the thresholds. The symptoms reported by the patient are mostly nocturnal, waking the patient up. Nocturnal palpitations that awaken from natural sleep, true syncope, are the most frequent symptoms, but cardiac arrest -although she may recover- and sudden death should never be ruled out.
As most of the time physicians consider the ECG tracing to be normal, patients are discharged from the hospital with the prescription of benzodiazepines and with a request for psychiatric evaluation considering them as a cardiac neurosis.
If we examine these patients in depth, we can find that more than 90% of them presented seizures in childhood without any electroencephalographic substrate and empirically treated with different types of anticonvulsants.
The referred symptoms are repetitive, and the attendance to the emergency department is constant, with the same hospital discharge result. The patients are regular visitors to the emergency department. Until a moment may come when the patient no longer comes on her own, since the access has been very serious and she is either in cardiac arrest or has suffered sudden cardiac death due to an erroneous diagnosis.
To conclude, we can state that not all patients with this type of symptomatology have a psychosomatic basis, but that their cardiac electrical system has an altered substrate and, therefore, their heart is much more prone to malignant arrhythmias than that of healthy people.
Therefore, the study of each of the parameters to be assessed must be meticulous. In this way, we can avoid much greater evils, such as cardiac arrest and even sudden cardiac death.
As "closure" we can state that the electrocardiographic pattern with short PR and QTc intervals exists, that it can produce high cardiac electrical instabilities and that, therefore, it should always be evaluated in detail in every electrocardiographic tracing and never be discharged from the hospital without being sure of its presence.
Of note, the author and his team have seen and diagnosed this variety of arrhythmia both in isolation and as part of other cardiac disorders such as Wellens Pattern **[7] (Figure 3)**, WolfParkinson-White **[8] (Figure 4)** and others **[9]**.
As a graphic example of this cardiac electrical abnormality, we can see below the image of a baseline ECG in a patient suffering from PR and short QTc interval.
The PR interval is 0.100 milliseconds: Short.
The QTc interval was evaluated according to the most commonly used formulas; in no case did it exceed 0.350 milliseconds.
Figure nº 1: This figure was the first electrocardiographic tracing studied by the author and corresponded to a 36-year-old male with the symptoms mentioned in the text. **[1]**

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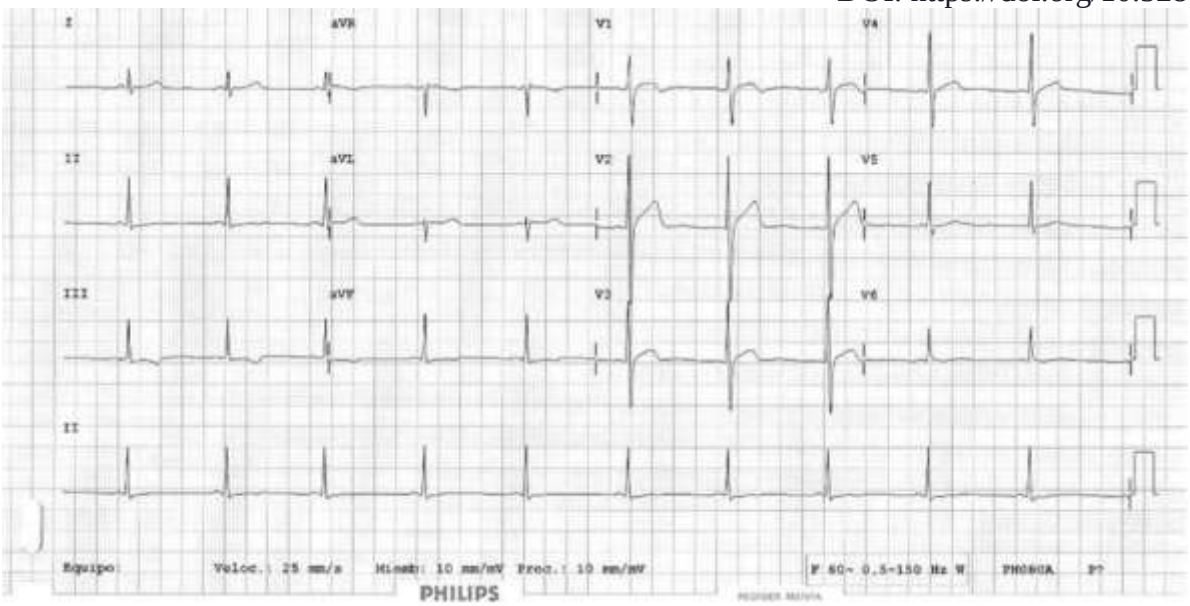

Figure 2: Values obtained using the most commonly used formulas relating the measured value of the QT interval and the RR interval (heart rate).

RR	0.9523809523809523	seg
QTc (Rautaharju)	402	mseg
QTc (Bazett)	341	mseg
QTc (Framingham)	333	mseg
QTc (Friderica)	338	mseg
QTC (Call)	339	mseg

Figure No. 3: A typical association of the Breijo model and the Wellens pattern. **[7]**

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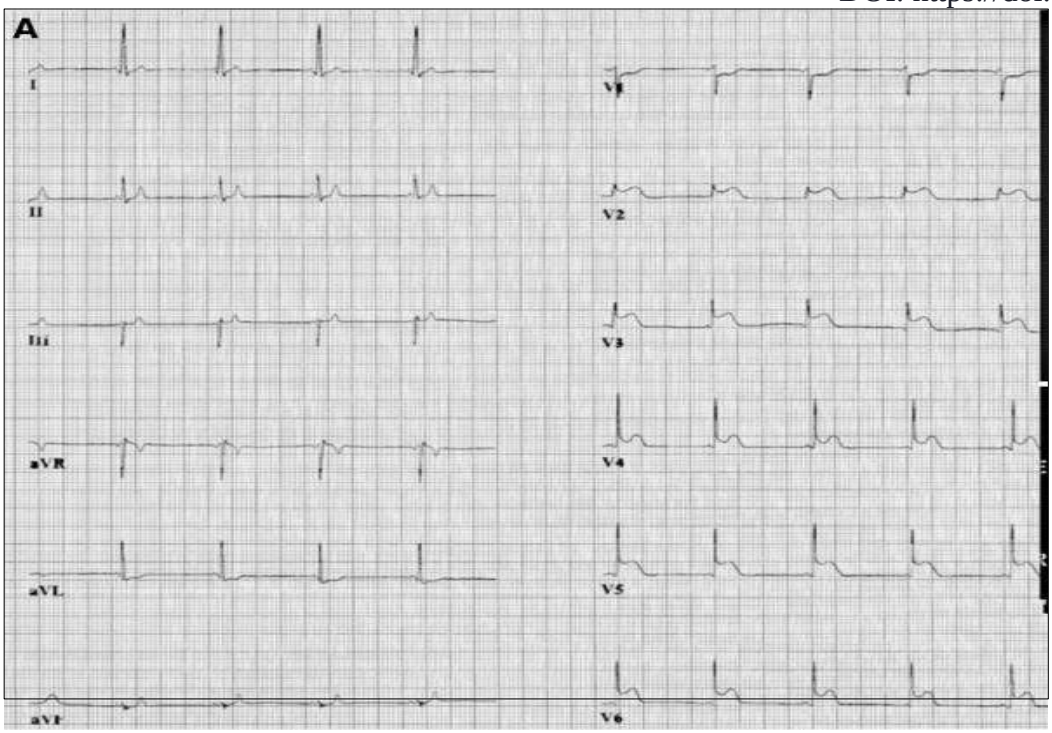
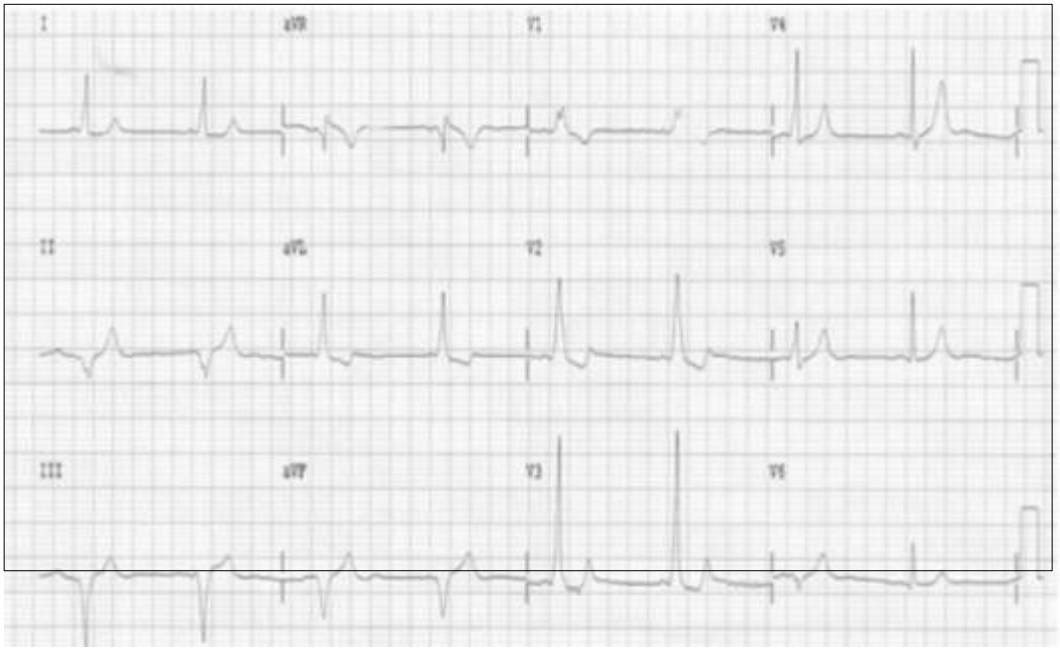


Figure No. 4: A WPW and a Breijo model together on the same ECG tracing. **[8]**



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