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Short Communication

An International Consensus for the Value of the Electrocardiographic QT Interval

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For many authors, the electrical cardiac systole includes from the beginning of the Q wave (or beginning of the R wave if there is no Q wave) to the ending of the T wave, wherever the descending branch of the T wave reaches the isoelectric line of the ECG.

For many others, to which we belong, the electrical cardiac systole must also include the P wave. In any case, it is imperative to measure waves, intervals and electrocardiographic segments in all cases.

In order of calculating the different lengths of these ECG entities, many different calculation formulas have been proposed, being the most known and used those of Bazett [1] and Fridericia [2]. It is fair to say that, before Bazzet, L.M. Taran and N. Szilagyi [3] were the true pioneers in the description of the formula, as Cobos M.A. and García Rubira J.C. have written in their magnificent work [4].

Most of the time, when we want to obtain the values in the measurement of an electrocardiographic QT interval, we use formulas based on either exponential formulas, - such as those of Bazett and Fridericia-, or linear formulas — such as those of Framingham and Hodges- (even though there are many others (Table 1).

Bazett's is by far the most widely used.

Nevertheless, the values obtained by applying these formulas hardly ever coincide with those considered normal and acceptable ranges by the authors who formulated them.

Thus, for example, Bazett's formula ($QTc = QT / RR^{1/2}$) considers as normal levels those ranging between 0.400 and 0.440 seconds in adults.

Many other authors set the upper limit of QTc in men at 450 ms, whereas in women the normal QTc value is considered to be 470 ms for a long QT- interval. This should be inadmissible unless the author who modifies the values considered as "in normal ranges" by the one who described the calculation formula (Bazett, Fridericia, Hodge...) includes in the calculation formula something like "QTc modified by the author in question". If this is not the way, any author could modify the interval QT measurement at will and according to his own statistics, thus obtaining a false diagnosis of short QT or long QT.

As we have already written, also for us, the limiting values in the duration of a QT interval range between 0.360 (below these values we will consider it as short) and 0.460 sec. (above which it will be considered as long).

But always explaining in the formula the Bazett's modification with our own name. Thus, for example, in our case it would be:

"QTc modified by Breijo from Bazett's formula".

Alternatively, and adding acronyms for simplification purposes:

"QTcm Breijo from Bazett".

If this were not the norm, we think that overdiagnosis and underdiagnosis would be the general trend, and thus, the treatment

of the bearer of such anomalies could be either overtreated or untreated; both situations can be harmful for the bearer of the anomaly.

In other words, we think that, when whatever author presents the results of QT interval measurement using the Bazett or Fridericia (or others) formula, he should always add the " surname" QT Bazett (or Fridericia) modified by the author himself whenever the measuring values obtained do not coincide with those considered normal by Bazett or Fridericia: i.e., between 0.400 and 0.440 milliseconds.

Bazett QTc = QT / (RR)½
Fridericia QTc = QT / (RR) 1/3
Framingham QTc = QT + 0,154 (1−RR)
Hodges QTc = QT + 1,75 (FC − 60)
Van de Water QTc = QT—0,087 (RR—1000)
Matsunaga QTc = log (600) QT / (log RR)
Kawataki QTc = QT/RR(0,25) Mayeda QTc = QT/RR x 0,604
Larsen y Skulason QTc = QT + 0,125 (1—RR)
Schlamowitz QTc = QT + 0,205 (1—RR)
Wohlfart QTc = QT + 1,23 (FC—60)
Boudolas QTc = QT + 2,0 (FC—60)

Table 1: Different methods for calculating the corrected interval QT value.

Taken from MSc. Dr. Elibet Chávez González [5].

Within the extensive review that this author has made throughout his career, the diagram that best adapts to consider a QT interval as long or short is the "Boston Diagram", in which the QT value and the heart rate are correlated (Figure 1).

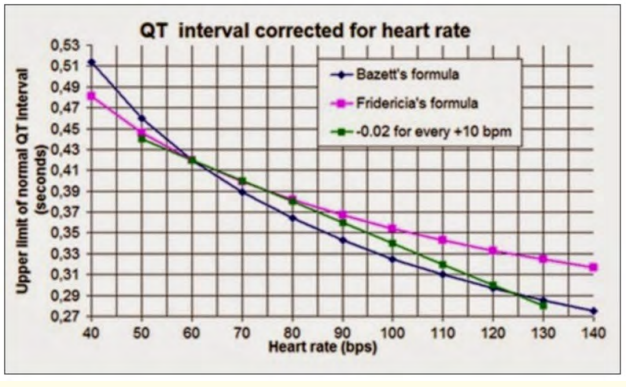

Figure 1: Boston Diagram.

Either the presence of a short QT interval (< 0.360 sec) or a long QT interval (> 0.440 sec) is capable of producing very serious health cardiac alterations for the bearer, the worst being sudden cardiac death. According to our own experience and that of many other authors, only with a difference of 0.10 seconds, the QT interval length could be short or long; and this difference could mean neither more nor less than a possible sudden death.

Therefore, we emphasize the inexcusable need for an international standardization of criteria to unanimously distinguish when the length of the QT interval is or is not altered: The values need to be at all times well agreed upon and with the same criteria for all physicians at the time of measuring an electrocardiographic QT interval.

Although sex may have an influence when considering a QT interval as long, we affirm that any QT interval equal to or greater than 0.450 seconds should be studied in depth without ruling out at any time the possibility that the individual undergoing analysis of his cardiac disorders may present a "long QT condition".

In the same way, when we evaluate a short QT interval length, it should always be taken into account and be susceptible to an in-depth evaluation whenever the values obtained are equal to or less than 0.360seconds.

Summarizing

An international agreement on the limit values of the corrected QT interval, either the minimum or the maximum value, is absolutely indispensable for all cardiologists and physicians in general if the aim is to make an accurate diagnosis of QT interval disturbances and thus to prevent, as far as possible, the symptoms that these electrocardiographic disturbances can cause to the bearer patient with such disturbances. Especially the dreaded "sudden cardiac death".

Bibliography

1. Bazett HC. "An analysis of the time-relations of electrocardiograms". *Heart* 7 (1920): 353-370.

2. Fridericia LS. "The duration of systole in an electrocardiogram in normal humans and in patients with heart disease". *Annals of Noninvasive Electrocardiology* (1920).

3. Taran LM and Szilagyi N. "The duration of the electrical systole (QT) in acute rheumatic carditis in children". *American Heart Journal* 33 (1947): 14-26.

4. Miguel A., *et al*. "Who Was the Creator of Bazett´s Formula?" *Revista Española de Cardiología* (2008): 896-897.

5. Dr Elibet Chávez González. "The QT interval, its origin and importance of the knowledge of formulas for its measurement in different clinical circumstances". *Cor Salud* 6.1 (2014): 79-85.