

Electro-mechanical window by phonocardiogram in congenital long-QT syndrome

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Introduction: potential interest of the electromechanical window (EMW) on diagnosis and prognosis in the LQTS was recently suggested by various studies, using invasive methods or echocardiography.

Aim: to evaluate feasibility, reproducibility and diagnosis interest of the EMW measured by phonocardiography in the LQTS.

Methods: a prospective, bi-centric, controlled study of 31 LQTS-genotyped patients and 21 healthy subjects was conducted. We used a phonocardiograph made from coupling an electrocardiograph with an electronic stethoscope, and recorded a phonocardiogram for every patient. EMW measurement was obtained by measuring the time difference between the end of the T wave and the first net deflection of B2. We have considered EMW as a diagnosis test, and interpreted it as positive if $EMW \leq 0$ and negative if $EMW > 0$. The measures and interpretations have been carried out by two observers, separately.

Results: inter-observer reproducibility of the measure of EMW was excellent (intra-class correlation coefficient 0.90). EMW window was significantly reduced (or rather inversed) in LQTS patients compared with controls (-30 +/- 29 ms vs 18 +/- 16 ms respectively; $p < 0.001$). The diagnostic test using the EMW was significantly more sensitive than the diagnosis using the QTc (93.3% [IC 78.7%-98.2%] vs. 53% [IC 36.1%-69.8%] respectively) without statistically significant differences on the specificity (71,4% [IC 50% - 86.2%]) vs 85.7%; ([IC 65.4%-95.0%]). In the subgroup of concealed LQTS patients (QTc < 460 ms), 11/13 patients had an $EMW \leq 0$, which equated to an improvement in the diagnosis of LQTS to 85% ($p < 0.01$).

Conclusion: the measure of electro-mechanical window by phonocardiogram is an effective diagnosis method in congenital long QT syndrome. Indeed, it is both simpler and more reliable than the epinephrine test, and more sensitive than the measure of the corrected QT.