Electrocardiographic Alternans in Myocardial Bridge: A Case Report

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Myocardial bridge (MB) is a rare congenital heart condition in which a "bridge" of myocardium is overlying a "tunneled" coronary artery. MB can be associated with critical cardiac events and was recognized among the main causes of sudden cardiac death for athletes. Aim of this study was to evaluate electrocardiographic alternans (ECGA) on a MB patient, being ECGA a cardiac electrical risk index defined as beat-to-beat alternation of electrocardiographic P-wave, QRS-complex and T-wave morphology at stable heart rate.

ECGA analysis was performed in a 1-hour 12-lead electrocardiographic recording of a 54 years-old MB male patient at rest by application of the heart-rate adaptive match filter method to successively extracted (1-s step) 64-beat windows. Only windows characterized by stable heart rate and low level of noise were accepted. ECGA was quantitatively described by measuring mean (over windows and leads) areas (μV×s) of P-wave, QRS-complex and T-wave alternans (PWA, QRSA, TWA, respectively). Additionally, the prevalent alternans was identified as the one, among the three, showing higher alternating area.

Values of the alternans areas are reported in the Table. The prevalent alternans was TWA (with an area of 6.3 μV×s and a prevalence occurrence rate of 94%), followed by PWA and QRSA. ECGA was also found to be significantly correlated with heart rate (0.72, $p<0.01$). Additionally, TWA was higher than in previously analyzed healthy subjects (on average, 3 μV×s); no reference value on PWA and QRSA in normal subjects is available.

Mean ECGA values over leads

ECGA	area	occurrence
PWA	4.7 μV×s	5%
QRSA	4.3 μV×s	1%
TWA	6.3 μV×s	94%

In conclusion, ECGA is increased in our MB patient. Therefore, in general, MB could be associated to an increased cardiac electrical risk, especially while performing physical activity at high heart rate. Further studies are needed to confirm this hypothesis.