On the Feasibility of Locating Myocardial Bridge though the 12-Lead Electrocardiogram: a Case Study.

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Myocardial bridge (MB) presents a unique anatomical variation in coronary arteries, where the artery tunnels through the myocardium rather than running on its surface. MB can occasionally lead to clinical manifestations such as ischemia and sudden cardiac death. Locating the bridge can be complex and currently requires various imaging modalities. Thus, large-scale screening of MB on the general population is not realistic, and clinical tests are usually performed after occurrence of symptoms. This paper aims to explore the feasibility of using a 12-lead electrocardiogram (ECG) test to locate MB location. A 12-lead Holter ECG from a male patient with a MB (MB-ECG) proximal to the anterior descending branch of the left coronary artery assessed via echocardiography, and two synthetic 12-lead ECG simulating the presence of ischemia in the same location (I-ECG) and normal sinus rhythm (NSR-ECG), respectively, were used to feed CineECG. CineECG is a method that processes the 12-lead ECG to obtain a video where a moving vector represents the average electrical activation sequence in the heart, and thus the various ECG waves. Visual inspection of the images provided by CineECG when fed with MB-ECG and I-ECG indicates that, in correspondence of the ST segment (which, on the ECG, is typically displaced in the presence of ischemia), the vector was pointing towards the left wall of the septum (Fig. 1A and Fig. 1B) instead than toward the heart apex (Fig. 1C)., as when fed with NSR-ECG. Thus, CineECG highlighted an altered, ischemic-like electrical activation in the heart of the patient, directly relatable to the MB. In conclusion, this preliminary study suggests that CineECG analysis of 12-lead ECG, which could easily be applied for large-scale screening, is a promising procedure to detect and locate MB.

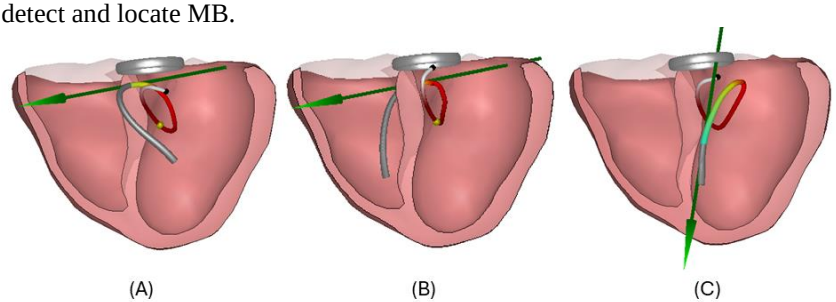

Figure 1