To the Editor

Our finding that monocyte counts tended to be higher in the control group (0.48 \pm C2 vs. 0.46 \pm C2) are Buhlin. However, we are currently undertaking a larger intervention study, the aim of which is to assess whether treatment of periodontal disease reduces the levels of serological markers of CVD risk. Should differences/changes in monocyte counts be observed in this study, then we would, in light of Dr. Otis and her colleagues’ suggestion, certainly re-evaluate the relationship between monocyte counts and the risk of CVD, particularly in individuals with periodontitis.

References


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Direct epicardial mapping predicts the recovery of left ventricular dysfunction in chronic ischaemic myocardium

We read with interest the article of Vahlhaus et al., concerning epicardial mapping to predict the recovery of left ventricular dysfunction in chronic ischaemic myocardium. This study has been based on bi-polar voltage mapping criteria during surgery for the diagnosis of myocardial hibernation. The authors report that there is a great overlap between groups of viable and non-viable myocardial segments found in a grey zone of 5.4–12.3 mV. They also state that the data provided by their study is obviously obtained too late to help in pre-operative decision making, but that bi-polar voltage may be useful to understand the pathophysiology of chronic ischaemic dysfunction. They also admit that it is not the aim of the present study to implement direct electrical mapping for clinical use.

Our criticism of this study is that their method was different from that generally used for electromechanical mapping, namely the combined bi-polar voltage criteria and local linear shortening. The recognition of myocardial viability should be based not only on voltage measurement (electrical reserve) but also on local linear shortening (contractile reserve). The method advocated in clinical use is the endocardial electromechanical NOGA mapping (Biosens Webster Cordis, Johnson Johnson, Diamond Bar, CA, USA). The NOGA segmental quantitative analysis is performed after transformation of the three dimensional map into a polar map, with 12 segments from the apical, the mid and basal location. Myocardial viability is present when the voltage is more than 6 mV (Nle value of 15 mV) and local linear shortening is more than 7% (Nle value 11%). The myocardial regions with parallel decrease of voltage and linear shortening identify hibernating myocardium with an improvement in contractility 6 months after coronary revascularisation. The sensitivity and specificity of this test, versus nuclear technique are low and can be improved by further analysis of local voltages.
Even if myocardial viability and its surrogate myocardial ischaemia cannot be related solely to ventricular systolic function the consideration of bi-polar voltage with local linear thinning, is the recommended method for the diagnosis of myocardial viability. The inclusion of local linear thinning alongside the voltage criteria, decreases the extent of "grey zone and overlap" between groups of viable and non-viable myocardial segments observed in the study of Vahlhaus et al. The authors state that the 18F-FDG-PET represents the gold standard for detection of myocardial viability. However, the "gold standard" test with 18F-FDG-PET, a metabolic marker, is insufficient for viability assessment, and it should be coupled to a flow marker such as N-13 ammonia. Increased, or maintained, FDG uptake on a PET scan in the presence of decreased flow (mis-match) is diagnostic for myocardial hibernation. Conversely a decrease in both the metabolic and flow PET scan is an indication of the absence of viability.

Given the expensive cyclotron generator with high cost and complexity, the use of new tracers detected by planar scintigraphy and SPECT with recently developed 511 keV collimators are more economical and more easily accessible to a wide range of hospitals. The PET with 11-carbon acetate (aerobic or oxidative metabolism) with or without dobutamine infusion is more accurate than conventional FDG PET (anaerobic or glycolytic metabolism). Fatty acid derivatives 123-I-betamethyl-P-iiodophenyl pentadecanoic acid and 15-O-123-I-phenyl-pentadecanoic acid, which are not metabolised but accumulate in viable myocardium, can also be detected by planar and SPECT imaging.

Finally, we now use a new technique based on GATED-SPECT scintigraphy allowing the combined assessment of perfusion and contraction, reconciling in some ways the results of echocardiography and myocardial scintigraphy. The perfusion and contraction scores differ, as the diagnostic criteria for myocardial hibernation. A new study with a positron emitted noradrenaline analogue, 11c-hydroxyephedrine demonstrated myocardial regional sympathetic denervation-hibernation mis-match, which contributes to the high incidence of ventricular arrhythmia and sudden cardiac death in patients not amenable to revascularisation.

The downside of the technique proposed by Vahlhaus et al., is that it is hazardous to submit a patient to a major interventional procedure with general anesthesia and cardiopulmonary by-pass without previously assessing the benefits and risk of such a method. The strength of the technique is its safety and ability to identify by a simple predictor of outcome, which is derived from basic information captured during a non-invasive examination. The patients are not subjected to risky and costly procedure before a revascularisation attempt in this era of judiciary medical practice and cost containment. The presence of at least 20% of viable myocardium is mandatory for an increase in left ventricular ejection fraction after coronary revascularisation, in the absence of peri-operative myocardial infarction, with a time window of 3-6 months. Regarding the Dobutamine-Atripine echocardiography, at least 5 or 6% of total myocardium is necessary for genesis of wall motion abnormality. Moreover, myocardial damage of less than 25% of ventricular wall thickness or less than 3% of left ventricular mass is not going to produce an abnormal segmental motion. However, the dobutamine test has a low sensitivity and may overlook potentially viable myocardium. The recently developed Doppler Strain Imaging can more easily detect the myocardial viability with decreased systolic lengthening and increased post-systolic shortening. The tissue Doppler measurement of a velocity, at the epicardial and endocardial layers, of less than 5 and 11 cm/s, respectively, allows also the recognition of myocardial hibernation. Concerning the magnetic resonance imaging we have the structural T1 and T2 weighed-ECG gated technique, functional Gradient-Echo, Harmonic phase, Tagged MRI and Resonance Spectroscopy for "metabolic biopsy".

Nevertheless, the conventional cine wall motion images do not detect early viability episodes in the high-field MRI environment, and lag behind the ECG changes. The recently developed MRI compatible-life support equipment has made this technique easier to use with fringe field situated within the outer Faraday cage, allowing continuous access to the patient throughout the duration of scan.

In conclusion, myocardial hibernation is inherently an unstable state from which patients can progress to more severe cardiac condition and death or return to a better situation with timely coronary revascularisation. In accordance with the concept of unstable angina in coronary insufficiency, we have proposed recently the term of "unstable myocardial" in cardiac hibernation emphasizing the life-saving ability of a time-honoured coronary revascularisation.

References


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Direct epicardial mapping predicts the recovery of left ventricular dysfunction in chronic ischaemic myocardium: Reply

We greatly appreciate the comments by Dr. Achrafi. He underlines not only the importance of the detection of viability in chronic ischaemic and dysfunctional myocardium but also elaborates on the various methods used to identify such tissue. Whereas most of the arguments are well taken and discuss the present status, there are some specific points we would like to address.

It was stated by Kornowski that the NOGA system may not be able to detect viability accurately due to a relatively large intermediate zone between 6 and 10 mV. Kornowski called this intermediate zone the ‘grey zone’1. We did not find such a grey zone in our study but we only cited Kornowski’s statement, since his observation was the background for the hypothesis of our study. Since infarct development starts in the sub-endocardial layer, viable myocardium is more likely detectable from the epicardium. Therefore, we tried to decrease the extent of the expected grey zone with overlap by using the epicardial instead of the endocardial approach which has been introduced recently as stated by Dr. Achrafi. In this context, the NOGA system is indeed useful to correlate local contraction with electrical signal characteristics. In our study, pre-operative data on segmental LV-function were correlated to...