

Noninvasive risk factors for the prediction of inducibility on programmed ventricular stimulation in post-MI patients with ejection fraction over 40% at SCD risk, insights from the PRESERVE EF study

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Background: Sudden cardiac arrest (SCA) in post myocardial infarction (post-MI) patients with a relatively preserved left ventricular systolic function (LVEF \geq 40%) has an annual incidence of 1%, in the absence of adequate risk stratification methods and guideline recommendations for primary prevention. In the PRESERVE-EF study we used a two-step SCA risk stratification approach to detect patients at risk for major arrhythmic events. Seven noninvasive risk factors (NIRFs) were extracted from ambulatory electrocardiography (AECG). Patients with at least one NIRF present were referred for invasive programmed ventricular stimulation (PVS). Inducible patients received an ICD.

Purpose: To assess the performance of NIRFs extracted from 24hr AECG, based on the PRESERVE EF criteria, in predicting inducibility.

Methods: The PRESERVE EF study enrolled 575 patients. Two hundred and four of them had at least one NIRF and an indication for PVS, but 52 of them declined. Finally, 41 out of 152 patients who underwent PVS were inducible. For the present analysis data from these 152 patients (mean age 60 \pm 10years, LVEF 49 \pm 6%, 89% males) were analyzed. Chi-square test, univariate logistic regression and areas under ROC curves were calculated for the PVS inducibility endpoint.

Results: Age, male gender and LVEF for the PVS inducible patients group (n = 41) and the noninducible patients group (n = 111) were, respectively: 61 \pm 9years vs 59 \pm 10years (p = 0.310), 98% vs 86% (p = 0.048), 45 \pm 4% vs 51 \pm 7% (p < 0.001). Among NIRFs examined, LVEF \leq 50%, nsVT \geq 1/24hour and presence of LPs on SAECG presented high and significant Odds Ratios (ORs) for a positive PVS study end point. A simple risk score based on cutoff points of LVEF \leq 50%, NSVTepisode \geq 1/24hour and presence of LPs missed only 1 out of the 41 inducible patients and yielded: OR 14.146 (p = 0.01) with a high sensitivity 98% but low specificity 26% for a positive PVS (AUC = 0.65).

Conclusion: Cut off points of LVEF \leq 50%, nsVTepisode \geq 1/24hour and presence of LPs were important predictors of inducibility. A simple risk score based on these predictors achieves high sensitivity but low specificity. The final decision for an ICD implantation should be based on a positive PVS, which is irreplaceable in risk stratification.