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The importance of shock lead positioning in patients with coronary artery disease

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Introduction. Myocardial perfusion disorders are usually underestimated during the defibrillation lead implantation. This may impair a proper functioning of the lead (pacing threshold, sensing and impedance) resulting in detection fails. So, it’s important to find out a new criteria that can determine the most suitable place for the lead implantation.

Aim. The defibrillation lead implantation technique optimization using cardiac scintigraphy in patients with coronary artery disease (CAD).

Material and methods. 81 patients (male - 72, age 64,0±8,7 years) with CAD and cardioverter-defibrillator (ICD) implantation indications were examined. Patients were divided into two groups. In the 1-st group before ICD implantation, patients underwent cardiac 99mTc-methoxy-isobutyl-isonitrile scintigraphy for the right ventricle wall perfusion disorders assessment (figure 1). In this group defibrillating lead was implanted to the septal position, if the perfusion disorders were in the apical segments, and to the apical position, if perfusion disorders were in the septal segments. In the 2-nd group lead was implanted using the conventional approach. Defibrillating lead parameters (pacing threshold, sensing, impedance and shock impedance on 1-st, 7-th, 30-th and 180-th follow-up days) were compared. Statistical analysis of the results was performed using the Statistica 10.0 software package. To assess the normality of the data distribution, the Kolmagorov-Smirnov test was used. The arithmetic mean (M), standard deviation (SD), median (M?) and quartiles [Q1, Q3] were calculated. The Mann-Whitney test for independent samples was used for groups comparing.

Results. The 1-st group consisted of 45 (55,5%) patients (male - 41, age 62,2±8,8 years). Perfusion disorders were diagnosed in all patients, the summed rest score was 20,00% [13,00; 32,00]. For 28 (62,2%) patients ICD was implanted for primary, and 17 (37,8%) - for the secondary sudden cardiac death prevention. In 28 (62,2%) cases in this group defibrillating lead was implanted to the apical and in 17 (37,8%) - to the septal position.

The 2-nd group consisted of 36 (44,5%) patients (male - 31, age 66,3±8,2 years (p=0,03)). For 21 (58,3%) patient ICD was implanted for primary, and 15 (41,7%) - for the secondary sudden cardiac death prevention. In 20 (55,5%) cases in this group defibrillating lead was implanted to the septal and in 16 (44,5%) - to the apical position.

There were significant differences between groups in terms of: threshold and sense at all follow-up days (p=0,0001) and impedance on 1-st (p=0,003), 30-th (p=0,0001) and 180-th day (p=0,002), respectively. Conclusion. Assessment of the right ventricular perfusion before ICD implantation can reduce the pacing threshold and raise sensing, thereby prolong the ICD longevity and improve life-threatening ventricular tachyarrhythmias detection in the early and long-term period in patients with CAD.
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Conclusion. Assessment of the right ventricular perfusion before ICD implantation can reduce the pacing threshold and raise sensing, thereby prolong the ICD longevity and improve life-threatening ventricular tachyarrhythmias detection in the early and long-term period in patients with CAD.