Effectiveness and prognostic value of intravascular imaging in patients with left main coronary artery stenosis and heart failure

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Aims: A comparative analysis and evaluate the effectiveness and prognostic value of optical coherence tomography (OCT) and fractional flow reserve (FFR) guiding measurement in patients with stenosis of the terminal part of the left main coronary artery (LMCA).

Methods: 222 patients were selected in the study. Inclusion criteria: true bifurcation stenosis of the LMCA according to quantitative coronary angiography (QCA) and classification by A. Medina. Criteria for determining the hemodynamic significance of stenosis: according OCT - minimal lumen area (MLA) in the terminal part of LMCA < 6 mm²; according FFR guiding – < 0.8 (in LCx or LAD or both). Patients, who have not been diagnosed hemodynamically significant stenosis, were further subjected to the dynamic observation. All received optimal medical therapy. The study continued to participate patients whose compliance to receive drugs was not lower than 80%. Primary endpoints: frequency of MACE (death, myocardial infarction, revascularizations). The follow-up were 12, 24, 36 months.

Results: The OCT was performed in 110 patients and FFR guiding measurement – in 112 patients. According to the OCT, were hemodynamically significant stenoses are determined in 36 (32.7%) patients and after FFR-guiding measurement – in 32 (28.6%) of patients ($\chi^2 = 2.184$ p > 0.05). Patients without hemodynamically significant stenoses distributed into 2 groups: group 1 (n=74) – according to the OCT and group 2 (n=80) – according to the FFR. The long-term results were monitored in all patients. The frequency of myocardial infarction in group 1 were 1.4% and in group 2 – 7.5% (p < 0.05). The frequency of revascularization in group 1 were 5.4% and in group 2 – 15% (p < 0.05). The total frequency of major cardiac events were 8.75% in group I and 22.5% in group II ($\chi^2 = 6.435$; p < 0.001). The survival without major cardiac events were significantly different between the groups, of 93.25% in group 1 and 77.5% – in group 2 ($\chi^2 = 7.162$ p < 0.001).

Conclusions: The effectiveness of the OCT imaging and the FFR-guiding measurement in determining the hemodynamic significance of the bifurcation stenosis of the LMCA, not different. However, in the long term period, patients with insignificant stenosis identified by the FFR, have a worse prognosis and are distinguished by a major cardiac events, compared with the OCT, which does not allow us to recommend the FFR method as the main one for determining the hemodynamic significance of LMCA.