Fractional flow reserve (FFR) guided vs angiography guided coronary artery bypass graft (CABG): a systematic review and meta-analysis.

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Background: A strategy of percutaneous coronary intervention (PCI) driven by FFR (Fractional Flow Reserve) has demonstrated to reduce adverse events through the "deferring" of unnecessary stenting procedures compared to PCI guided by angiographic evaluation of stenosis. Coronary Artery Bypass Graft (CABG) represents another option for revascularization, being superior to PCI in patients with diffuse disease. In this setting, some evidence has been provided about physiological driven CABG procedures, but studies reported contrasting results regarding clinical benefits and outcomes at follow up.

The aim of this meta-analysis is to evaluate clinical and procedural impact of FFR versus angiographic guided surgical revascularization and assess outcomes at follow up.

Methods: All randomized controlled trials (RCTs) or observational studies with multivariable adjustment or propensity matching were included. MACE (Major Adverse Cardiac Events) was the primary end point, while its single components (death, myocardial infarction and revascularization) along with number of grafts and percent of off-pump CABG were the secondary ones. Of 86 studies identified, 4 articles were included in this review, representing a combined total of 777 patients (426 angio-guided and 351 FFR-guided). Mean age was 66±2.1, 80% man, 74% hypertension, 71% hyperlipidemia, 33% diabetes, 39% smokers. Mean EuroSCORE I was 2.7. 18% a prior MI, and 25% a prior PCI. Coronary lesions were allocated as follow: 36% left anterior descending artery, 32% circumflex artery, 27% right coronary artery. Mean follow up was 30 months. At the follow up, rates of MACE did not differ (MACE OR 1.31:0.88-1.96), as those of death (OR 1.47:0.86-2.51), of MI (OR 1.80:0.89-3.63), and of target vessel revascularization (1.03: 0.54-1.97.). FFR-guided CABG was associated with more off-pump surgical procedure (OR 0.58, IC 0.34-0.97) and shorter hospitalization time (8.2±2.49 vs 8.87±3.25 days, p<0.01). FFR- guided CABG was associated more frequently with off-pump surgical procedure (OR 0.58:0.34-0.97) with fewer anastomoses (2.5 vs 3), leading to higher rates of global artery revascularization in FFR group (56% vs. 45%) and higher rates of venous grafts in angio-guided group (55% vs. 44%). Shorter hospitalization time was recorded in FFR patients (8.2±2.49 vs 8.87±3.25 days, p<0.01). Graft patency at follow up was not statistically higher in the FFR guided group (OR 0.67, CI 95% 0.32-1.39, all CI 95%).

Conclusions: FFR-guided surgical revascularization is associated with more off-pump procedures, a lower number of surgical anastomoses and more arterial grafts compared to angiography guided CABG. These differences lead to a shorter hospitalization time in the FFR-guided group compared to the angiography-guided group. No difference between two groups in MACE, overall death and MI was observed during the follow up. RCT with longer follow up are needed to evaluate long term outcomes.