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FOCUS ON LEFT MAIN INTERVENTIONS

Outcomes After Left Main Percutaneous Coronary Intervention Versus Coronary Artery Bypass Grafting According to Lesion Site

Results From the EXCEL Trial

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ABSTRACT

OBJECTIVES The authors sought to determine the extent to which the site of the left main coronary artery (LM) lesion (distal bifurcation versus ostial/shaft) influences the outcomes of revascularization with percutaneous coronary intervention (PCI) versus coronary artery bypass grafting (CABG).

BACKGROUND Among 1,905 patients with LM disease and site-assessed SYNTAX scores of <32 randomized in the EXCEL (Evaluation of XIENCE Versus Coronary Artery Bypass Surgery for Effectiveness of Left Main Revascularization) trial, revascularization with PCI and CABG resulted in similar rates of the composite primary endpoint of death, myocardial infarction (MI), or stroke at 3 years.

METHODS Outcomes from the randomized EXCEL trial were analyzed according to the presence of angiographic core laboratory–determined diameter stenosis ≥50% involving the distal LM bifurcation (n = 1,559; 84.2%) versus disease isolated to the LM ostium or shaft (n = 293; 15.8%).

RESULTS At 3 years, there were no significant differences between PCI and CABG for the primary composite endpoint of death, MI, or stroke for treatment of both distal LM bifurcation disease (15.6% vs. 14.9%, odds ratio [OR]: 1.08, 95% confidence interval [CI]: 0.81 to 1.42; p = 0.61) and isolated LM ostial/shaft disease (12.4% vs. 13.5%, OR: 0.90, 95% CI: 0.45 to 1.81; p = 0.77) ($p_{interaction}$ = 0.65). However, at 3 years, ischemia-driven revascularization occurred more frequently after PCI than CABG in patients with LM distal bifurcation disease (13.0% vs. 7.2%, OR: 2.00, 95% CI: 1.41 to 2.85; p = 0.0001), but were not significantly different in patients with disease only at the LM ostium or shaft (9.7% vs. 8.4%, OR: 1.18, 95% CI: 0.52 to 2.69; p = 0.68) ($p_{interaction}$ = 0.25).

CONCLUSIONS In the EXCEL trial, PCI and CABG resulted in comparable rates of death, MI, or stroke at 3 years for treatment of LM disease, including those with distal LM bifurcation disease. Repeat revascularization rates during follow-up after PCI compared with CABG were greater for lesions in the distal LM bifurcation but were similar for disease isolated to the LM ostium or shaft. (J Am Coll Cardiol Intv 2018;11:1224–33) © 2018 by the American College of Cardiology Foundation.

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Effective revascularization of patients with stenosis of the left main (LM) coronary artery reduces mortality compared with medical therapy (1). Coronary artery bypass grafting (CABG) has historically been regarded as the gold standard therapy for patients presenting with LM coronary artery disease (LMCAD), although this practice is based on data from nonrandomized studies (2–10) or underpowered randomized trials using first-generation drug-eluting stents (11–14). The recently completed EXCEL (Evaluation of XIENCE versus Coronary Artery Bypass Surgery for Effectiveness of Left Main Revascularization) and the NOBLE (Nordic-Baltic-British Left Main Revascularization Study) randomized trials (15,16) have provided data comparing percutaneous coronary intervention (PCI) using contemporary drug-eluting stents with CABG for LMCAD. The larger of these trials, the EXCEL trial, reported similar 3-year outcomes for the composite primary endpoint of death, myocardial infarction (MI), or stroke with PCI using fluoropolymer-based cobalt chromium everolimus-eluting stents (CoCr-EES) compared with CABG. Thirty-day major events were less common after PCI, although long-term ischemia-driven revascularization rates were lower after CABG.

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Whether outcomes after revascularization of patients with LMCAD vary according to the pattern of atherosclerosis in the LM stem, specifically whether the disease involves the distal LM bifurcation or is limited to the LM ostium or shaft, has not been reported from randomized trials. A multicenter registry study reported that patients with ostial or mid-shaft LMCAD had a favorable prognosis after PCI with first-generation drug-eluting stents (17). A propensity-adjusted analysis from the DELTA (Drug-Eluting Stent for Left Main Coronary Artery Disease) registry indicated that distal bifurcation disease had worse outcomes than ostial or shaft disease after PCI (18). Neither study compared these PCI outcomes to a control arm of patients undergoing CABG. Nonetheless, PCI guidelines and appropriateness criteria recommendations for revascularization vary according to coronary artery disease complexity, including distal LM bifurcation involvement (19,20). We thus examined the outcomes of PCI versus CABG according to LM lesion location in a prespecified analysis from the EXCEL trial to determine the extent to which this parameter should influence revascularization decisions in patients with LMCAD.

ABBREVIATIONS AND ACRONYMS

CABG = coronary artery bypass grafting

CI = confidence interval

CoCr-EES = cobalt chromium everolimus-eluting stent(s)

LM = left main coronary artery

LMCAD = left main coronary artery disease

MI = myocardial infarction

OR = odds ratio

PCI = percutaneous coronary intervention

QCA = quantitative coronary angiography

TVR = target vessel revascularization

METHODS

PROTOCOL AND PATIENT SELECTION. The design of the EXCEL trial has been previously reported (21). In brief, the EXCEL trial was an international, open-label, multicenter trial in which 1,905 patients with LMCAD and low or intermediate SYNTAX (Synergy between Percutaneous Coronary Intervention with Taxus and Cardiac Surgery) scores (≤32) eligible for both PCI and CABG as assessed by a local heart team were randomized to treatment with CoCr-EES (XIENCE, Abbott Vascular, Santa Clara, California) or CABG. The primary endpoint was the composite rate of death, MI, or stroke at a median follow-up of 3 years. Major secondary endpoints included death, MI,

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