

Elective Coronary Revascularization Procedures in Patients With Stable Coronary Artery Disease



Incidence, Determinants, and Outcome (From the CORONOR Study)

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ABSTRACT

OBJECTIVES The authors sought to describe the incidence, determinants, and outcome of elective coronary revascularization (ECR) in patients with stable coronary artery disease (CAD).

BACKGROUND Observational data are lacking regarding the practice of ECR in patients with stable CAD receiving modern secondary prevention.

METHODS The authors analyzed coronary revascularization procedures performed during a 5-year follow-up in 4,094 stable CAD outpatients included in the prospective multicenter CORONOR (Suivi d'une cohorte de patients CORONariens stables en région NORd-Pas-de-Calais) registry.

RESULTS Secondary prevention medications were widely prescribed at inclusion (antiplatelet agents 96.4%, statins 92.2%, renin-angiotensin system antagonists 81.8%). A total of 481 patients underwent ≥ 1 coronary revascularization procedure (5-year cumulative incidences of 3.6% [0.7% per year] for acute revascularizations and 8.9% [1.8% per year] for ECR); there were 677 deaths during the same period. Seven baseline variables were independently associated with ECR: prior coronary stent implantation ($p < 0.0001$), absence of prior myocardial infarction ($p < 0.0001$), higher low-density lipoprotein cholesterol ($p < 0.0001$), lower age ($p < 0.0001$), multivessel CAD ($p = 0.003$), diabetes mellitus ($p = 0.005$), and absence of treatment with renin-angiotensin system antagonists ($p = 0.020$). Main indications for ECR were angina associated with a positive stress test (31%), silent ischemia (31%), and angina alone (25%). The use of ECR had no impact on the subsequent risk of death, myocardial infarction, or ischemic stroke (hazard ratio: 1.04; 95% confidence interval: 0.76 to 1.41).

CONCLUSIONS These real-life data show that ECR is performed at a rate of 1.8% per year in stable CAD patients widely treated by secondary medical prevention. ECR procedures performed in patients without noninvasive stress tests are not rare. Having an ECR was not associated with the risk of ischemic adverse events. (J Am Coll Cardiol Intv 2018;11:868-75)
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The management of patients with coronary artery disease (CAD) has been substantially modified during the last decades by the increasing use of revascularization procedures and the effective evidence-based secondary prevention therapies including antiplatelet agents, statins, and/or renin-angiotensin system inhibitors (1-4). Although invasive strategies are unanimously accepted in the acute setting (3,4), uncertainty largely persists regarding elective coronary revascularization (ECR) procedures when performed in stable CAD outpatients treated with contemporary secondary prevention therapies (1,2,5,6). There are limited recent data in the literature on the real life practice of ECR in cohorts of patients with stable CAD (7,8). We thus designed the present analysis to describe the incidence, determinants, and outcome of ECR procedures performed during a 5-year follow-up period in 4,184 stable CAD outpatients included in the CORONOR (Suivi d'une cohorte de patients CORONariens stables en région NORd-Pas-de-Calais) registry.

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METHODS

STUDY POPULATION. The CORONOR study is a prospective multicenter registry that included 4,184 consecutive outpatients with stable CAD. The study population has been previously reported in detail (9,10). The patients were included by 50 cardiologists from the region Nord-Pas-de-Calais in France between February 2010 and April 2011. Patients were considered eligible if they had evidence of CAD defined by at least 1 of the following: previous myocardial infarction (MI) (>1 year ago), previous coronary revascularization (>1 year ago), and/or obstruction of $\geq 50\%$ of the luminal diameter of at least 1 native coronary vessel on coronary angiography. The sole exclusion criterion was hospitalization for MI or coronary revascularization within the last year. This study was approved by the French medical data protection committee and authorized by the Commission Nationale de l'Informatique et des Libertés for the treatment of personal health data. All patients consented to the study after being informed through a written document of the objectives of the study and on the treatment of data, as well as on their rights to object, of access, and of rectification.

STUDY DESIGN AND DEFINITIONS. A case record form, which contained information regarding demographic and clinical details of the patients including usual cardiovascular risk factors and treatments, was

prospectively completed at the initial visit by the investigators (i.e., the treating cardiologists). The patients were then followed up by their treating cardiologists. The number of outpatient visits as well as the practice and/or the type of noninvasive stress tests during follow-up was at the discretion of the treating cardiologists. Protocol-specified follow-up was performed at 2 years and at 5 years, using a standardized case record form to report coronary revascularizations. When coronary revascularization was reported, all related documents (reports of outpatient visits, reports of noninvasive stress tests, discharge summaries, percutaneous coronary intervention [PCI] and/or coronary artery bypass [CABG] reports) were collected. We also collected follow-up data on death, MI, and ischemic stroke. Missing information was completed by contacting either their general practitioners and/or the patients themselves. All clinical events were adjudicated by 4 investigators (T.M., O.T., N.L., and C.B.) blinded to each other. A third investigator joined the adjudication in case of disagreement according to pre-specified definitions. Coronary revascularization procedures were adjudicated as elective or acute. Acute coronary revascularizations were defined as those performed in a setting of an acute coronary syndrome, including all myocardial infarctions (ST-segment elevation and non-ST-segment elevation myocardial infarction) as well as unstable angina. Coronary revascularizations not performed in a setting of an acute coronary syndrome were defined as ECR. In patients with ECR, data on: 1) type of procedure (PCI, CABG); 2) use of bare-metal stent (BMS) or drug-eluting stent (DES) when stents were used; 3) the practice of fractional flow reserve (FFR)-guided procedures; 4) anginal symptoms or equivalent before revascularization; 5) the practice of noninvasive stress tests before revascularization, as well as the type of test if performed (electrocardiogram [ECG] exercise test, nuclear stress test, stress echocardiography); and 6) antianginal medication modification before revascularization were retrospectively collected. The cause of death was determined after a detailed review of the circumstances of death and classified as cardiovascular or noncardiovascular (11). Deaths from unknown cause were considered as cardiovascular. MI was defined according to the universal definition (12,13). Ischemic stroke was defined as a sudden onset of focal neurological symptoms with the presence of cerebral infarction in the appropriate territory on brain imaging.

ABBREVIATIONS AND ACRONYMS

ACE	= angiotensin-converting enzyme
ARB	= angiotensin receptor blocker
BMS	= bare-metal stent(s)
CABG	= coronary artery bypass
CAD	= coronary artery disease
CI	= confidence interval
DES	= drug-eluting stent(s)
ECG	= electrocardiogram
ECR	= elective coronary revascularization
FFR	= fractional flow reserve
HR	= hazard ratio
LDL-C	= low-density lipoprotein cholesterol
MI	= myocardial infarction
PCI	= percutaneous coronary intervention
SHR	= subhazard ratio

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