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CLINICAL RESEARCH
Coronary

Comparative Outcomes After Unprotected Left Main Stem Percutaneous Coronary Intervention

A National Linked Cohort Study of 5,065 Acute and Elective Cases From the BCIS Registry (British Cardiovascular Intervention Society)

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Objectives The goal of this study was to report outcomes from percutaneous coronary intervention (PCI) to an unprotected left main stem (UPLMS) stenosis according to presenting syndrome, including ST-segment elevation myocardial infarction (STEMI), non–ST-segment elevation acute coronary syndrome (NSTEACS), and chronic stable angina (CSA).

Background There are no published whole-country data concerning patient outcomes following PCI to UPLMS.

Methods This study is a prospective national cohort study using data from the British Cardiovascular Intervention Society (BCIS) registry from January 1, 2005, through December 31, 2010.

Results Of 5,065 patients having PCI to an UPLMS, 784 (15.5%) presented with STEMI, 2,381 (47.0%) with NSTEACS, and 1,900 (37.5%) with CSA. Crude 30-day and 1-year mortality rates were STEMI: 28.3% and 37.6%, NSTEACS: 8.9% and 19.5%, and CSA: 1.4% and 7.0%, respectively. Unadjusted in-hospital major adverse cardiovascular and cerebrovascular event rates were STEMI: 26.6%, NSTEACS: 6.6%, and CSA: 3.3%. Risk of 30-day mortality was much greater for STEMI and NSTEACS patients than CSA (STEMI adjusted odds ratio [aOR]: 29.45, 95% confidence interval [CI]: 19.37 to 44.80, NSTEACS aOR: 6.45, 95% CI: 4.27 to 9.76). More than 40% of patients presenting with STEMI had cardiogenic shock, in whom mortality was higher than in STEMI cases without shock (30 days: 52.0% vs. 11.7%, 1 year: 61.1% vs. 20.9%). Radial access, compared with the femoral approach, was associated with a lower risk of 30-day mortality (STEMI aOR: 0.37, 95% CI: 0.21 to 0.62; NSTEACS aOR: 0.66, 95% CI: 0.45 to 0.97).

Conclusions More than one-half of the patients who received UPLMS PCI were acute where outcomes were much worse than elective cases. Cardiogenic shock is common in STEMI patients, of whom more than one-half die at 30 days. The radial approach was associated with reduced early mortality in acute cases. (J Am Coll Cardiol Intv 2014;7:717–30) © 2014 by the American College of Cardiology Foundation

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Coronary artery bypass grafting (CABG) has been the standard of care for the management of left main stem (LMS) disease (1–5). In contemporary practice, however, percutaneous coronary intervention (PCI) has become an alternative strategy in patients who have unprotected left main stem (UPLMS) disease, particularly in those deemed

See page 731

at high risk for surgery (6), even though repeat revascularization procedures are increased with LMS PCI compared with CABG (2). Notably, higher rates of success are not confined to elective patients with chronic stable angina (CSA), and favorable outcomes have been reported in emergency cases when CABG is often contraindicated (7–9). Yet, for patients who receive PCI to disease of the UPLMS, there is a paucity of data that measure outcomes in unselected patients on a large scale and in a consecutive series.

There is, therefore, value in reporting contemporary and representative outcomes data for PCI to the UPLMS in order to inform patients, healthcare professionals, and regulators of both the benefits and inherent risks of such therapy, and also to highlight areas where novel interventions aimed at improving outcomes may be targeted (7,10–15). Moreover, there is a gap in the knowledge base regarding the relative merits of PCI to an UPLMS culprit lesion in patients who present with ST-segment elevation myocardial infarction (STEMI) or non–ST-segment elevation acute coronary syndrome (NSTEACS) (16). For patients with cardiogenic shock, there are very limited data available in the published reports, with early outcomes reported in only small "hypothesis-generating" cohort studies. Similarly, although recent international guidelines recommend a radial approach to PCI over that of the femoral approach (17), the wider implications of this have not been studied in patients who receive PCI to disease of the UPLMS.

The British Cardiovascular Intervention Society (BCIS) registry is a prospective whole-country registry of all PCIs in adults that has collected patient-level data from all centers in the United Kingdom since 2005. It provides data that cannot be collected within a randomized controlled trial, and few cohort studies have comparable population coverage, long-term follow-up, and depth of data detail in relation to clinical risk. The primary aim of this study was to perform a population-based comparative investigation into the clinical outcomes of patients who received PCI to an UPLMS stenosis, according to clinical syndrome at presentation. Our secondary aims were: 1) to quantify the impact of cardiogenic shock; and 2) to report the impact of the radial versus femoral approach on outcomes by clinical presentation.

Abbreviations and Acronyms

aOR = adjusted odds ratio
BCIS = British Cardiovascular Intervention Society
CABG = coronary artery bypass grafting
CI = confidence interval
CSA = chronic stable angina
IABP = intra-aortic balloon pump
IVUS = intravascular ultrasound
LVSD = left ventricular systolic dysfunction
MACCE = major adverse cardiovascular and cerebrovascular event(s)
NSTEACS = non–ST-segment elevation acute coronary syndrome
PCI = percutaneous coronary intervention
STEMI = ST-segment elevation myocardial infarction
UPLMS = unprotected left main stem

Methods

Setting and design. This study was on the basis of data from the BCIS audit program, in which participation is mandated for all PCI operators and all hospitals in the United Kingdom (18). Data for every PCI procedure performed were collected prospectively at each hospital. These data were then encrypted and transferred securely online to a central database, using a system developed by the Central Cardiac Audit Database, now part of the National Institute for Cardiovascular Outcomes Research (NICOR). The data for each PCI procedure comprise 113 core fields that describe the patient demographics and clinical presentation, indications for PCI, procedural details, and outcomes during the hospital stay (19).

Patients, procedures, and treatments. Although BCIS collects data from all countries in the United Kingdom, robust mortality tracking is only available for patients who live in England and Wales—this represents approximately 89% of the U.K. population. Thus, the sampling frame comprised all patients in England and Wales. Patients were eligible for the UPLMS analyses if they had received PCI to a diseased UPLMS during a 6-year period between January 1, 2005, and December 31, 2010, and were at least 18 years of age. These patients were drawn from those who had the left main stem as the treated vessel. Patients with an UPLMS were defined as those who did not have a patent graft to any left-sided coronary artery (18). For those with multiple admissions, we used the earliest record.

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