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Impact of European Society of Cardiology and European Association for Cardiothoracic Surgery Guidelines on Myocardial Revascularization on the activity of percutaneous coronary intervention and coronary artery bypass graft surgery for stable coronary artery disease

Martin T. Yates, MRCS, Gopal K. R. Soppa, MRCS, Oswaldo Valencia, MD, Sion Jones, MRCS, Sami Firoozi, FRCP, and Marjan Jahangiri, FRCS(CTh)

Objective: Joint guidelines on myocardial revascularization were published by the European Society of Cardiology and European Association for Cardiothoracic Surgery: Patients with left main stem, proximal left anterior descending, or 3-vessel disease should be discussed with a surgeon before revascularization, and ad hoc percutaneous coronary intervention has no elective indication in these categories. We assess the impact of the guidelines on referral patterns to a cardiac surgery service at a large-volume cardiac center in the United Kingdom.

Methods: Joint guidelines were published in August 2010. All patients with severe disease undergoing percutaneous coronary intervention at one institution were identified 6 months before (January to June 2010) and 6 months after (January to June 2011) their introduction. Decision-making and surgical referral were determined from minutes of multidisciplinary meeting.

Results: A total of 197 patients underwent elective percutaneous coronary intervention pre-guidelines, of whom 62 had severe disease. Only 6 patients (9%) were discussed at a multidisciplinary meeting before intervention. After introduction of the guidelines, elective percutaneous coronary interventions were performed in 164 patients, of whom 42 had surgical disease. Only 8 patients (17%) were discussed at a multidisciplinary meeting before intervention (P = not significant). Follow-up was a median of 480 (380-514) days for the pre-guideline group and 104 (31-183) days for the post-guideline group. Ad hoc percutaneous coronary intervention in surgical disease occurred in 8 patients (14%) pre-guidelines and was unchanged for 9 patients (26%) post-guidelines (P = not significant).

Conclusions: Despite recommendation by both cardiology and cardiac surgical bodies and widespread publicity, a significant number of patients in this single-center study are not receiving optimal treatment recommended by these guidelines. (J Thorac Cardiovasc Surg 2014;147:606-10)

Coronary revascularization improves both symptoms and survival in patients with significant coronary artery disease.[1-3] This can be achieved by coronary artery bypass grafting (CABG) or percutaneous coronary intervention (PCI). The safety and efficacy of both procedures have been well established, but there is great variability in their use in clinical practice.[4] With this in mind, a joint consensus between surgeons and cardiologists was required to guide practice on the basis of current best evidence. A group composed of cardiac surgeons and interventional and noninterventional cardiologists has recently produced joint guidelines for the European Society of Cardiology (ESC) and European Association for Cardiothoracic Surgery (EACTS).[5] These guidelines provide a framework to assist in decision-making for patients requiring elective coronary revascularization.

The ESC/EACTS Guidelines state that in patients with stable coronary artery disease, those with 1- or 2-vessel disease, not involving the proximal left anterior descending (LAD) artery, should be offered PCI. More extensive disease involving the left main stem (LMS) or proximal LAD, or those with 3-vessel disease should be considered for CABG in the first instance. Specific mention is made of high-risk groups, including patients with chronic kidney disease, left ventricular failure, and diabetes, in whom surgery is the preferred option.

All patients with coronary artery disease who are being considered for revascularization will undergo a diagnostic angiogram. Intervention performed during this procedure

From the Departments of Cardiology and Cardiac Surgery, St George's Hospital, London, United Kingdom.

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Address for reprints: Marjan Jahangiri, FRCS(CTh), Department of Cardiac Surgery, St George's Hospital, Blackshaw Rd, London SW17 0QT, United Kingdom (E-mail: marjan.jahangiri@stgeorges.nhs.uk).

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Abbreviations and Acronyms

CABG = coronary artery bypass grafting
EACTS = European Association for Cardiothoracic Surgery
ESC = European Society of Cardiology
LAD = left anterior descending
LMS = left main stem
PCI = percutaneous coronary intervention
RCA = right coronary artery

is known as ad hoc PCI. In a large series of 38,431 patients receiving ad hoc PCI, up to 30% were potentially candidates for CABG.[6] The guidelines make a specific recommendation that stable patients should have intervention deferred. This allows discussion with a surgeon and provides time for the patient to understand the options available to them.[5]

The ESC/EACTS Guidelines place particular emphasis on a multidisciplinary approach and suggest that a Heart Team containing both cardiologists and surgeons discuss complex patients before intervention. Furthermore, patients being treated against the guidelines, for whatever reason, should be discussed with the Heart Team before intervention.[5] The aim of this study is to evaluate the effect of the publication of the ESC/EACTS Guidelines on revascularization practice at a cardiothoracic unit in the United Kingdom.

PATIENTS AND METHODS

Patient Population

The study was carried out at St George's Hospital, London, United Kingdom, a teaching hospital with a tertiary Cardiology and Cardiothoracic Surgery Unit representing a significant proportion of the coronary revascularization workload of NHS London.

Timing of Study

The ESC/EACTS Guidelines on Coronary Revascularization were published in August 2010 and presented in detail to the multidisciplinary team at our hospital. To study the impact of the guidelines, patients undergoing coronary revascularization from January to June 2011 were studied. Patients who had undergone revascularization from January to June 2010 were used as control population. This allowed time for the guidelines to be incorporated into practice and prevent seasonal bias.

Database

All patients undergoing revascularization at St George's Hospital during the study period were identified. Surgical patients were identified from the Central Cardiac Audit Database, and those undergoing PCI were identified from The British Cardiovascular Intervention Society database. These data are collected during every PCI procedure, with a final set of data entered after patient discharge. All patients having undergone PCI during the study periods were identified. Those undergoing previous cardiac surgery were excluded.

A database of all patients discussed at the multidisciplinary meeting at St George's Hospital during the stated time periods was compiled from contemporaneous minutes recorded at each meeting. Minutes are written by a dedicated member of staff at each meeting recording the diagnosis, management plan, and reasons for deviation from expected practice. The minutes are then circulated to all physicians and surgeons who attend the meeting for approval before finalization.

Definitions

Elective procedures were those carried out on stable patients usually as a day case procedure. Urgent procedures were those carried out as an inpatient, usually for non–ST-segment elevation myocardial infarction or unstable angina. Emergency procedures were those carried out before the start of the next working day, usually primary PCI due to ST-segment elevation myocardial infarction.

Coronary artery stenosis was defined as narrowing of 50% or greater of vessel diameter at angiography. Three-vessel disease was defined as stenosis of the right coronary artery (RCA), LAD, and circumflex artery.

Outcomes

The notes or electronic patient records were reviewed for all patients and correlated with the multidisciplinary meeting database to determine which patients had been discussed by the multidisciplinary team. Secondary outcomes investigated were vessels intervened on, subsequent revascularization, and in-hospital mortality.

Data are presented as a mean ± standard deviation. Categoric data were tabulated for chi-square and Fisher exact test. To compare mean differences, the normality test (Shapiro–Wilk) (age) was performed for continuous data and Student *t* tests were performed for independent samples.

RESULTS

Revascularization Activity

From January to June 2010, before publication of the guidelines, there were a total of 504 PCIs performed, excluding those patients who had undergone previous cardiac surgery. Of these, 197 were elective, 147 were urgent, and 160 were emergency. There were 264 isolated CABGs performed during the same time period. From January to June 2011, after publication of the guidelines, 498 PCIs were performed, 164 elective, 138 urgent, and 196 emergency. There were 260 isolated CABGs performed during the same period. There was no significant change in activity of elective PCI ($P = .34$) or CABG ($P = .4$) after publication of the guidelines.

Referral Patterns to Cardiac Surgery

In 2010, 67 patients (34%) undergoing elective PCI had disease potentially suitable for CABG. Only 6 (9%) of these were discussed with a cardiac surgeon before intervention. This compares with 48 (29%) of all elective PCIs in 2011, of which 8 (17%) were discussed with a surgeon (Figure 1). A small number (2010 n = 5, 2011 n = 6) of these PCIs were for in-stent restenosis and excluded from further analysis. The demographics of both groups were similar. There was no difference in the proportion of procedures carried out since the introduction of the guidelines (34% vs 29%; $P = .26$).

During both time periods, the demographics of the groups not discussed with a surgeon were similar. The average age was 65 ± 6 years in 2010 and 67 ± 8 years in 2011 ($P = .03$). A significant number of patients had diabetes in