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Variables Associated with Inappropriate Revascularization Procedures in Spain

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Abstract

Background: In 1997 18,500 percutaneous transluminal coronary angioplasties (PTCA) and 9,000 coronary artery bypass graft surgeries (CABG) were performed in Spain, an increase of 23% and 30%, respectively, compared to the previous year. The rapid increase in the number of these interventions raises the question of how many of them are performed for inappropriate reasons.

Purpose: To determine the appropriateness of coronary revascularization procedures in Spain and measure the association between inappropriate use and different variables.

Methods: Appropriateness criteria for PTCA and CABG were developed by a Spanish expert panel using the RAND appropriateness method in 1997. A retrospective study was made of patients who had undergone coronary revascularization (PTCA or CABG) in Spain during 1997. A random sample of 3,500 clinical records (1,800 PTCA patients and 1,700 CABG patients) was chosen after stratification by hospital type (public or private) and number of interventions (For PTCA: 50-249, 250-399, ≥ 400 ; for CABG: 50-99, 100-199, ≥ 200). Hospitals which had performed fewer than 50 procedures, patients with previous CABG, and patients receiving other surgical procedures at the time of the intervention were excluded. To maintain the sample size, clinical records which met exclusion criteria or could not be located were replaced using random selection criteria. A pre-tested abstract form was used to collect data from the clinical records, and double data entry was performed. Each intervention was classified as appropriate, uncertain or inappropriate in accordance with the appropriateness criteria previously developed by the Spanish expert panel. Logistic regression techniques were used to build a model with the following independent variables: 1) age; 2) type of vessel disease (left main, 3 vessel, 2 vessel with proximal left anterior descending (PLAD) involvement, 2 vessel other than PLAD, PLAD alone, 1 vessel other than PLAD); 3) medical therapy (optimal, suboptimal); 4) sex; 5) Clinical situation prior to the intervention (asymptomatic, chronic stable angina, unstable angina, acute myocardial infarction, post-myocardial infarction, cardiac arrest, palliative PTCA, emergency CABG); 6) Left ventricular ejection fraction (LVEF) ($>50\%$, 31-50%, 20-30%); and 7) Surgical risk (low/moderate or high). Each variable was measured in accordance with precise operational definitions developed for the study.

Results: The final sample consisted of 3,466 interventions (1,779 PTCA and 1,687 CABG). Revascularization was found to be appropriate for 68.6% of interventions, uncertain for 19.9% and inappropriate for 11.6%. The logistic regression model found a statistically significant association between inappropriate use and the following variables: 1) age (OR 1.0234; 95%CI 1.007-1.041); 2) vessel disease (reference group = left main): 2 vessels other than PLAD (OR 46.5; 12.7-170.4) and 1 vessel other than PLAD (OR 593.5; 163.5-2,153.6); 3) suboptimal medical therapy (reference group = optimal) (OR 6.0; 4.0-8.9)

Conclusions: In Spain, 1 out of 10 patients is revascularized for inappropriate reasons. Inappropriate revascularization is associated with the absence of PLAD involvement, with suboptimal medical therapy, and with increased patient age. The prospective use of appropriateness criteria can help reduce the rate of inappropriate coronary revascularization interventions.

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