

# Quality improvement measure in interventional cardiology: a risk-adjustment model

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The establishment of quality standards based on patient outcome data is a rational means for differentiating the quality of health care in the marketplace. The explanation is clear; high-risk patients generate larger costs, and individuals with complex pathology, multiple coexisting diseases, or significant risk factors, develop more complications and have poorer outcomes, even with excellent care. The final goal of risk adjustment is to account for pertinent patient characteristics before making inference about the effectiveness of care.

Information obtained from registries is increasingly being used to assess the process of care and patient outcomes, supported by the paradigm that the future of healthcare is increasingly in the hands of those who are effective users of clinical data. Any attempt to produce unadjusted outcome analysis and comparisons, by named operator, or institutions, may be misleading and will therefore encourage adverse selection practices.

The aim of this study was to develop a risk adjustment model for major adverse cardiac and cerebrovascular events following percutaneous coronary intervention (PCI), using data from Portuguese national registry.

Retrospective analysis of prospective collected data from 10,641 consecutive patients who underwent PCI, in a total of 19 Portuguese centres who participated in the Portuguese PCI registry, between June 2003 and June 2006. Major adverse event was a composite variable comprising death, acute myocardial infarction, need for a new revascularization by urgent coronary artery bypass graft, and stroke. The authors considered as independent variables those that characterize the individuals and treatment aspects, namely demographic (age, gender); clinical aspects (diabetes, hypertension, peripheral disease) and technical and functional aspects (number of vessels diseased, lesion type, ejection fraction).

A bivariate analysis was done, identifying those that have the strongest statistical association with major adverse events. To build the model, and to identify independent risk factors for major adverse events, a multivariate logistic regression analysis was undertaken, which included all variables that showed, in the bivariate analysis, an odds ratio  $>1$  and were statistically significant ( $P < 0.05$ ). Factors associated with major adverse events were: age  $> 80$  years, female gender, acute myocardial infarction, renal failure, three or more vessels

diseases, ejection fraction severely impaired, and cardiogenic shock.

There are many fields where the risk-adjustment strategy can be used to enforce the quality assessment and quality improvement, including the following: to detect potential adverse selection (based on the severity of the disease); to identify and define quality indicators; for quality assessment purposes, providing a comparison of outcomes among providers

(hospitals or physicians) after adjusting for risk and assessing changes in risk-adjusted outcomes for a provider over time.

The risk-adjustment model developed in this study, by allowing the identification and evaluation of patient risk factors that are associated with adverse events, constitutes a potential contribution to quality improvement in interventional cardiology.



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*Comment on the paper:*

**Sousa P, Sousa Uva A, Pinto F on behalf of the investigators of PCI Registry of Portuguese Society of Cardiology – Risk-adjustment model in health outcomes evaluation: a contribution to strengthen assessment towards quality improvement in interventional cardiology, *International Journal for Quality in Health Care* 2008; 20(5):324-330**