GUEST EDITORS' PAGE

Quality Improvement Strategy of the Spanish Society of Cardiology

The RECALCAR Registry

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T he Spanish Society of Cardiology (SSC) recently launched a strategy for cardiovascular disease health care quality improvement named *SEC-CALIDAD* (SSC-Quality). The RECALCAR (REcursos y CALidad en CARdiología) registry is a key element of this strategy.

Although Spain has a low cardiovascular mortality rate in comparison with northern European countries, cardiovascular diseases are still responsible for the majority of deaths and disabilities in the Spanish population of 46 million individuals. Cardiovascular risk factors are very prevalent in the general population, and obesity is epidemic in the young, which portends a sharp increase in the incidence of cardiovascular diseases in the near future.

The National Health Service (NHS) of Spain is a public health care service agency that covers the whole population. The administrative organization of Spain is based in 17 regions. This decentralized health care system model may produce inter-regional inequities in the quality of medical care. The SSC is collaborating with the Ministry of Health to promote strategies that aim to improve and homogenize the quality of the medical care in Spain, and to diminish these inequities. One of these strategies is the RECALCAR project.

The RECALCAR registry, started in 2012, uses 2 sources of data. One source is the minimum basic dataset (MBDS) of hospital discharges, coded annually according to the International Classification of Diseases, Ninth Revision, Clinical Modification (1) by all hospitals. The other source of information is an annual enquiry (107 items) answered by the chiefs of the cardiac unit of the NHS to obtain information about the activity, structure, personnel, and equipment of each unit. These data provide the SSC with very useful information about the performance of each cardiac unit in our country. Thus, the Ministry of Health has granted RECALCAR as a register of interest for the NHS.

From 2012 to 2015, the registry obtained responses from 123 to 151 NHS cardiology units (54% to 72% of the identified units), with a weight of 66% to 85% when weighted by the installed beds. Remarkable stability was maintained in all indicators during the period. The median number of cardiologists in each cardiac unit was 13 to 15, with significant variations between cardiac units (SD ± 9), and there was an average of 50 cardiologists per 1 million inhabitants, with significant variations between Spanish regions. The average discharges of the cardiac units were 5 per 1,000 inhabitants per year, with an average length of stay of 5.5 ± 1.1 days. The most significant finding was the marked variability in indicators of structure, activity, and management between cardiac units and between regions. We have not found regional deficits in equipment, but there were gaps in relevant aspects of the organization and management, such as the absence of a cardiologist on duty at the hospital or the absence of critical care beds dedicated to cardiology in cardiac units with 24 or more beds (30% and 45%,

respectively), poor implementation of process management, and scarce development of cardiac units' health care networks.

The information gathered through the cardiac unit inquiry was double-checked to evaluate its accuracy. A sample of cardiac units was audited, and the data reported are compared with data coming from the MBDS and other SSC registries (Catheterization and Coronary Intervention Registry [2] and Spanish Catheter Ablation Registry [3]). Moreover, RECALCAR provides blind comparisons of informant cardiac units with the performance of the cardiac units of similar complexity, which over time allowed for performing benchmarking and starting a virtuous cycle of quality improvement.

The Ministry of Health of Spain provides to SSC only a share of the MBDS data. The partial database facilitated to SSC (MBDS_SSC) is comprised of approximately 350,000 yearly hospital discharges with a principal diagnosis of "cardiac diseases" and also approximately 50,000 yearly hospital discharges given by cardiac units with principal diagnosis different to "cardiac diseases." MBDS_SSC is now comprised of >4 million episodes of hospitalization during the period of 2007 to 2014.

We analyzed 100,993 discharge reports from the Spanish NHS between 2009 and 2010 with the diagnosis of acute myocardial infarction (MI) [4]. In-hospital mortality was adjusted for risk following the models of the Institute for Clinical Evaluative Sciences (Canada) and the U.S. Centers for Medicare & Medicaid Services [5] and was expressed as risk-adjusted mortality ratio and risk-standardized mortality ratio, according to the service responsible [6]. The typology of the hospital, treatment in a cardiology unit, and percutaneous coronary intervention were significantly associated with the survival of a patient who was hospitalized for MI. The risk-adjusted in-hospital mortality in hospitals of medium-high complexity, with a structured cardiac unit, was significantly lower than in hospitals with <200 beds. The adjusted mortalities in the groups with the best and worst outcomes were 6.74% (high-complexity hospitals) and 8.49% (very low complexity), respectively, which was statistically significant (p < 0.001). Mortality was also lower when the cardiac unit was responsible for the discharge (7.21% vs. 7.75%; p < 0.001) or when angioplasty had been performed during admission (7.19% for angioplasty vs. 7.86% for fibrinolysis; p < 0.001). Another finding derived from RECALCAR is the lower intrahospital risk-adjusted mortality of MI found in teaching hospitals that had critical cardiovascular care integrated into cardiac units when compared with hospitals that provided critical cardiovascular care in general intensive care units [7]. On the basis of these findings, the SSC recommended that the Spanish NHS establish health care networks that favor percutaneous coronary intervention and the participation of cardiac units in the management of patients with acute MI.

Investigating the association between health care outcomes and structure, resources, activity, and the management of hospitals and cardiac units is a basic pillar of RECALCAR. The registry has shown significant differences between Spanish regions and between hospitals on health care quality, MI mortality, and readmissions, which has fueled organizational health care reforms. Regions that have developed primary angioplasty networks for ST-segment elevation myocardial infarction have a higher rate of percutaneous coronary intervention in MI and lower intrahospital MI deaths [8]. The discussion of these important data with regional authorities has yielded strategies to improve the care of patients with ST-segment elevation myocardial infarction; several new primary angioplasty regional networks have been set up, which are expected to reduce inequalities and to improve globally the prognosis of patients with acute MI.

The SSC is currently collecting the information of readmissions after MI and analyzing the different factors that play a role in readmissions as a means to improve them. Other studies under way derived from RECALCAR are the analysis of the existing sex [9] and age [10] differences in management and mortality observed in Spain, and the management of heart failure in the NHS hospitals.

As a scientific society, we are seeking to systematically investigate the structure, resources, activity, and management of cardiac units with health care outcomes. RECALCAR deepens the focus of the U.S. Centers for Medicare & Medicaid Services on the basis of hospital characteristics (mainly volume) [11], attending also to specific arrangements for heart disease care in the hospital setting. The use of this information to analyze and improve health care quality will be followed in the future by other scientific societies in Spain.

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