

## Editorial

## Domino Effect in Quality of Care: Improving One Aspect of a Disease Can Improve Its Entire Spectrum



## Efecto dominó en la calidad asistencial: mejorar un aspecto de una enfermedad puede mejorar todo el espectro

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There have been many changes in the diagnosis and treatment of acute ischemic heart disease. Acute coronary syndrome (ACS) is a term that seems to have been around forever and the same applies to the indication for coronary angiography in hospitalized patients. The rapid pace of change, present in all sectors of society, also affects scientific knowledge and clinical practice. Although difficult, it is vital to assimilate and above all reflect on our health care and research practice.

Acute coronary syndrome is complex because it comprises a wide and heterogeneous spectrum of patients who have had myocardial ischemia as a consequence of a transition from atherosclerosis to coronary atherothrombosis.<sup>1</sup> Thus, patients have symptoms of pain or discomfort, in the widest sense of the word, suggesting or raising suspicion of myocardial ischemia. Faced with this diagnostic hypothesis, electrocardiogram is the fundamental tool to determine if the patient has ACS with persistent ST-segment elevation (STEACS) or ACS without persistent ST-segment elevation (NSTEMACS). All of this seems obvious and evident but the rapid uptake and use of acronyms makes us forget the concepts embedded in the words. In this case, the overlooked word is the adjective “persistent”, and it is this persistence of ST-segment elevation that reflects the pathophysiological mechanism of the complete obstruction of an epicardial coronary artery.<sup>2</sup> Thus, although both types of ACS share a common pathophysiological basis explaining the overlap in their management, STEACS and NSTEMACS are considered separate entities and are treated as such by the clinical practice guidelines of the scientific bodies<sup>3–6</sup> or are represented in clinical registries such as DIOCLES.<sup>7</sup>

Nonetheless, when an approximation is made from an epidemiological point of view, ACS can be considered a single entity.<sup>8,9</sup> Indeed, this is the approach taken by Cordero et al<sup>10</sup> in an article published in *Revista Española de Cardiología*.

The authors analyzed the clinical characteristics, treatment, and prognosis of patients admitted for ACS to a single center and in

2 periods differentiated by the implementation of a STEACS care program, henceforth referred to as the infarction code. The first period covered 2 years and included 866 patients, whereas 344 patients were registered in the second period, 1 year after implantation of the infarction code. There were no differences between the groups in age or sex distribution, but there was a difference in risk factors. In the second period, there were more active smokers and a lower proportion of patients with diabetes mellitus, less previous ischemic heart disease (although the authors do not specify the incidence of previous infarction), and less heart failure. In addition, in accordance with this profile, there were more patients with STEACS (39.5% vs 29.8%;  $P < .01$ ), with a worse profile in the acute phase—determined by a Killip class  $\geq$  III—or higher risk—defined by a GRACE risk score  $> 140$ —but with a similar Charlson comorbidity index score. As expected, implementation of the infarction code significantly increased use of primary percutaneous coronary intervention (PCI) (94.9% vs 51.9%;  $P < .01$ ), which reduced the times to coronary angiography and PCI of patients with STEACS, but not those of patients with NSTEMACS; there were also no differences in the revascularization rates. A notable datum is that 90.1% of all patients with ACS underwent PCI after the implementation of the infarction code, an increase from 82.1% in the previous period ( $P < .01$ ), exceptionally high percentages if we consider all patients with ACS. In contrast, the use of surgical revascularization was minimal,  $< 3\%$  in the 2 periods, without statistically significant differences between them. In-hospital mortality was similar in both periods and the variables associated with this event were as expected: revascularization was associated with lower mortality, whereas diabetes mellitus, a history of heart failure, and a GRACE risk score  $> 140$  were associated with higher mortality. There were no differences in 1-year mortality between the 2 periods. Again, the factors significantly associated with higher mortality were age and diabetes mellitus, and the factors associated with lower mortality were revascularization and therapy with angiotensin II receptor antagonists or angiotensin-converting enzyme inhibitors. In the conclusions, the authors state that, after the creation of the STEACS care network, the incidence of this disease increased, with a more severe patient profile, and that primary PCI became routine as a reperfusion therapy, with a reduced length of hospital stay. No changes were observed in mortality in the 1-year follow-up. The

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authors indicate that a health care network created for reperfusion therapy in STEACS patients improved clinical care for ACS in its entire spectrum.

The idea that prompted the authors to approach ACS as a whole might be interesting, but the information obtained would probably have been more useful if they had, in addition to the general data on ACS, broken down the data by STEACS and NSTEMACS groups in the 2 periods.

Of the results presented by the authors, various characteristics stand out that make this registry unique and, thus, mean that the conclusions cannot be extrapolated to other settings. First, the annual admissions rate decreased by 21% after the implementation of the infarction code. Despite this reduction, and in contrast to the tendency of this disease,<sup>8,9</sup> the incidence of STEACS increased by 9.7 percentage points. As noted by the authors, the most plausible explanation for this finding is that, as catheterization was always available and patients were not transferred to another center for primary PCI, the center itself also admitted the most critically-ill patients with STEACS; these patients would not have been treated in the center in the pre-infarction code period. This would explain why the mortality rate was similar in the 2 periods because, even with reduced health care waiting times for all patients, independently of severity, they would be included in the second registry period, avoiding a selection bias. In contrast, the high percentage of PCI performed for all ACS patients and the low use of surgical revascularization indicate a bias in the population studied, due to the characteristics of either the center or the population itself. Indeed, the lack of quality control and poor adherence to the rules established for registries could have increased the risk of a selection bias, one of the main problems of patient registries.<sup>11</sup>

Another interesting point is that the authors did not explain the mechanism for the reduction in mortality from 3.9% to 1.1% ( $P = .05$ ) in high-risk patients with NSTEMACS after infarction code implementation. The authors report that there was no increase in PCI in the patients with NSTEMACS and no reduction in the time to its performance. Therefore, the improved mortality would not be at the expense of an a priori aggressive therapy. Nonetheless, it cannot be ruled out that the higher-risk NSTEMACS patients could have benefited from greater availability of a catheterization laboratory. Regardless, the authors make no specific mention of this possible factor, leaving this hypothesis as mere speculation. Neither is extensive information available on the in-hospital treatment nor the left ventricular ejection fraction at discharge. Information was only provided on the medical therapy at discharge, and there was increased use of dual antiplatelet therapy with second-generation antiplatelet agents, prasugrel and ticagrelor, between the 2 periods, from 2.3% to 43.0%. Finally, the authors indicate that the implementation of the infarction code health care network led to organizational improvements with benefits for all patients with ACS.<sup>10</sup>

There is no doubt that care networks for reperfusion therapy of STEACS have been shown to be effective tools to improve patient prognosis.<sup>12,13</sup> But what actually improves our work in any area of life is application of the wheel of continuous improvement of Edwards Deming, whose basic rules are: a) you cannot improve

what you cannot manage; b) you cannot manage what you cannot measure; c) you cannot measure what you cannot define, and d) you cannot define what you cannot identify. Thus, first, it is necessary to plan by establishing objectives and applying a method. The next step is to carry out the plan, that is, to execute it. At the same time, the results must be checked against the objective and, finally, one must act by applying the necessary corrective measures.<sup>14</sup> Thus, the study by Cordero et al<sup>10</sup> is welcome, as it clearly achieves 3 parts of the Deming cycle: plan, do, and study. All that remains is for the cycle to start again. Our clinical practice should be based on high-quality health care registries.

## CONFLICTS OF INTEREST

None declared.

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