Public Reporting
Small Changes Lead to Minimal Impact
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Public reporting policies have been implemented based, in part, on the belief that hospitals and providers will improve processes of care in response to the awareness of being observed (the Hawthorne effect) while simultaneously assuming that access to care will remain constant. Unfortunately, several reports have emerged, suggesting that public reporting may influence clinical treatment decisions and lead to avoidance of high-risk patients.1–3 Physicians in public reporting environments fear being labeled as negative outliers and express concern that current risk-adjustment models are inadequate to account for patients at the extremes of risk. In response to these concerns, regulators in some states have modified existing public reporting policies by introducing exceptions for uniquely high-risk patients. For example, in 2006, the New York State Department of Public Health began censoring patients with refractory cardiogenic shock from analysis of operator mortality after percutaneous coronary intervention (PCI). This resulted in an increase in rates of coronary angiography and PCI and overall decline in mortality of patients presenting with cardiogenic shock.4 In 2010, New York began censoring patients with cardiac arrest complicated by anoxic brain injury who subsequently died. The impact of this policy change had until now been unstudied.

See Article by Strom et al

In this issue of Circulation: Cardiovascular Interventions, Strom et al5 report their evaluation of the impact of excluding patients with anoxic brain injury after cardiac arrest from analysis of operator PCI mortality in the New York State public report. This retrospective, observational study used administrative claims data from State Inpatient Databases for New York and additional comparator states between 2003 and 2013 to compare rates of coronary angiography, revascularization, and mortality in patients with cardiac arrest after acute myocardial infarction (AMI) before and after introduction of the 2010 exclusion rule. Comparator states were included in the analysis to control for secular trends in management of cardiac arrest patients over the study period. A total of 26,379 patients with AMI and cardiac arrest were included in the analysis. Among all states included in the analysis, there was an observed increase in coronary angiography and PCI after 2010, with a concomitant decline in coronary artery bypass grafting. However, when compared with other states, New York had lower observed adjusted relative rates of coronary angiography and PCI before and after the exclusion rule was introduced. These findings suggest that while there are secular trends toward increased use of PCI (and decreased use of coronary artery bypass grafting) in the treatment of cardiac arrest complicating AMI, the 2010 exclusion rule did not significantly impact rates of revascularization for cardiac arrest patients in New York.

Why did the introduction of an exclusion rule fail to promote increased rates of coronary angiography and PCI among patients with cardiac arrest? There are multiple possibilities, but perhaps most importantly, censoring only those patients with anoxic brain injury after cardiac arrest (rather than all patients with cardiac arrest) focused on an extremely small population of patients. In fact, only 103 patients or 0.07% of all PCI cases between 2010 and 2012 were censored based on this rule, and it may be unlikely that censoring a tiny fraction of high-risk cases would influence the treatment of all patients with AMI and cardiac arrest or assuage several physician concerns regarding the inclusion of high-risk patients in analysis of PCI mortality for public reporting—namely that risk models inadequately adjusts for patients at the extremes of risk, and that being identified as a negative outlier in the public report may have significant professional consequences.

Interestingly, the adjusted relative risk of in-hospital mortality rates among cardiac arrest patients in New York remained lower than comparator states, despite lower rates of coronary angiography and PCI. Several factors may have influenced this observation. The lower adjusted risk of mortality in New York may reflect improved processes of care entirely unrelated to the decision to pursue revascularization. Separately, the clinical impact of acute revascularization in cardiac arrest patients, particularly for those without ST-elevation and those who remain comatose after resuscitation, remains uncertain. While analysis of the Parisian Region Out of Hospital Cardiac Arrest registry suggested that emergent coronary angioplasty after cardiac arrest in patients without postarrest ST-segment elevation is an independent predictor of survival, other observational studies have not corroborated this finding.6 To date, there has been only 1, relatively small, retrospective study specifically examining the impact of angiography on mortality in comatose cardiac arrest patients without ST-elevation, which suggested improved survival with early coronary angiography, but no incremental benefit of early PCI.7 Therefore, whether...
increased rates of angiography and revascularization would have improved mortality in New York is unknown. Finally, it should be noted that the current study was conducted using administrative claims data and relies on accurate hospital coding of clinical comorbidities and events. As with all observational studies, despite multivariate adjustment, the possibility remains that unmeasured differences between groups may confound observed differences in outcomes.

Observational studies of other high-risk conditions have found higher adjusted condition-specific mortality rates in public reporting environments among patients who likely would have benefited from revascularization. The most notable example is in patients with cardiogenic shock after AMI. In a retrospective, propensity-matched analysis of patients with AMI and cardiogenic shock enrolled in the SHOCK registry (Should We Emergently Revascularize Occluded Coronaries for Cardiogenic Shock?), patients in New York were less likely to undergo coronary angiography and PCI and waited significantly longer for coronary artery bypass grafting than non–New York patients. New York residence was independently associated with an increased hazard for in-hospital mortality, a result likely driven by lower rates of revascularization. A separate retrospective observational study of Medicare beneficiaries admitted with AMI between 2002 and 2010 demonstrated that patients in public reporting states were less likely to receive PCI, with the greatest differences observed in patients presenting with ST-segment–elevation myocardial infarction and cardiogenic shock or cardiac arrest. Another analysis used the Nationwide Inpatient Sample to identify 84,121 patients presenting with AMI and demonstrated decreased rates of PCI in public reporting states and higher adjusted in-hospital mortality, driven predominantly by patients who did not receive revascularization. These studies suggest that public reporting may unintentionally lead to avoidance of high-risk patients, who stand to have the greatest individual benefit from angiography and revascularization compared with more stable patient populations.

However, we should be optimistic that broader exclusion rules may have the potential to impact physician behavior and favorably affect condition-specific mortality. In 2006, a physician advisory group in Massachusetts recommended addition of 3 preprocedural features not collected by the National Cardiovascular Data Registry instrument. These included coma on presentation, active hemodynamic support during PCI, and cardiopulmonary resuscitation at PCI initiation, which were used to form a composite compassionation use variable for in-hospital mortality after PCI. Introduction of the compassionate use variable was associated with an adjusted odds ratio of 27.3 for in-hospital death and improved discrimination of the risk-adjusted model for in-hospital mortality. Importantly, introduction of the compassionate use variable was also associated with an observed increase in proportion of patients with cardiogenic shock treated with PCI in Massachusetts, while no concomitant change in rates of coronary artery bypass grafting (for which there was no change in risk prediction methodology) was observed. Separately, in 2006, when New York State excluded patients with refractory cardiogenic shock from the public report, PCI utilization for cardiogenic shock increased with an overall decline in mortality. These data suggest that introduction of additional covariates and censoring extreme risk cases may increase confidence of participating physicians in risk-adjustment methods and improve access to appropriate, high-risk interventions.

In order for public reporting programs to be successful without leading to avoidance of high-risk patients, physicians performing high-risk procedures must have confidence in the adequacy and accuracy of risk-adjustment models. For this to occur, risk-adjustment models must account for severity of illness in extremely sick populations or such groups may need to be censored from analysis of operator PCI mortality. In New York, had the exclusion rule censored all patients with cardiac arrest (as has been advocated by every major governing society in cardiovascular medicine) instead of being restricted only to those patients with anoxic brain injury who subsequently died, the results may have more closely mirrored the observed changes that occurred when New York began censoring patients with cardiogenic shock. This more general exclusion was associated with an increase in utilization of coronary angiography and PCI and a reduction in condition-specific mortality. In addition to modifying current risk prediction models by introducing additional covariates or eliminating the highest-risk patients, we must also reconsider whether mortality is an adequate measure of overall PCI quality. We think that risk-adjusted mortality should be complemented by measures of procedural appropriateness, as well as condition-specific outcomes (not just procedural), to ensure that access to care for high-risk patients is maintained. The potential for public reporting to improve transparency of healthcare quality and improve clinical care compels us to continue refining our strategies to ensure that the benefits are not offset by inadvertent consequences of reporting policies.

Disclosures
None.

References


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