Policy Commentary

Future of the PCI Readmission Metric

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Abstract—Between 2013 and 2014, the Centers for Medicare and Medicaid Services and the National Cardiovascular Data Registry publically reported risk-adjusted 30-day readmission rates after percutaneous coronary intervention (PCI) as a pilot project. A key strength of this public reporting effort included risk adjustment with clinical rather than administrative data. Furthermore, because readmission after PCI is common, expensive, and preventable, this metric has substantial potential to improve quality and value in American cardiology care. Despite this, concerns about the metric exist. For example, few PCI readmissions are caused by procedural complications, limiting the extent to which improved procedural technique can reduce readmissions. Also, similar to other readmission measures, PCI readmission is associated with socioeconomic status and race. Accordingly, the metric may unfairly penalize hospitals that care for underserved patients. Perhaps in the context of these limitations, Centers for Medicare and Medicaid Services has not yet included PCI readmission among metrics that determine Medicare financial penalties. Nevertheless, provider organizations may still wish to focus on this metric to improve value for cardiology patients. PCI readmission is associated with low-risk chest discomfort and patient anxiety. Therefore, patient education, improved triage mechanisms, and improved care coordination offer opportunities to minimize PCI readmissions. Because PCI readmission is common and costly, reducing PCI readmission offers provider organizations a compelling target to improve the quality of care, and also performance in contracts involve shared financial risk. (Circ Cardiovasc Qual Outcomes. 2016;9:186-189. DOI: 10.1161/CIRCOUTCOMES.115.002472.)

Key Words: coronary heart disease ■ Medicare ■ percutaneous coronary intervention ■ quality assessment, healthcare ■ quality improvement ■ risk adjustment

In the summer of 2013, the Centers for Medicare and Medicaid Services and the National Cardiovascular Data Registry began to publically report risk-adjusted 30-day readmission rates after percutaneous coronary intervention (PCI) episodes of care for American hospitals that choose to submit data to the National Cardiovascular Data Registry’s CathPCI registry.1,2 This voluntary initiative followed recognition by the Medicare Payment Advisory Committee that PCI was one of 7 conditions for which readmission accounted for nearly a third of total readmission costs in the United States.3

To measure risk-adjusted readmission rates after PCI, this metric relied on a linkage between administrative data to identify readmissions with registry data to adjust for patient complexity.1 Risk adjustment with registry data was an important and unusual strength of this metric because administrative data intended for billing lack clinical detail important for risk adjustment in coronary artery disease.4 However, relying on registry data allows public reporting only for hospitals participating in this voluntary registry and relied on clinical adjudication in CathPCI, a time-intensive process. This PCI readmission public reporting pilot project was stopped in December 2013, and PCI readmission is not currently subject to national public reporting in the United States. In 2014, the Physician Consortium for Quality Improvement and National Committee for Quality Assurance recognized the importance of 30-day death and readmission measures after PCI, but did not explicitly include either in their list of PCI performance measures.5 In New York state, the Department of Public Health collects data on PCI readmission,6 although the American College of Cardiology has not yet stated whether PCI readmission will be reestablished nationally as a publicly reported measure.7 PCI readmission has received more attention in Europe, with the European Society of Cardiology calling for studies examining the causes of PCI readmission.7

As such, the future of this metric in the United States remains unclear. Overall focus on hospital readmissions in cardiology has been motivated by the idea that prevention of readmissions can both improve quality and reduce costs for cardiology patients. The United States spends far more on health care than any other country. Health expenditures account for 16.9% of GDP, two and a half times the average among countries in the Organization for Economic Cooperation and Development.8 The cost of heart disease in the United States is projected to triple by 20309 and accounts for nearly a third of all Medicare spending and nearly a fifth of total healthcare spending.10
With the intent to improve quality and reduce costs, Section 3025 of the Affordable Care Act of 2010 authorizes the Centers for Medicare and Medicaid Services to implement financial penalties for hospitals with higher risk-standardized readmission rates through the Hospital Readmission Reduction Program (HRRP). Of the first 3 conditions included in the HRRP, 2 were cardiology diagnoses—acute myocardial infarction (AMI) and congestive heart failure (CHF). By contrast, readmissions after PCI without AMI were not included in the HRRP.

**Limitations of the PCI Readmission Performance Metric**

Because the cost of PCI readmission reflects only 5.8% of the cost of total PCI episodes of care, some have argued that focusing on the index PCI may offer more effective opportunities to improve value. Alternative possibilities for cost savings include reducing inappropriate PCI or limiting waste during the index episode of care. Importantly, if compensation for PCI and post-PCI care is aggregated into bundled payments, the small proportion of cost attributable to readmissions may limit provider enthusiasm for focusing on readmissions rather than index episodes of care.

Furthermore, PCI readmission does not appear to relate closely to procedural complications. In particular, a medical record review of 262 early PCI readmissions at Geisinger Medical Center in Danville, Pennsylvania, demonstrated that only 11.9% of readmissions are related to procedural complications. By contrast, 40.2% of early readmissions were considered unrelated to the index admission, including noncardiac chest discomfort. A similar analysis within the Partners Healthcare system in Boston, Massachusetts, demonstrated compatible results with only 6.7% of readmissions related to procedural complications and 38.1% of readmissions for chest discomfort or other symptoms concerning for angina without immediately obvious stent thrombosis. Detailed adjudication of those cases revealed that only 2.6% of those patients with chest discomfort underwent target lesion revascularization (TLR) despite 84.4% of patients undergoing at least one diagnostic procedure during the readmission.

**Lessons From Other Readmission Metrics**

In addition, lessons from all-cause readmissions and readmissions after other episodes of care have raised concerns about readmission metrics generally. For example, hospital readmissions are associated with characteristics of populations, such as mental illness, poor social support, and poverty. In fact, additional patient characteristics not included in the HRRP methodology accounts for nearly half of the probability of readmission for patients between hospitals in the highest and lowest hospital readmission rate quintiles. After exacerbations of chronic obstructive pulmonary disease, readmission is more common among patients eligible for both Medicare and Medicaid, a marker of lower socioeconomic status. Available data on PCI readmission suggest correlations with race and insurance status, with black patients nearly twice as likely to experience hospital readmission. In addition to patient characteristics, hospital characteristics appear to be correlated with readmission. In particular, larger hospital size and safety net status are both correlated with higher readmission rates. The association between readmission rates and both hospital characteristics and patient characteristics may suggest a causal role of social inequity and other factors outside the control of provider organizations.

These associations also suggest that readmission metrics could unfairly punish hospitals that care for socioeconomically vulnerable populations. Withholding reimbursements from these hospitals may in fact worsen the care that vulnerable patients receive. In addition to the concerns about equity and worsening disparities, focusing on readmissions may divert the attention of providers away from other important inpatient quality goals, like safety and survival during the index hospitalization. As such, even if risk-adjusted readmission metrics reflect genuine differences in quality addressable by improvements in care coordination and quality, patients may benefit more from limited financial resources addressing other important quality needs aside from readmission and care transitions.

**Potential to Improve Quality and Value**

Despite all this, focusing on PCI readmission still holds substantial promise for improving value in cardiology care. Just because readmissions are not related to procedural complications does not mean that they are not preventable. The tools to prevent these readmissions, however, must focus more on patient education, access to outpatient care, and attention to medication reconciliation rather than improvements in procedural technique. In fact, nearly half of PCI readmissions are preventable with improved clinical care. Because anxiety is associated with PCI readmission, patient education and reassurance may also reduce readmission rates. Many more may be preventable with improved triage mechanisms when patients return with low-risk chest discomfort. In a variety of settings throughout the United States and Europe, chest discomfort without myocardial infarction is the most common reason for early hospital readmission. Managing these patients in the outpatient setting with better education and anxiety reduction may result in significant cost savings and improvements in patient convenience and satisfaction.

The wide variation in all-hospital 30-day PCI readmission rates in different settings suggests that variation in quality and characteristics of health systems may influence readmission rates. In New York, the PCI readmission rate is 15.6%. In Massachusetts, the rate is 10.4%. In Italy, the rate is 4.7%. This 3-fold difference in readmission rates is not likely attributable to case mix alone. When PCI readmission rates for individual hospitals are risk-adjusted, wide variation in readmission rates persist. In Massachusetts, 8 of 24 hospitals were statistical outliers even after risk adjustment, with 4 hospitals above average and 4 hospitals below average. Nationally, the median readmission rate after PCI in the lowest decile is 8.9% compared with 22.0% in the highest decile. Such variation, including variation that persists after adjustment for case mix, suggests the possibility of variation in quality.

Quality differences and high preventability raise the potential that hospitals could improve readmission rates through postprocedural care. In that context, improving care for this population may mean expanding quality improvement for PCI beyond the technical aspects of the PCI procedure.
The Future of the PCI Readmission Metric

After Medicare included AMI and congestive heart failure in the HRRP, AMI and CHF readmission rates dropped, contributing to a 8% decrease in all-cause readmission rates nationally. As such, for fiscal year 2015, the HRRP was expanded to include readmissions after elective arthroplasty and hospitalizations for chronic obstructive pulmonary disease. More than half of all PCI are performed for indications other than AMI, so the AMI metric alone misses many PCI patients. Excluding these patients from the HRRP, therefore, misses an opportunity to improve care for these patients and improve value in cardiology care. Furthermore, metrics currently in the HRRP only count readmissions for patients discharged alive after an inpatient admission. A notable strength of the PCI metric is that it included patients with both inpatient and observation status during the index PCI. In addition, given the concern about provider organizations manipulating HRRP metrics by designating readmissions as observation episodes of care, metrics for readmission after PCI and other conditions could also consider counting both observation and inpatient episodes of care as readmissions. As such, a refined PCI readmission metric could count observation stays in both the definition of PCI discharges (the metric denominator) and the definition of PCI readmissions (the metric numerator). Also, although registry data risk adjustment was a notable strength of the National Cardiovascular Data Registry–Centers for Medicare and Medicaid Services PCI readmission metric, a risk-adjustment methodology based on administrative data would facilitate application to all American PCI-capable hospitals and would facilitate broader adoption.

If the HRRP is eventually expanded to include PCI, the association of PCI readmission with patient characteristics, including race and socioeconomic status, deserves substantial scrutiny. As with readmissions for other disease conditions, the optimal policy response to these disparities is unclear and depends on the cause of the disparities. If disparities are related to lower-quality hospitals serving marginalized patients, then financial penalties may improve the care these patients receive. However, if the disparities are related to structural social problems, financial penalties could exacerbate disparities. A robust research agenda to understand the underlying causes of disparities in readmission rates is essential, both for PCI readmission and for the conditions currently included in the HRRP. Until we understand why disparities are associated with readmission rates, adding socioeconomic status to the risk-adjustment methodology may help mitigate unintended consequences for vulnerable patients and the hospitals that serve them.

Even if the HRRP is not expanded to include non-AMI PCI patients, provider organizations may have additional motivations to track and target PCI readmissions. Many provider organizations are currently incentivized to minimize overall health spending through accountable care organization contracts. Cardiology care is a major focus of accountable care organizations. Because PCI readmissions are costly, potentially preventable, and can reduce availability of hospital beds, provider organizations may improve quality and performance in accountable care organization contracts by reducing PCI readmissions.

Conclusions

Although PCI readmissions are costly and preventable, the substantial population of non-AMI PCI patients has not yet been targeted for Medicare financial penalties through the HRRP. Provider organizations may still wish to focus on preventable PCI readmissions because of contracts that focus on quality and cost. Understanding the association of demographic and social factors with PCI readmission and other readmissions is essential to improving equity and reducing disparities in health outcomes. Including socioeconomic status in administrative risk-adjustment models for PCI and other conditions may minimize unintended consequences. Despite these limitations, reducing PCI readmissions still offers an opportunity to improve value in cardiology care nationally.

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