Should We Care About Short-Term Readmissions After Percutaneous Coronary Intervention?

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Since the publication of the landmark analysis in 2009 by Jencks et al[1] demonstrating that one sixth of Medicare beneficiaries were readmitted within 30 days after hospitalization, accounting for billions of dollars in potentially preventable expenditures, reducing unplanned early rehospitalization has become a national priority.[2] With the passage of the Affordable Care Act in 2010, the Centers for Medicare and Medicaid Services established the Hospital Readmissions Reduction Program, which incentivizes hospitals to curtail readmissions by penalizing those with excess 30-day readmission rates after index hospitalizations involving acute myocardial infarction, congestive heart failure, or pneumonia.[3,4] The payment incentives were subsequently expanded in 2014 to include patients admitted with acute exacerbation of chronic obstructive pulmonary disease, total hip, or total knee arthroplasty and subsequently in 2015 to include patients admitted for coronary artery bypass grafting.[4] Although the program has resulted in a decline in hospital readmissions among Medicare beneficiaries,[5–7] there continues to be ongoing debate about the impact of hospital incentives for readmission reduction on overall patient outcomes, including mortality.[8,9]

See Article by Tripathi et al

Although readmissions after percutaneous coronary intervention (PCI) were not initially considered for measurement by the Hospital Readmissions Reduction Program, the recognition that PCI was 1 of 7 procedures accounting for a third of overall readmission costs with substantial variation between hospitals[1] led the Centers for Medicare and Medicaid Services in 2013 to initiate voluntary reporting of risk-standardized readmission rates for National Cardiovascular Data Registry CathPCI registry participating hospitals as part of a pilot program.[10] Although a hospital's readmission rates were determined from Medicare fee-for-service claims, patient demographics and clinical variables were obtained by linkage to the CathPCI registry, a process that enabled more refined risk adjustment but precluded extension of the program to hospitals not participating in the registry.[10,11] Perhaps related to the inability to comprehensively implement this program nationally and evidence that readmissions after PCI appeared to be mostly unrelated to procedural quality,[12–14] the pilot reporting program ended in December 2013, and the PCI readmission metric has not been adopted by the Hospital Readmissions Reduction Program at this time.[11] Although individual states continue to collect data on PCI readmission,[15] the status of PCI readmissions for hospital performance benchmarking remains uncertain. Furthermore, national data on rates and causes of PCI readmissions beyond Medicare beneficiaries are limited.

Use of Administrative Data to Study Readmissions

It is in this context that Tripathi et al[16], in this issue of *Circulation: Cardiovascular Interventions*, present their current analysis of national rates and costs of readmission after PCI. Their well-constructed analysis included 206 869 hospitalized patients surviving to hospital discharge after receiving PCI in 2013 included in the Healthcare Cost and Utilization Project Nationwide Readmissions Database, a data set that contains discharge information from 22 geographically disparate states and accounting for nearly half of all US hospitalizations.[17] The authors primary findings were (1) 30-day readmission rates occurred after 12% of PCI discharges, with significant variation in rates among hospitals, (2) mean 30-day hospitalization costs (as determined by third party payments) were $17 576 higher for procedures that ultimately resulted in readmission compared with those not resulting in readmission, and (3) nonspecific chest pain was the primary reason for rehospitalization in 24% of patients after PCI.[16]

Although the Nationwide Readmissions Database presents a unique and novel opportunity to study the rates and causes of readmissions across a spectrum of age, geography, and insurance type, there are several important caveats for interpreting the results of research generated from it. First, the study population only included those patients who were deemed inpatients during their PCI hospitalization.[16] As a majority of elective PCIs in the United States now occur electively in the outpatient setting,[18] these findings represent a subgroup that are likely to be higher risk and are enriched for acute coronary syndrome patients compared with the general PCI population.[17] Second, the wide degree of variation in unadjusted hospital readmission rates after PCI (ranging from 6% to 17%) may in part reflect differences in hospital case mix, including mix of inpatient versus outpatient procedural volumes.[16]

PCI Readmissions as a Hospital Quality Metric

Despite some limitations,[19,20] administrative data represent an important source of nationally representative data, and

The opinions expressed in this article are not necessarily those of the editors or of the American Heart Association.

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(*Circ Cardiovasc Interv*. 2017;10:e006123. DOI: 10.1161/CIRCINTERVENTIONS.117.006123.)

***Circ Cardiovasc Interv* is available at http://circinterventions.ahajournals.org**

DOI: 10.1161/CIRCINTERVENTIONS.117.006123

the current study by Tripathi et al[16] adds to existing local and regional findings suggesting high rates of PCI readmissions on a national level. Prior studies have varied in the estimated rates of PCI readmissions, ranging from 4.7% in Italy[21] to 15.6% in New York.[15] In addition, even after risk adjustment, wide variation in readmission rates exists between hospitals.[12] Nationally, the observed variation in median readmission rates in the National Cardiovascular Data Registry CathPCI database, ranging from 8.9% in the lowest decile to 22% in the highest decile, persisting despite adjustment for case mix, may imply variation in hospital quality and formed the basis for the Hospital Readmissions Reduction Program pilot program to study PCI readmissions in 2013.[11] Prior data from PCI-performing hospitals in Massachusetts have suggested that nearly 90% of the observed interhospital variation is because of unmeasured differences in pre- and postprocedural factors, rather than measureable differences in hospital quality of care.[12]

A broader question is the role of PCI readmissions overall as a hospital quality metric. First, as the cumulative cost of PCI readmissions only represents 5.8% of the cumulative costs of all PCI episodes of care,[22] efforts to reduce costs for the index hospitalization may produce a more substantial cost reduction. Second, complications of the initial PCI represent a small proportion of reasons for readmission.[13,23,24] Prior data from PCI-performing hospitals in Massachusetts have suggested that nearly 90% of the observed interhospital variation is because of unmeasured differences in pre- and postprocedural factors, rather than differences in complication rates or other PCI quality measures.[12] In a medical chart review of 262 readmissions after PCI at Geisinger Medical Center in Danville, Pennsylvania, only 11.9% of readmissions were related to procedural complications[13] and in a similar analysis at Partners Healthcare in Boston, Massachusetts, only 6.7% of readmissions were because of procedural complications, with only 2.6% undergoing target lesion revascularization despite high rates of testing in this group.[14] In the study by Tripathi et al,[16] procedural complications only accounted for 7% of all PCI readmissions, similar to these prior studies. The most common diagnosis associated with readmission was nonspecific chest pain (24%) which echoes findings from other analyses suggesting between 38.2% and 40.2% of early admissions were for nonspecific chest discomfort and anxiety.[13,23] Tripathi et al[16] demonstrate overall low rates of PCI (13%), coronary artery bypass grafting (2%), and in-hospital mortality (3%) in individuals readmitted with PCI suggesting that chest pain after PCI is generally low risk. Despite this, however, the anxiety on behalf of patients and providers associated with chest pain after PCI frequently results in further diagnostic testing and readmission, which may in part drive the high costs for readmissions observed in the current study.[14,23,25]

What Can Be Done About Readmissions After PCI?

Whatever the reasons for rehospitalization, PCI readmissions in many cases can be prevented.[14] As social factors such as homelessness and psychological factors such as anxiety are associated with readmission after PCI,[25] improved counseling and appropriately resourced discharge planning may reduce recurrent presentation to the hospital. Similarly, as low-risk chest pain is often the presentation leading to readmission after PCI,[13,14,23,24] improved triage of post-PCI patients to identify the appropriate diagnostic and treatment pathway for these individuals may hasten evaluation and lead to safe discharge from the emergency department. Tanguturi et al[26] demonstrated that a multidimensional approach toward readmission reduction using a validated questionnaire to identify patients at high risk for readmission after PCI with subsequent targeted interventions in this group resulted in an absolute decline in readmissions from 9.6% to 5.3% over a 4-year period at 1 institution.[26] A discharge checklist was used to ensure that high-risk patients had the appropriate discharge medications and close follow-up.[26] These higher risk patients were additionally shown educational videos on chest discomfort and heart failure, and on re-presentation to the emergency room, their outpatient cardiologist was notified electronically with early cardiology assessment encouraged, and triage decisions made according to a risk stratification algorithm developed.[26] Thus, multidimensional targeted approaches may be successful at reducing readmission in this population.

Last, although recently observed inverse associations between heart failure readmissions and mortality have increased skepticism on the role of readmissions as a benchmarking strategy, the totality of evidence support the notion that chest pain after PCI is generally of low risk for in-hospital mortality and thus unlikely to reproduce the results that have been hypothesized in the heart failure population.[27]

Conclusions

There is now a well-formed literature base suggesting that readmissions after PCI are common and associated with high costs and low in-hospital mortality. Whether or not readmissions after PCI reflect hospital quality and should be used as a performance metric remains debatable. Nevertheless, the high and potentially preventable costs of these readmissions cannot be ignored. Further efforts to both implement and evaluate strategies to reduce these readmissions could significantly improve the value of care delivered to PCI patients, reducing unnecessary hospitalizations and lowering healthcare costs.

Sources of Funding

Dr Yeh is funded by a grant from the National, Heart, Lung, and Blood Institute (1RO1HL136708-01). Dr Yeh reports additional grant support from Boston Scientific and Abiomed, and consulting fees from Abbott, Medtronic, and Teleflex, outside the submitted work.

Disclosures

None.

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KEY WORDS: Editorials ■ acute coronary syndrome ■ benchmarking ■ inpatient ■ Medicare ■ myocardial infarction

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Circ Cardiovasc Interv. 2017;10:
doi: 10.1161/CIRCINTERVENTIONS.117.006123
Circulation: Cardiovascular Interventions is published by the American Heart Association, 7272 Greenville Avenue, Dallas, TX 75231

Print ISSN: 1941-7640. Online ISSN: 1941-7632