Rising Rates of Cardiac Procedures in the United States and Canada
Too Much of a Good Thing?

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Publicly funded Medicare programs in the United States and Canada face daunting fiscal challenges in the decades ahead. Since 1965, the US Medicare program has provided access to physicians and hospitals for elderly Americans, and the Canadian Medicare program has provided similar coverage for Canadians of all ages since 1967. Paying for growing numbers of enrollees in these Medicare programs to receive effective but expensive tests and treatments has begun to strain government budgets and the tax systems that support them.

The stakes are particularly high for patients with coronary heart disease (CHD). As a leading cause of mortality and morbidity in both countries, CHD remains a fertile field of innovation to improve health outcomes. If new tests and treatments are used indiscriminately, however, their impact may be minimal for many patients, deleterious for some patients, and costly for society.

Two studies in this issue of Circulation document the dramatic rise in cardiac procedures since 1992 in the United States and Canada, respectively. Each of these studies used claims data from its Medicare program to assess rates of acute myocardial infarction (AMI) and cardiac procedures through 2001 and to estimate the diagnostic “yield” of stress tests and cardiac catheterizations that led to subsequent procedures. The US study included all elderly adults receiving fee-for-service care in the US Medicare program, and the Canadian study included adults of all ages residing in Ontario.

In both countries, increases in procedure rates over time were most pronounced for stress imaging studies, cardiac catheterizations, and coronary angioplasty, whereas rates of AMI as a marker of CHD prevalence were relatively constant. By 2001, cardiac procedure rates for elderly patients in Ontario approached but did not yet exceed the corresponding rates for elderly patients in the United States during 1993. As the Canadian authors observed, these differences closely paralleled the much greater availability of cardiologists and catheterization facilities in the United States. However, as they also noted, the comparable rates of increase in procedure rates in these 2 very different healthcare systems suggest that the availability of cardiac procedures and physicians’ willingness to recommend them are expanding at a similar pace in both countries.

Despite much higher US rates of cardiac catheterization, the proportions of patients proceeding to revascularization procedures in the US and Ontario were remarkably similar (50% versus 46%). This finding was consistent with prior research showing that identical proportions of AMI patients catheterized in each country were found to have left main or 3-vessel coronary disease. The Canadian study also found that relatively small proportions (2% to 4%) of invasive cardiac procedures were performed on patients in the last 6 months of life.

Each study also provided useful insights about sociodemographic variations in care over time. In the United States, where concerns about racial and gender disparities are paramount, cardiac procedure rates for white men remained substantially higher than for white women, black women, and black men, despite rising rates in all 4 groups. In Ontario, where procedure rates were analyzed by age, gender, and income but not race, these rates rose more rapidly among elderly patients and women, whereas increases were relatively similar among patients from areas with lower and higher average incomes.

A distinctive feature of the US study was the analysis of patients undergoing coronary angioplasty who received coronary stents. As this proportion rose from 0% in 1994 to >80% in 2001, the proportion of patients requiring another angioplasty within 6 months fell substantially, from ~25% to <15%. If falling restenosis rates were associated with better relief of cardiac symptoms and reduced risks of repeated procedures, then many patients may have experienced improved quality of life and possibly improved survival. In conjunction with wider use of coronary angioplasty and stenting, rates of coronary artery bypass graft (CABG) surgery in the United States peaked in 1997 and fell nearly 10% by 2001.

With financial data from a single-payer insurance system, the Canadian study reported that the total costs of noninvasive and invasive cardiac procedures nearly doubled in Ontario from 1992 to 2001. This finding led Alter et al to conclude that rising cardiac procedure rates and costs “challenge the sustainability of Medicare in Canada.” On the basis of the much higher US cardiac procedure rates reported by

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Lucas et al,1 a similar inference could presumably be drawn for the Medicare program in the United States.

Insights from these 2 studies about the rising volume of cardiac procedures can certainly inform the Medicare policy debate in each country. However, the common and costly nature of cardiac procedures described in these studies addresses only 1 aspect of the most important policy question that must be answered: What is the value of these procedures to individual patients and society? To understand whether the benefits of the procedures justify their costs, both individually and in aggregate, it is essential to consider the appropriateness and outcomes of cardiac procedures.

In an economic analysis of changing treatments for AMI among US Medicare beneficiaries from 1984 to 1998, costs of treatment increased nearly $10 000 per patient, but elderly patients also experienced a 1-year gain in average post-MI survival over this time period. This survival benefit was estimated to be worth $70 000, far exceeding the rising cost.6 As long as taxpayers value these health benefits and the US and Canadian economies are growing, rising healthcare expenditures for effective medical services can be sustained while other sectors of the economy continue to grow.7

Two recent US studies of geographic variations in the treatment and long-term outcomes of MI shed light on the relative value of cardiac procedures and medications. In one study, areas with the highest rates of both cardiac catheterization (as a marker for invasive treatments) and β-blocker use (as a marker for medical treatments) among eligible elderly patients had a 6.2% reduction in absolute mortality rates at 7 years.5 The survival benefit associated with greater use of cardiac catheterization was evident mainly in areas with low rates of β-blocker use, whereas the survival benefit associated with greater use of β-blockers was present regardless of the corresponding rates of cardiac catheterization in local areas. Another study demonstrated better AMI outcomes in New England despite lower rates of invasive cardiac procedures relative to other areas of the United States.9,10 Much of this regional survival benefit in New England was attributable to greater use of β-blockers.

A third recent study compared long-term outcomes of MI among US and Canadian participants in the Global Utilization of Streptokinase and t-PA for Occluded Coronary Arteries (GUSTO-1) trial.11 Much higher rates of invasive cardiac procedures in the United States than in Canada—mirroring the higher US procedure rates reported in this issue of Circulation1—were associated with a significant reduction in risk-adjusted mortality rates at 5 years in the United States relative to Canada (19.6% versus 21.4%). This survival benefit was substantially greater than at 1 year.12 Greater use of coronary angioplasty and CABG surgery during initial AMI hospitalizations in the United States explained all of the difference statistically in long-term survival between US and Canadian patients.

Much of the observed benefit of coronary revascularization procedures for appropriate patients results from improved myocardial perfusion and function. These benefits are particularly apparent when primary angioplasty is provided to appropriate patients with AMI13 or when CABG surgery is provided to patients with multivessel coronary disease and diabetes mellitus.14 Some of the benefits related to coronary revascularization procedures are achieved through greater associated use of antiplatelet agents, β-blockers, lipid-lowering medications, smoking cessation, and cardiac rehabilitation programs. Furthermore, when patients undergo revascularization procedures, cardiologists typically work more closely with patients and their primary care physicians, and this ongoing collaboration may also improve survival.15

In the ideal healthcare system envisioned by the US Institute of Medicine, all appropriate patients (for whom the marginal health benefits of procedures exceed their marginal risks) would receive cardiac procedures in a safe and timely manner.16 Waste would be minimized and efficiency would be maximized by ensuring that patients who are unlikely to benefit substantially from these procedures are not subjected to them. Moreover, decisions about clinical appropriateness would always be equitable, without explicit or implicit bias related to the patient’s race, ethnicity, gender, age, or socioeconomic position.

To strive for this ideal in cardiac care, healthcare researchers and practicing cardiologists must play leading roles in developing, interpreting, and applying the evidence needed to decide which patients are most likely to benefit from cardiac procedures. Radionuclide imaging studies, for example, can play a critical role in assessing ischemia for patients with specific ECG abnormalities or risk factors such as diabetes mellitus.17 However, the findings of Lucas et al1 indicate that the use of radionuclide imaging with stress tests in the United States has become much less focused in recent years. As overall rates of stress testing in the US Medicare population doubled from 1993 to 2001, the proportion of tests performed with radionuclide imaging increased from 50% to >80%.1 The corresponding fraction of stress tests performed with radionuclide imaging in Canada rose from one third to one half.2 The nearly 3-fold absolute rise in US rates of radionuclide imaging suggests that these imaging studies have become the standard of clinical practice without clear evidence to support their routine use in place of exercise tests without radionuclide imaging.

To address concerns about suboptimal resource allocation and clinical value in the US healthcare system, numerous payers are beginning to implement financial incentives to promote high-quality and efficient care, commonly described as “pay-for-performance” tools. Early versions of these tools have focused on underuse of basic primary care services in managed care plans18 and of medications and noninvasive tests provided to hospitalized patients in the Medicare program.19 The next generation of pay-for-performance measures may address more expensive components of specialty care, such as potential overuse of cardiac procedures, across a wider range of private and public insurance programs.

Although much remains to be learned about how physicians respond to pay-for-performance measures, these measures provide an important opportunity to reward more appropriate and cost-effective care. The current US and Canadian healthcare systems pay for cardiac procedures regardless of their appropriateness. New payment models should be developed to pay physicians more for providing clearly appropriate procedures and substantially less for
procedures of limited value. The Medicare programs in the US and Canada could play a leading role in implementing and evaluating financial and nonfinancial incentives for physicians to provide this optimal care. Physicians and healthcare organizations that are well equipped with effective information systems to monitor and document the appropriate use of cardiac procedures and to improve their care accordingly will most likely thrive under these new payment models.20

Recent studies of AMI outcomes suggest that rising rates of cardiac procedures in the United States and Canada must be interpreted carefully. The amounts that public and private purchasers are willing and able to spend on health care will remain an active subject of broader political and economic debate. While this debate continues, physicians in both countries will have an increasing responsibility to ensure that expensive cardiac procedures are used effectively and efficiently to maximize their value for improving health.

Disclosures

None.

References


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