The value of measuring value

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In this issue of the *Journal of Thoracic and Cardiovascular Surgery*, Ghanta and colleagues¹ report a retrospective analysis with a multi-institutional statewide Society of Thoracic Surgeons cardiac surgical database comparing outcomes and cost in propensity-matched cohorts of patients undergoing aortic valve replacement (AVR) through a full sternotomy and those undergoing mini-AVR through a partial sternotomy or limited thoracotomy incision. The propensity-matched patients had similar characteristics and outcomes, with fewer transfusions, a higher rate of discharge by 4 days, and lower costs for the patients undergoing mini-AVR. Ghanta and colleagues¹ conclude that these “real life” data suggest equivalence in outcome, along with the noted advantages for patients undergoing AVR through a smaller incision.

Measurement of cost and outcome, the determinants of “value” in health care, is assuming increasing importance in the evaluation of all medical interventions, especially those surgical procedures done frequently and at higher cost. The analysis reported in this article is thus timely and relevant. It is important to recognize that Ghanta and colleagues¹ used hospital-specific cost-to-charge ratios in the calculation of hospital costs. This methodology applies a single institutional factor (the cost-to-charge ratio) that, when multiplied by the charges billed to the patient, provides an estimate of the cost of the services provided. This method of estimating costs has some obvious limitations. It makes the assumption that the relevant ratio is constant across various departments within a single hospital, a premise that almost certainly is not true. Ghanta and colleagues¹ did correctly use different cost-to-charge ratios for each of the participating hospitals. Individual hospitals may have widely disparate charges, which do not necessarily correspond to similar differences in cost. Had Ghanta and colleagues used a single cost-to-charge ratio applied to all of the hospitals in the study, this might have skewed the data significantly.

A better but more labor-intensive way to assess costs is to measure them with a technique known as *activity-based costing*. In activity-based costing, every service, every test, every encounter with a caregiver (nurse, physical therapist, etc) is assigned a unit cost. The cost of a patient encounter is calculated by estimating the number of units of service

and then multiplying by the unit cost for service. This method is demanding of resources but has the potential to become the most accurate and therefore the preferred way to determine the costs of medical services. Its implementation may be facilitated by the ever increasing functionality of electronic medical records. Along with improvements in quantitative measures of quality, enhancements in estimates of cost will provide more accurate, reliable, and comparable measures of the value (quality divided by cost) of health care services.

In their study, Ghanta and colleagues¹ included but did not separately analyze patients undergoing AVR through a minithoracotomy. This surgical approach was used in a relatively small minority of the patients who may have differed from those patients who had surgery through a partial sternotomy. Should these differences turn out to be significant, this might diminish the persuasiveness of the results. Specifically, what might be the conclusions of this research were these patients to be excluded or analyzed separately?

The propensity model reported deserves comment. In the matching procedure, Ghanta and colleagues¹ included only 3 clinical factors: the Society of Thoracic Surgeons predicted rate of mortality score, the operative year, and the surgeon who performed the procedure. This resulted in matching only 65% of possible matches. Anomalously, the matched patients had more heart failure, fewer patients in New York Heart Association functional class III or IV, and fewer patients with chronic obstructive pulmonary disease than either unmatched group. This suggests a potential systematic problem with the calculation of the propensity score, which could be related to the 35% of patients not matched. It also may have biased the results. It therefore might be of interest to redo the matching procedure including more of the available clinical variables in the calculation of the propensity score.

The approach reported in this article is a model, although perhaps an early version, of the kinds of analyses that increasingly will be required for the evaluation of the services provided by all health care providers, not only cardiothoracic surgeons. It is worth remembering, however, that our specialty has led the development of tools (the clinical database, for example) that have provided the opportunity to assess the benefits and the clinical costs of the operations we surgeons do on patients with diseases of the chest. As the ability to assess costs improves and with the increasing availability of other databases, which provide measures of outcome, cardiothoracic surgeons again likely will play leadership roles in refining the tools we use to assess the value of the services that we offer to those who come to us in need.

Reference

1. Ghanta RK, Lapar DJ, Kern JA, Kron IL, Speir AM, Fonner E Jr, et al. Minimally invasive aortic valve replacement provides equivalent outcomes at reduced cost compared with conventional aortic valve replacement: A real-world multi-institutional analysis. *J Thorac Cardiovasc Surg*. 2015;149:1060-5.

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