Measuring Outcomes for Neurosurgical Procedures

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KEYWORDS

• Clinical outcomes • Measuring quality • Outcome assessment • Complication rates • Outcome

KEY POINTS

- Outcomes must be measured before they can be improved.
- Improving outcomes involves understanding current levels of performance, identifying areas in need of potential improvement, initiating changes in clinical care provided, and finally, measuring the change in performance achieved.
- Secondary data (like claims data) can be used to somewhat track outcomes and quality, although there are significant problems with data validity and completeness.
- Primary data are the most accurate source of outcomes data, but require a large investment in time and money, are subject to reporter bias, and are prone to privacy concerns.

INTRODUCTION

Surgical procedures account for a large portion of health care expenditures. As such, their cost and indications have come under scrutiny at a policy level as well as on the news media. Studies of the effectiveness and efficacy of surgical interventions have been argued to be necessary in accurately assessing surgical outcomes and potentially avoiding preventable complications as it has been shown in other aspects of medical inpatient care.[1–4] The Centers for Medicare and Medicaid Services (CMS) has in the past initiated a program for the assessment of hospital performance in measures of care (www.hospitalcompare.hhs.gov), but no such programs yet exist for the assessment of surgical care provided.

Measuring surgical outcomes has been indirectly associated with improving outcomes of care. A focus on outcomes is advocated as the best way to improve outcomes. Such a process involves understanding current levels of performance, identifying areas in need of potential improvement, initiating changes in clinical care provided, and finally, measuring the change in performance achieved, a cycle that has been argued to be a powerful ally in the quest of improving quality of care.

The recent explosion of Web sites dedicated to the assessment of purported physician quality indicates an increasing public interest in the quality of their physician of choice. As most of these Internet sources rely on haphazard and potentially inaccurate data, misinformation abounds. To date, however, the lack of any official data sanctioned by the CMS, private payers, or physician professional societies has allowed for a gap of available information, often fulfilled by subpar surrogate venues.

The recently implemented Affordable Care Act promises a focus on quality and accountability of care. Although these have been concepts traditionally embedded in medical and surgical practice, few attempts have been made in quantifying those parameters as they related directly to

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surgical procedures, in general, and neurosurgical procedures, in particular, outside the realm of research.[5,6]

Part of the difficulty in addressing quality of surgical care is the absence of a universally agreed on definition for quality. In addition, for any definition of quality used, there are limited instruments to accurately and reproducibly measure it. Although the neurosurgical literature is replete with disease-specific outcome studies using narrowly applicable scales, a more generic methodology that can be used uniformly to assess surgical outcomes does not exist.[7–11]

In this article, the important components of such a process are presented, and the possible application of a quality assessment initiative in the clinical setting is discussed. The article draws from the experience of a large similar process carried out at Mayfield Clinic and the University of Cincinnati's Department of Neurosurgery that was designed, was implemented over the past decade, and has been reported elsewhere.[5] This process has been shown to accurately record procedure-specific and disease-specific outcomes following surgical intervention in a large mixed academic and private practice setting, incorporating the entire gamut of neurosurgical interventions, both cranial and spinal.

DISCUSSION

The lack of a universally accepted definition for quality of surgical care has led to the use of several surrogates for quality, including population-derived/patient-centered data (rates of mortality, rates of major postoperative complications, and rates of type of discharge disposition as well as length of stay) and systemic indicators (data extracted from deidentified databases related to inpatient diagnoses, malpractice claims, as well as adherence to accepted standards).[12–14] Such data, although not traceable to individual patients, are nonetheless powerful because they are derived from large cohorts of patients with specific diagnoses or having undergone specific procedures.[15–17] Much of the early clinical outcomes work was performed analyzing such data.

As powerful and relatively accessible secondary data as they may be, there are several limitations that are associated with their analysis. Deidentified data that, in general, populate such databases do not allow for careful analysis of individual patient charts to assess comorbidities, additional information, or auditing of the accuracy of the data. Databases that are based on coding data are susceptible to inaccurate coding, particularly of secondary diagnoses, because the primary providers are rarely the people responsible for the coding. The almost universal adoption of electronic medical records (EMR) in most clinical settings promises to reduce the inaccuracies of coding and transcribing, but such potential benefits in studying clinical outcomes remain still unproven.

Systemic indexes, usually related to adherence to certain processes found to be effective in clinical settings, are another standard that can be used in a fairly straightforward way to assess quality of care. There have been several early data related to processes resulting in the CMS process of hospital performance evaluation (www.hospitalcompare.hhs.gov). Nonetheless, a study by Nicholas and colleagues[18] assessing the accuracy of outcomes reporting in 2000 US hospitals found a low correlation between rates of compliance with CMS preoperative process of care and perioperative outcomes.

With all the limitations of analysis of secondary data, the importance of assessing primary clinical data becomes evident. However, before the components of such an analysis are addressed, the limitations of primary outcome data study should be discussed. Primary data can be difficult to measure accurately (eg, reported postoperative pain levels), may have limited clinical utility and relevance (eg, mortality rates for most neurosurgical procedures), can be prohibitively time-consuming in their collection (eg, postoperative neuropsychological testing), are overwhelmingly operator-dependent (eg, radiologic determination of bony fusion), are often multifactorial and potentially biased by unknowable factors (eg, return to work date depending on patient social circumstances and potential for secondary gains), and are difficult to manage in a secure way that ensures against breaches of patient privacy.

Lessons from the design and implementation of an organization-wide quality improvement process that Mayfield Clinic and the Department of Neurosurgery at the University of Cincinnati undertook over a period of several years are discussed. In doing so, it is hoped that the important components of such a process are assessed and lessons learned throughout the design, trial, and implementation course of the project are shared. As the practice setting is a large mixed academic and private practice environment with more than 5000 neurosurgical procedures spanning the spectrum of cranial and spinal surgery, it is likely that parts of the authors' experience will be applicable to most neurosurgical settings.