Improving safety for surgical patients: Suggested strategies

by Paul F. Nora, MD, PhD, FACS,
Chicago, IL

Since Ernest A. Codman's seminal work in 1908 on the classification of errors that cause adverse surgical outcomes, some members of the surgical community have been active in the areas of risk reduction and patient safety.[1] Subsequently, surgical leaders such as Scudder in trauma and Cullen in cancer began stressing the importance of reviewing patient records as a method of evaluating care. The initiation by the American College of Surgeons (ACS) of the hospital standardization program—the forerunner of the Joint Commission on Accreditation of Healthcare Organizations (JCAHO)—in 1918 was the beginning of defined attempts to make quality a goal in treating the hospitalized patient.[2]

The surgical community has continually engaged in the development of improvements to those areas of patient care where risk reduction can be accomplished without compromising the delivery of highly technical care.

Definitions

In this discussion, the author will use the definition of patient safety set forth by the National Patient Safety Foundation: "Patient safety is the avoidance, prevention, and amelioration of adverse outcomes or injury stemming from a process of care."

The following definitions of related terms are derived from the Institute of Medicine (IOM) report[3] and the report of the Quality Interagency Coordination (QuIC) task force.[4]

- An *adverse event* is an injury caused during medical management that results in measurable disability.
- A *preventable adverse event* is an adverse event that is attributable to error.
- A *medical error* is an adverse event or near miss that is preventable with the current state of medical knowledge.
- A *system* is a regularly interacting or interdependent group of items forming a unified whole.
- A *systems error* is an error that is not the result of an individual's actions, but the predictable outcome of a series of actions and factors that comprise a diagnostic or treatment process.

Safety is a critical component of quality. From the patient's perspective, the first domain of quality refers to "freedom from accidental injury."

Discussion

The introduction of several disciplines—such as systems analysis, ergonomics, and the cognitive sciences—has caused the medical community to rethink some of our more traditional approaches to managing errors in medical care delivery.[5] The application of a systems approach is not new to personnel working in the operating room and critical care units. Indeed, anesthesiologists have been at the forefront of a systems approach for patient safety, and the second edition of the *Patient safety manual*—published by the ACS in 1985—stresses the importance of a systems approach, including the key element of accountability.

In the perioperative arena, a systems-based approach to analyzing errors has been readily applied. Regardless of whether one thinks of the operating room as a system or as a subsystem, the patient assumes that the surgeon or physician performing the intervention is technically competent. Given patients' high expectations, ensuring the competency of any physicians performing a procedure is a fundamental component of system accountability.

The primary concern that has been emphasized by the surgical hierarchy is the development and maintenance of competence, both cognitive and technical. Most of the approved surgical training programs have invested significant resources in *surgical skills* programs. Hands-on continuing medical education courses, emphasizing surgical skills for practicing surgeons, are offered by the various surgical specialty societies, medical schools, and other educational groups.

Recertification of surgeons for competence in their various specialties by the surgical boards should be ongoing. The surgical boards face a unique problem in testing for technical competence. Unlike the simulation model for anesthesia, the application of simulation for measuring surgical technical competence is difficult and may take many years to develop.

The American Board of Medical Specialties (ABMS) has been in the forefront of the concept of measuring competencies continuously during the span of a physician's professional career. Most people in the field of recertification support the view that review of outcomes with risk adjustment is a useful tool in evaluating performance. It is even more valuable when outcomes assessment is based on a focus area—such as a carotid endarterectomy (CEA). At the same time, defects in system (institutional) competence can affect the assessment of outcomes. Nonetheless, the use of outcomes measures for study and analysis can be helpful. Presently, the American Board of Surgery has used the adequacy of clinical practice characteristics with appropriate risk adjustment as a surrogate for help in evaluating competence in the recertification process.

Because of the inherent problems in measuring surgical competence, particularly technical ability, initial and subsequent credentialing is very important. Therefore, the hospital staff leadership, with input from peers, must carefully scrutinize surgeons when awarding surgical privileges. Because of limited resources, enlisting the aid of retired surgeons to assist voluntarily with peer review may be an option. The granting of surgical privileges on a biennial basis should include monitoring the

activities of all members of the surgical department through the use of mortality/morbidity conferences, clinical indicators, and any other activity that may fall under the category of continuing quality improvement. This must be an ongoing activity.[6,7]

When new technology is developed and physicians seek to use it, organizations such as the ACS have formulated guidelines[8] for (1) issues to be considered before new technologies are applied to the surgical patients, and (2) evaluation of credentials of individuals for the purpose of awarding surgical privileges in new technology.[9]

Another serious concern for the safety of the patient is recognition of the impaired physician by the leadership in the hospital. A monograph published by the ACS may be of use in staff deliberations regarding this issue.[10]

A program that has been exemplary in the area of quality improvement is the collaborative project from the Veterans Administration called the National Surgical Quality Improvement Project.[11] The outcomes data from 123 medical centers are analyzed and compared in an effort to improve quality. Key to the success of this program has been appropriate risk adjustment and extensive feedback.

Quality improvement cooperative studies, such as the Northern New England Cardiovascular Disease Study Group, exemplify what a voluntary group can accomplish.[12] They examine outcome results in a defined area of cardiovascular procedures. Their nonthreatening use of peer review and feedback of the data have been very rewarding. The data obtained are owned by the physicians and have been used in a constructive way. Their approach is a classic example of the continuous quality improvement process. More recently, Kresowik and others presented a study on the utilization, processes, and outcomes for CEA procedures performed on patients in 10 states.[13] A striking variation was seen in utilization and outcome in over 10,000 Medicare patients subjected to CEA. A major conclusion of the study was that a surgeon doing CEA should participate in outcomes assessments and adopt appropriate protocols for the care of patients having CEA procedures.[13]

As mentioned previously, health care delivery is a complex system, and human performance is a part of that system. In the operating room, the surgeon is definitely one, but not the only, system practitioner. The surgeon is truly at the "sharp end" of the system during the operative phase of care of the surgical patient.

With this as background, the author reviewed studies that examine the nature of preventable adverse events in surgical patients. Hopefully, some strategies might be derived from such a review that would help improve safety in the care of the surgical patient.

In two of these studies, the major cause of preventable surgical adverse events was classified as *technical error*. The exact nature of these technical errors is not discussed in detail. However, in both studies, it is suggested that surgical technique was a major factor in many of these cases. In fact, Leape clearly states that hospitals might benefit by addressing technical complications in surgery and wound infections.[14]

Gawande and others, discussing the preventable adverse events in surgical patients in Colorado and Utah, indicate errors in surgical technique as a major factor.[15] In addition, they target various surgical procedures that have an unusually high percentage of preventable adverse events, though they do not spell out in any detail the exact nature of the technical errors.

The third study that the author reviewed was the analysis of errors in the treatment of patients from a regional trauma system of San Diego County.[16] This study involved more than 22,000 trauma patients admitted to six designated trauma centers (five adult and one pediatric). The study divided the treatment into three phases of the system: (1) resuscitation, (2) operative phase, and (3) critical care phase. This study especially lent itself to a systems approach in error analysis. The operative phase was deemed to be the second most frequent site of errors. Errors in technique contributed to over 50 percent of errors in the operative phase.

Closure of the quality assurance loop by analysis and implementation shows how effective a mature system can be, as illustrated by this multihospital trauma system. Delivery of safe care to the surgical patient is a complex system. Many factors must come into play, such as resource availability, organizational policies, changing technology, and the performance of different people.

Suggested strategies

The three studies mentioned previously suggest that technical errors were a common cause of preventable adverse events in the surgical patient. With this fact in mind, several practical strategies are worth consideration.

1. Directors of surgical training programs must carefully judge the cognitive and technical skills of residents, and, if a correctable deficiency is seen, it should receive special attention. If residents in surgical specialities are not capable of mastering the technical skills, they should be advised to enter a nonsurgical discipline.

2. For the practicing surgeon, standardization of their technical approach for most procedures should be followed when possible. Attention to detail is paramount. Voluntary self-reporting of errors by the practitioner to the appropriate health care organization (hospital) with confidentiality assurances could be of great value. Certification and recertification by appropriate ABMS boards is a good baseline, but may prove to be less useful in determining competence, particularly in the area of operative skills and surgical judgment.

3. Leadership of the surgical staff of the hospital must monitor performance of the surgical staff and, if necessary, limit surgical privileges at the time of reappointment, or immediately if conditions warrant. Although most hospitals collect data on surgeons, it is the closure of the quality assurance loop that is frequently the most difficult.

4. The systems approach is very important in the area of perioperative care. An active, multidisciplinary hospital committee is essential.

5. For any procedure involving new technology in the surgical patient, additional education and training may be indicated.

6. The members of the surgical staff should be encouraged to participate in collaborative studies concerning outcomes. Results of these types of studies may well become the benchmark of practice in the future. Analysis and sharing of outcomes data will be helpful in improving quality and its subset—patient safety. ▽

This article was generated through the efforts of the Committee on Patient Safety and Professional Liability of the ACS Board of Regents. Members of the committee believe that this and other articles published in the *Bulletin* will stimulate thought and possible action on a wider spectrum of issues related to patient safety and professional liability.

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***Dr. Nora** is a member of the board of directors of the National Patient Safety Foundation and a consultant to the ACS Committee on Patient Safety and Professional Liability.*

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