As stated, quality encompasses a range of processes. Care of the patient is now a shared responsibility of stakeholders who have equal discretionary authority to make care decisions. The pathway to excellence likely involves elements of care that are not well archived and therefore not well studied. How, then, does an institution achieve excellence? The answer lies in a willingness to engage in new paradigms of processes and relationships. These certainly include, among others: elimination of competition between surgeons and subspecialization of procedures performed, open dialogue with team cardiologists during a preoperative conference, preoperative involvement of appropriate consultants for at risk patients, administration supportive of additional inpatient days spent attaining maximal medical optimization, use of a limited number of cardiac anesthesiologists who are accomplished transesophageal echocardiographers equipped with dedicated machines and probes, a care model that encompasses nurse practitioners and intensivists, and a dedicated cardiac quality surveillance team. Clearly, the responsibility for quality extends beyond the surgeon and its pursuit involves a dedicated team effort and supportive, involved administration. Let us commit ourselves to development of

the benchmarks needed and a relentless pursuit of excellence in which reducing failure to rescue is seminal.

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Commentary: Failure to rescue: What does it really measure?

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Likosky and colleagues¹ are to be congratulated for another meaningful contribution to the art and science of outcomes

Failure to rescue (FTR) is defined as operative mortality among patients developing postoperative complications. The quality of medical and surgical care will be advanced by improving the understanding of the complex relationship of operative mortality, postoperative complications, and FTR.

CENTRAL MESSAGE

Failure to rescue (FTR) is defined as operative mortality among patients developing postoperative complications. As a measure of quality, FTR will allow for more focused assessment of postoperative cardiothoracic surgical care.

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analysis and quality improvement in cardiothoracic surgery. Failure to rescue (FTR) is defined as operative mortality among patients developing postoperative complications. Operative mortality is defined in all Society of Thoracic Surgeons (STS) databases as “(1) all deaths, regardless of cause, occurring during the hospitalization in which the operation was performed, even if after 30 days (including patients transferred to other acute care facilities), and (2) all deaths, regardless of cause, occurring after discharge from the hospital but before the end of the 30th postoperative day.”^{2,3}

In their observational study of 83,747 patients undergoing isolated coronary artery bypass grafting (CABG) operations between July 2011 and June 2017 across 90 hospitals, Likosky and colleagues report that the “significant interhospital variation in mortality rates was driven principally by failure to rescue rates rather than complication rates.” They conclude that “the reported interhospital variability in successful rescue following CABG supports the importance of identifying best practices at high-performing hospitals, including early recognition and management of complications,” and state that “efforts to reduce mortality should focus on identifying and implementing optimal rescue strategies.”

FTR as a measure of quality has been studied using both the Society for Thoracic Surgeons (STS) Congenital Heart Surgery Database (STS CHSD)⁴ and the STS Adult Cardiac Surgery Database (STS ACSD).⁵ Pasquali and colleagues⁴ examined FTR in STS CHSD and concluded that “hospitals with low mortality rates do not have fewer complications after pediatric heart surgery, but instead have lower mortality in those who experience a complication (lower FTR). Further investigation into FTR as a quality metric in pediatric heart surgery is warranted”. Edwards and colleagues⁵ examined FTR in STS ACSD and concluded that “CABG mortality rates vary directly with FTR, but complication rates have little relation to death. FTR rates derived from The Society of Thoracic Surgeons data can serve as national benchmarks. Predicted FTR rates may facilitate patient counseling, and FTR O/E ratios have promise as valuable quality metrics.”

A risk model is a mathematical formula that can be used to predict the probability that a given outcome will occur,⁶ typically based on data from a large benchmark population. Whenever one is developing or using a risk model, it is important to consider the purpose of the analysis. Risk models can be used to predict the risk of a given patient, assess the case mix of a given program, or even assess the performance of a given program in comparison with multi-institutional aggregate outcome data.⁶ The point in time at which risk is being assessed with a risk model is critical in each of these applications. The STS Adult Cardiac Surgery Risk Models^{7,8} facilitate estimation of the risk of procedure-specific operative mortality and morbidity

adjusted for preoperative patient-level factors present at the time that the patient enters the operating theater. The STS CHSD Mortality Risk Model similarly facilitates estimation of the risk of operative mortality adjusted for preoperative patient-level factors present at the time that the patient enters the operating theater.⁹⁻¹¹

Risk adjustment for FTR requires a somewhat different time frame. To better estimate risk at the time that the patient enters the intensive care unit (ICU) after surgery, and to focus on performance of the postoperative care team and ICU, FTR risk models should include intraoperative and early postoperative parameters that are present on arrival to the ICU, such as cardiopulmonary bypass time, aortic cross-clamp time, and postoperative arterial blood levels of lactate immediately on arrival to the ICU. Thus, the resulting risk-adjusted outcomes would account not only for the patient’s original preoperative risk factors, but also for events during the procedure (eg, excessive blood loss, long cross-clamp times) that may contribute to risk. The inclusion of such intraoperative risk factors and immediate postoperative risk factors reflects the condition of the patient at the completion of the operation, and also reflects the overall risk of the patient when their care is assumed by the postoperative care team. Therefore, the inclusion of such intraoperative risk factors and immediate postoperative risk factors facilitates more accurate estimation of risk-adjusted FTR.

Likosky and colleagues are to be congratulated for enhancing our understanding of FTR. As the assessment of cardiothoracic surgical quality evolves, it is important to include all phases of delivery of healthcare. Cardiothoracic surgeons are involved in, and ultimately responsible for, all phases of cardiothoracic surgical care, including preoperative assessment and optimization, intraoperative management, and postoperative care. As a complement to overall risk-adjusted rates of operative mortality and morbidity, FTR will facilitate a more focused assessment of the quality of postoperative cardiothoracic surgical care, specifically the ability to salvage patients who experience serious postoperative complications.

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