How do you measure quality in trauma?

As a Chief Quality Officer, I spend a lot of time thinking about what separates a good anesthesia practice from a mediocre one, because I want my practice to be the good one. As a recovering traumatologist, I am especially interested in our happy little subspecialty. What are the best metrics for assessing the quality of trauma anesthesia? How do we know that we’re doing the best we can, and how do we identify opportunities for improvement?

Ideally, we want to optimize our delivery of the triple aim: clinical outcomes, population health, and cost efficiency. We want the best, safest care for the largest number of patients at the lowest possible cost. Easy to say, but difficult to translate into measureable data, specific to the actions and decisions of the trauma anesthesiologist. To drive improvement, we want measures that matter to patients, which are closely tied to what we do, and where performance varies across providers.

One approach, common to public programs for quality reporting, is to count how often we follow a given process. How often do we perform rapid sequence induction in patients with a full stomach? What percent of cases get the right antibiotic? Process measures are typically easy to define and easy to count. In most cases, there is no good reason not to follow the recommended process, and these exceptions are easy to identify and exclude from the quality data. The problem with process measures, though, is the long clinical distance between what we are counting (RSIs performed) and an outcome that matters (aspiration pneumonias). Many other variables intercede, making the linkage between the recommended process and the desired outcome inherently weak. This leads to a sense that nothing important is being measured, which causes cynicism in the stakeholders.

Another approach, closer to what matters but correspondingly harder, is to look at intermediate patient outcomes. How often is the systolic blood pressure above 100 in a patient with traumatic brain injury? How well do we follow standards for lung-protective ventilation? Like process measures, these intermediate measures depend on the strength of linkage between what we are assessing and an ultimate clinical outcome, although in this case we hope the...
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relationship between the measured activity and the desired outcome is more direct and obvious. However, these measures often require slogging through clinical records to find the data, as well as analytic effort to eliminate artifacts.

Even better might be to measure exactly what we want to know: the outcome in question. How many of our patients die? How many require a surgical airway because we can’t intubate them? How many develop respiratory distress syndrome? Ultimate outcome measures are often easier to count than intermediate ones, and robust definitions exist for the outcomes we really care about. Cynicism is averted, because everyone knows these things matter. Adverse outcomes are rare, but if we look at large numbers of cases, a pattern should emerge.

The problem is that outcome measures aren’t fair! Some trauma patients are more likely to die than others. Some will die before they reach us, but some will die during our care. Why should my score depend on how fast the ambulance drove? Or how good my surgeons are? Or the average age of patients served by my hospital? These kinds of objections are why hard clinical outcomes require careful risk adjustment before the data see the light of day.

Risk adjustment is the process of beating up the data after the fact to make the ultimate metric more specific to the question being asked. A variety of statistical methods can be used to level the playing field, ranging from multi-variable analysis to propensity scoring. Unfortunately, there are risks to risk adjustment. The same raw data fed into different schemes can produce wildly different results. To paraphrase an old line about theoretical models: “All risk adjustment schemes are flawed, although some are useful.” Good risk adjustment requires a lot more data – every potential risk factor from age to shoe size for every patient measured. In anesthesia, as a whole there are few good risk adjustment schemes, and fewer still that are in common use as quality benchmarking tools. In part this is because serious adverse outcomes are rare and exceptional, and in part because it is hard to gather large masses of all the relevant data.

But wait! Trauma care is a small niche, with many serious outcomes, and risk adjustment of trauma mortality has been a common academic sport. Beginning with the Major Trauma Outcome Study – a registry of risk factors and survival launched in the 1980s – traumatologists and trauma centers have had the ability to compare outcomes with their peers for almost three decades. Common ‘scoring’ for all possible traumatic injuries exists as a national vocabulary of abbreviated injury scores, maintained and updated by the Association for the Advancement of Automobile Medicine, and rolled together for
individual patients into the Injury Severity Score (ISS). Glasgow Coma Scale score and vital signs at the time of hospital arrival are condensed and summarized into schemes such as the Revised Trauma Score (RTS). Combine the anatomy of ISS and the physiology of RTS, stir in some age and gender and comorbidities and Voila! Probability of survival can be predicted. While not useful for the individual patient – always either a 1 or a 0 – summation of probability of survival across larger populations, followed by comparison to actual results, produces an outcome measure that works well for trauma centers. To the extent that anesthesiologists contribute to these outcomes, we should pay attention to the results. If you’re working in a designated trauma center, you have a trauma registry and you’re likely benchmarking yourself on overall mortality. Knowing your institutional performance is a good place to start measuring the quality of your anesthesia care.

How about a different kind of outcome? What about patient satisfaction? On the one hand, we believe the patient should be happy to survive. On the other hand, more than 90% are going to survive no matter what we do. If we were in this group ourselves, it would matter to us how well we were treated along the way. Was our privacy respected? Did the doctors and nurses communicate effectively? Were our pain and anxiety managed well? While inherently subjective, patient experience does matter. All other things equal, higher patient satisfaction is better than lower, and this will likely be a common measure of anesthesia group performance in the near future. Whether the results will have relevance for trauma anesthesia specifically is unclear, but it’s a safe bet that someone will try to find out.

The ASA has published recommendations on how to measure patient satisfaction. Automated systems make it easy to survey every patient cared for, and large numbers of returned surveys are beginning to accumulate. Results can be readily linked to the type of patient and procedure, so the potential exists to learn what trauma patients think about their anesthesia care, compared to non-trauma patients. But no one has done this yet, and there is an obvious bias in which patients respond and which do not. At present, we don’t know if trauma patients are happier than elective surgery patients (because they are grateful to survive?) or not (because they are angry about the trauma?). Yet patient satisfaction is an actionable metric, strongly impacted by providers, which matters to our stakeholders. I would put it on the list for trauma anesthesiologists to consider.

Finally, I would like to suggest another way to think about quality in trauma anesthesia. Instead of counting processes or outcomes, what about examining the qualities of the group itself. Are the providers professionals? Are they measuring their outcomes and reacting to the results? Do they have a quality improvement program? Do individual physicians receive feedback on their efforts?
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providers committed to measurement, improvement and change? Do they learn? Do they teach? Do they participate in team training and hospital policy writing? Do they do research, write papers and appear at national meetings? The presence of these global characteristics might be a better marker for the quality of the group than any numeric measure, and it is this list of ‘outcomes’ that I recommend most strongly.

References

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