When Bad Things Happen to Good Surgeons: Reactions to Adverse Events

Shelly Luu, BSc\(^a,\)\(^b\), Shuk On Annie Leung, BASc\(^a,\)\(^b\), Carol-anne Moulton, MBBS, MEd, PhD, FRACS\(^a,\)\(^c,\)\(^*\)

**KEYWORDS**
- Adverse events
- Judgment
- Psychological reactions
- Surgeon wellness

**VIGNETTE**

Tom Sinclair is an active 56-year-old professor of engineering recently diagnosed with colorectal cancer. Eager to find the best surgeon around, Tom asked advice from a friend, a nurse on your surgical ward, who recommended he see you. He came to your office with his wife of 30 years and was relieved that you recommended surgery the week after. He said he would delay a preorganized family holiday he was taking with his wife and 3 children to get this surgery behind him. As he left the office, you thought how difficult this diagnosis must be for him briefly imagining how you might feel if you received the same news. You are not that different in age after all, and the thought of dying at such a young age was a little too difficult to imagine. It was a fairly straightforward operation with no signs that the cancer had spread elsewhere. The tumor was a little lower in the rectum than you expected, but you decided that a covering stoma was not necessary, so you performed the anastomosis and closed. Tom’s wife and 3 teenaged children were waiting in the operating room as you walked in to tell them the good news.

This work was supported by the Ministry of Research and Innovation Early Researcher Award and the Royal College of Physicians and Surgeons of Canada Medical Education Research Grant.

\(^a\) The Wilson Centre for Research in Medical Education, University Health Network and University of Toronto, 200 Elizabeth Street, 1ES-565, Toronto, Ontario M5G 2C4, Canada

\(^b\) Faculty of Medicine, University of Toronto, 1 King’s College Circle, Room 2109, Toronto, Ontario M5S 1A8, Canada

\(^c\) Department of Surgery, University of Toronto, 100 College Street, Room 311, Toronto, Ontario M5G 1L5, Canada

\(^*\) Corresponding author. The Wilson Centre for Research in Medical Education, University Health Network and University of Toronto, 200 Elizabeth Street, 1ES-565, Toronto, Ontario M5G 2C4, Canada.

E-mail address: carol-anne.moulton@uhn.on.ca


surgical.theclinics.com

0039-6109/12/$ – see front matter © 2012 Published by Elsevier Inc.
“Thank-you doctor. You are our lifesaver,” his daughter said. You saw him every day, and each time he and his family were very grateful to you, singing your praises. You were a little embarrassed but accepted this acknowledgment as a great perk of your job. On the sixth postoperative day, you were called by the resident who had been on the night before to let you know that he thought Mr Sinclair—“your colon” from last week—was leaking. Tom had deteriorated overnight with sudden onset of abdominal pain and fevers, and his blood pressure dropped. He had a low-grade fever the day before, but you thought it was from a little redness at the wound site. You had removed a few staples and thought he should be fine. “How do you know he has leaked?” you asked somewhat agitatedly. A computed tomographic scan was just performed, which showed large amounts of free air and fluid throughout Tom’s abdomen and particularly in his pelvis. You hang up the phone.

Adverse events are unfortunately a part of every surgical practice. As surgeons who are intimately linked to these events, they affect each one of us, although the exact nature and impact of these events have not been well articulated or understood. Studies that have attempted to characterize the surgical personality from a psychological perspective have found that surgeons form the most distinct and consistent group among physicians. As a group, surgeons are trained for rapid and confident decision making with little room for error and reside in a culture where disclosure of error and explicit discussion of their own personal causes for error are not always facilitated. Surgical residents experience internal conflict as they are taught about the uncertainty of medicine in parallel with the unacceptability of error and, as opposed to other professions, counseling or debriefing at the individual level after medical errors is not routine. Moreover, surgeons are often reluctant to disclose errors to patients and colleagues for fear of malpractice litigation, shame, or self-disappointment. In-depth interviews conducted with general internists have found that error, whether perceived or real, reduced physicians’ self-confidence and induced fear of stigmatization and feelings of guilt. The competitiveness of medical practice, belief in physician control, and the basic principle of “first, do no harm” were noted to explain physicians’ responses to medical errors.

During a recent qualitative study as part of a larger program of research exploring surgical judgment, surgeons described considerable physiologic and psychological reactions when things went wrong. Surgeons would say, “I remember all my deaths,” or “We all have our own graveyard,” with details of these events seemingly burned in their memory. This seemed to be in contradiction to a previous discussion in the literature that suggested surgeons experience fewer symptoms of distress than internists and surgeons are more willing to risk failure. Given how relatively little is known about surgeons’ reactions to such events, we embarked on another qualitative study to explore this phenomenon in surgical practice. Terminology in this area is confusing in the current literature, with some terms (eg, error or mistake) having negative connotations associated with fault or, worse, negligence and others (eg, complication or adverse event) implying acts of God. It is often difficult to elicit the exact cause of an adverse event and therefore difficult to ever fully appreciate one’s exact role in the event. Was this an error or an act of God, a complication that would have happened no matter what in the best of hands because of this invasive intervention? This difficulty sets up a period of rumination of ‘was it my fault,’ which is described later.

In this article, we present a framework to understand surgeons’ reactions to adverse events, which were derived from a more recent study (details and methodology have been presented elsewhere) as well as a review of both the relevant psychology and
social psychology literatures that helped guide us in our understanding of these reactions. We situate this framework within the broader picture of mindful practice to gain an appreciation of how the psychological and social dimensions of the surgeon can affect judgment and cognition.

FRAMEWORK FOR UNDERSTANDING INDIVIDUAL SURGEONS’ REACTION TO ADVERSE EVENTS

Surgeons who participated in the study were reported to believe that their own reactions to adverse events were unique and relieved to hear that colleagues experienced similar reactions. Interesting differences were described when men attributed their reactions to being outliers (eg, when compared with their colleagues), whereas women attributed their reactions to being women (eg, more emotional, less ego). The investigators suggested that participants were aware that external appearances during these reactions may not be congruous with what was being experienced on the inside. Surgeon's culture promotes strength and certainty, and demonstrations of vulnerability or self-doubt are discouraged. When participants interviewed surgeons who had been described by their peers as cold or seemingly unaffected by these reactions, they found these individuals suffered similar reactions to adverse events. Given the consistency of these reactions, the investigators were able to define 4 phases that occurred among surgeons: kick, fall, recovery, and long-term impact.9

4 PHASES OF REACTION TO ADVERSE EVENTS

The Kick

The first phase that was described in this study was the kick; when surgeons first heard news of the event, they experienced a physiologic stress or anxiety reaction. There were physical manifestations of this phase, such as tachycardia, sweatiness, and agitation, which was reported to last up to several hours. The investigators also described significant feelings of failure that seemed complicated by not only sadness for the patient but also sadness for how it made them feel personally.9 Surgeons described feeling like they were no longer worthy of being a surgeon, likening it to getting a “D” on a test rather than the expected and usual “A.”9 Several factors were identified that influenced the severity of the reaction: the age of the patient, the nature of the case (emergent vs elective), the relationship they had developed with family and friends, and the severity of the complication.9 The dissonance surgeons felt between striving to be the ideal perfect surgeon and the current adverse event led to exaggerated emotions and self-blame.9

The Fall

After the kick, the next phase was described as the fall, when surgeons felt a downward spiral of emotions as they tried incessantly to find out details of the case in the hope that they would be somewhat exonerated in the complication. In this phase, surgeons questioned almost every aspect of the case to answer the question, “Was it my fault?”9 Long periods of rumination to uncover the details of the case were described.9 Although blame was not a big part of this phase, participants recognized the tendency to blame in an attempt to feel better about the situation.

Although surgeons put forth an ardent effort to find out whether they were responsible for the adverse event, it was often difficult to exactly discern the cause of the adverse event, let alone determine the role they played. Surgeons were more distressed if they felt they had contributed in some way to the adverse event. The
uncertainty resulted in extended periods of information searching and an inability to focus on other tasks.9

The Recovery

The beginning of the recovery phase was marked by a return of feeling normal and undistracted by the thoughts of failure associated with the first 2 phases. Surgeons described being able to continue with their daily work with ruminating thoughts of the event finally controlled. In brief interviews with surgeons after events, the investigators noted that surgeons were calmer and more reflective during the recovery phase. One surgeon was said to describe this as “the pall has lifted.” Surgeons realized the need to recover and move on from the event.9

Surgeons had different coping strategies to deal with the adverse events in their recovery phase, including discussion with colleagues and family. It seemed that surgeons felt better able to cope with the event once they satisfied themselves that they learned something from the event that will prevent future occurrences. One surgeon described changing the standard of practice after every adverse event, whereas another noted that teaching residents about the adverse event was a way of coping.9

The Long-Term Impact

Even though surgeons experienced adverse events similarly in the short-term period, there seemed to be differences in the cumulative effect of these reactions over time. Several surgeons suggested the long-term impact was a negative one, recognizing that these reactions were not getting any better or easier to handle with time. Several suggested that these reactions were actually getting worse and became the primary factor for considering early retirement or changing their scope of practice.9 These surgeons felt that the negative effect of these reactions over many years of their practice was cumulative, perhaps understandably when it is not uncommon to hear surgeons say, “I remember all my deaths by name.” An understanding of the severity of these reactions in the acute phase coupled with an understanding of the surgical culture sheds light on this statement.

IMPLICATIONS: PLACING THE FRAMEWORK INTO CONTEXT

The framework for understanding surgeons’ reaction to error illustrates the consistency with which surgeons experience adverse events. Translating this knowledge to promote patient safety in surgery requires an examination of the external or social environment that surgeons operate in as well as the internal landscape and cognitive processes inside the surgeon’s head.

The surgical culture stresses certitude, decisiveness, and confidence.14 In the acute phase after an adverse event has occurred, surgeons described the need to manifest these qualities of strength despite experiencing powerful negative emotions—to put on a brave face. Thus there is a tension between needing to appear strong and actually being strong after a complication.

The sociology literature describes social identity as an aspect of an individual’s self-concept that is derived from the individual’s membership in a group; a surgeon’s professional identity, therefore, is derived from belonging to the larger social group formed by health care practitioners.16 When there is incongruence between personal and professional identity, for example, feeling vulnerable and imperfect after a surgical complication, identity dissonance is created.17 The pressure to conform to mainstream expectations around behaviors, attitudes, and belief systems is well documented in
health care trainees entering training programs as well as individuals who are not part of the mainstream (eg, cultural/religious minorities, women in predominantly male environments). In the following sections, guided by various literatures, we examine the framework for surgeons’ reaction to error in the context of the surgical culture and its various implications as we strive for safer surgery.

Operating After a Complication

“I honestly think I almost crashed into four parked cars before I got out of the parking garage that day. I was so distraught…” (I-002).

The first 2 stages, the kick and the fall, were described as incapacitating for many surgeons because they found it difficult to concentrate on other activities during this period. Looking at the cognitive psychology literature on human attention, it suggests that a limited cognitive capacity exists for paying attention. Humans have a limited space of attentional resources, and, once that threshold is reached, the mind tends to take mental shortcuts and oversimplify at the cost of accuracy. As nicely captured in the aforementioned quotation, the ability to think straight after the recognition of a significant adverse event might be compromised. Although “crashing into four parked cars” in this state is an extreme example, it exposes the potential for how these reactions might interfere with subsequent judgment and decision making, particularly in the operative setting. In any intraoperative moment, there are numerous external and internal stimuli that are in essence competing for the surgeon’s attention (see the article by Carol-anne Moulton and colleagues elsewhere in this issue). The ability to think clearly and gather and process information at the moment of crisis can be jeopardized by consuming thoughts and emotions associated with ruminating on a previous complication.

Learning from Adverse Events: Reactions as a Source of Feedback

Learning from surgical errors and complications occur at both macrolevels and microlevels. At the macrolevel, systems-based initiatives such as surgical checklists are a result of recognized patterns of errors. At the microlevel, individual surgeons also learn to refine their procedural techniques and decision making from their errors. Furthermore, it has been suggested that emotion-laden reactions to errors that are subjective, variable, and surgeon dependent are also an important source for learning.

Surgeons vividly described emotions, and their physiologic manifestations, during the kick phase. These strong emotions are actually a powerful form of feedback for learning in addition to other formal system-implemented sources of feedback. It has been hypothesized that intuition comes from emotions and sensory input that are packaged with experiences and form part of our memory; when the memory is retrieved, the emotions and sensory experiences are automatically retrieved, often influencing behavior and decision making. Neurocognitive research has shown that subcortical areas, especially those involved in emotion and reactions to threat, process information beneath conscious awareness, and the input from these areas directly shapes reasoning. Therefore, the strong emotions evoked by a complication become imprinted in the memory of the surgeon, having the potential to influence decision making in subsequent cases in which this memory is retrieved unconsciously.

Counterfactual thinking is another psychological concept relevant to learning from adverse events. It describes the process of asking oneself questions such as what if or if only, comparing actual outcomes with imagined alternatives. Surgeons commonly engage in counterfactual thinking in response to a complication, particularly in the information-gathering or the fall phase. Counterfactual thinking can be
either upward (better than reality) or downward (worse than reality) and also outward focused (outside of my control) or self-focused (within my control). In the context of how surgeons interpret adverse events, counterfactuals that are both downward (it could have been worse) and outward focused (it is out of my control) are effective coping mechanisms but may lead to minimization of the event and blame (eg, other colleagues, systems factors). On the other hand, self-focused upward comparisons are more likely to result in performance-promoting learning (eg, if I had checked the blood work again before operating, this adverse event may have been avoided).

Surgeons might use counterfactual thinking in their reflections on adverse events. The pancreatic surgeon who resects a tumor resulting in positive oncological margins may use the upward counterfactual, “It doesn’t matter; a positive margin doesn’t always result in rapid local recurrence and death.” Alternatively, the surgeon may use the following downward counterfactual after the same error: “It could be worse; the patient may have died from a leaking pancreatic anastomosis.” Counterfactual thinking and emotions associated with the event both serve as feedback for critical reflection on personal performance. It has been suggested that for feedback to be effective, it should be specific, directed, and task oriented rather than self-oriented. However, the paradox is that surgeons’ sense of self or personal identity is inextricably linked to their professional identity and performance as a surgeon. Poor outcome after surgery, particularly if attributable to surgeon error, can provide negative feedback on surgeon performance in self-assessment. This feedback, which is both inconsistent with and lower than self-perceptions, can elicit negative emotions in the surgeon. There are many psychological and neurocognitive mechanisms in place to counteract negative feedback that surgeons receive. Becoming aware of these mechanisms might improve the potential for learning through critical self-reflection around the event.

**Why Error Disclosure is Difficult**

An American professor of law, Carol Liebman, asked if it was possible to train physicians to communicate better with their patients, with an end goal of improving and facilitating error disclosure. After 2 years of research, the investigator concluded, “We’re putting good people in positions where no one can succeed. Communicating with patients in these situations is just too difficult.” She further explained, “It’s just too hard for physicians who are facing emotional turmoil themselves” and that “physicians operate in a system in which the culture does not give them much space to process their feelings.”

The social pressures associated with the culture of decisiveness and certainty in surgery contributes directly to the difficulties in disclosure. Physicians are often reluctant to disclose errors to patients and superiors because of fear of malpractice litigation, shame and sense of inadequacy, and also high expectations of themselves. The official institutional forum for the discussion of adverse events, Morbidity and Mortality Conferences, has been evaluated with ambivalence by residents who are detracted by the threat of remediation and fear of getting “toasted” by colleagues.

In addition to the social pressures, results from our study also provide insight into why error disclosure is so difficult from the perspective of negative emotions. It has been found that disclosing self-focused counterfactuals can imply (incorrectly) to others that the surgeon was negligent or culpable in the adverse event. Therefore, it is less likely that individuals performing under organizational accountability pressures (such as surgeons under pressure of Morbidity and Mortality Rounds) would use such counterfactuals immediately after an adverse event, especially when they are immediately distressed. This is unfortunate because self-focused upward counterfactuals...
FUTURE DIRECTIONS AND SUMMARY

The 4 phases of surgeons’ reaction to error characterizes the surgeon as the second victim and might be a causative factor in the rising levels of surgeon depression and burnout.\textsuperscript{11} The reaction can be profound and is consistent across surgeons of different genders, experience levels, and specialties.\textsuperscript{9} Little research has been done in the way of evaluating support measures for physicians undergoing distress from adverse events.\textsuperscript{40} It has been suggested that by modifying the medical curriculum, increasing mentoring, and ultimately changing the culture in which adverse events are understood, it may be possible to lessen the emotional distress that physicians will encounter in the future.\textsuperscript{11} By increasing the surgical community’s awareness and understanding of the pervasiveness and severity of surgeons’ reactions to error, the culture can be made more accommodating and discussions with colleagues can be facilitated. Furthermore, special attention needs to be paid to surgical residents and fellows to prepare them for their future roles as attending surgeons because the new roles with greater responsibility for patients can result in greater distress in the event of error.\textsuperscript{39}

One way surgeons may better understand and process their own reaction and its potential impact on subsequent judgment is to develop the habits of what Epstein and others\textsuperscript{41} have described as mindful practice, the definition of which is the “conscious and intentional attentiveness to the present situation.” Applying the 4 habits of the mind, attentive observation, critical curiosity, beginner’s mind, and presence, when surgeons are experiencing these reactions allows surgeons to become more aware of their emotions and performance at the moment.\textsuperscript{41–43} As mentioned previously, the strong emotions evoked by a complication become imprinted in the memory of the surgeon, having the potential to influence decision making in subsequent cases as this memory is retrieved, sometimes subconsciously. It has been shown in a study with primary care physicians that mindful practice can be taught,\textsuperscript{44} offering benefits of not only reflective abilities at the moment but also personal well-being.\textsuperscript{45}

The framework presented in this article can serve as a platform for healthier and more productive discussions about adverse events and errors. It has been suggested, “the language people use both makes possible and constrains the thoughts they can have. More than just a vehicle for ideas, language shapes ideas—and the practices that follow from them.”\textsuperscript{46,47} With the language provided by this framework, it might be possible to better prepare and train the future generation of surgeons for what to expect when adverse events occur. It is quite possible that once surgeons learn they are not alone in these reactions and have a language to discuss them and a background to understand them, the negative impact of these reactions might be mitigated.

REFERENCES

34. Liebman CB, Hyman CS. A mediation skills model to manage disclosure of errors and adverse events to patients. Health Aff (Millwood) 2004;23(4):22–32.