

# Life After Death: The Aftermath of Perioperative Catastrophes

Farnaz M. Gazoni, MD  
 Marcel E. Durieux, MD, PhD  
 Lynda Wells, MD

Most anesthesiologists will experience the perioperative death of a patient or a major perioperative catastrophe in the course of their careers. Anesthesia training, however, does not prepare individuals to handle the aftermath of such a stressful event. Multiple surveys have shown that the death of a patient has a major emotional impact on up to 75% of health care providers involved, regardless of whether the death was expected or whether the patient was well known to the practitioner. Psychological recovery often takes weeks or months and is hampered by lack of emotional and professional support. Data indicate that the majority of anesthesiologists would prefer a more formal support structure, including the option to take time off from clinical work. Although a formal assessment of professional functioning after a perioperative catastrophe has not been done, the Association of Anaesthetists of Great Britain and Ireland instituted guidelines recommending support at multiple levels, and the "Adverse Event Protocol" available on the Anesthesia Patient Safety Foundation website provides a suggested series of steps to minimize patient injury and identify the cause of an adverse anesthesia event after it occurs. The negative consequences of failure to cope well after these events are significant to individuals and health care systems alike. Further study into the short-term and long-term impact of perioperative catastrophes on providers and health systems is needed. Additionally, education on how to handle the aftermath of perioperative catastrophes and formal support structures should be provided to practitioners at all levels of training.

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*Self-love, my liege, is not so vile a sin  
 As self-neglect*

William Shakespeare, *King Henry V*, Act 2, Scene 4

**T**he majority of practicing anesthesiologists will experience the perioperative death or serious injury of a patient over the course of their careers. Although these occurrences are rare, they can have considerable psychological and professional consequences for the anesthesiologist involved. The literature about doctors' experiences caring for dying patients is sparse and anecdotal, but often expresses feelings of sadness, guilt, and stress.<sup>1</sup> This stress has been linked to burnout and increased risk for psychiatric disorders, such as depression and drug abuse, but we know little about its impact on patient care.

In specialties in which caring for terminally or critically ill patients is part of daily practice, trainees

and attendings are taught the skills needed to break bad news to families and how to develop effective coping mechanisms in the face of poor outcomes. Anesthesia training does not usually include this teaching. In fact, the "focus of training in anesthesia is concerned with the avoidance of disasters, rather than the management of their aftermath."<sup>2</sup> The solitary nature of the practice of anesthesia, the rarity of these events, and evidence that anesthesiologists are unlikely to receive much in the way of professional support after a sentinel event, make them particularly prone to psychological distress should they experience the death or serious injury of a patient.<sup>3</sup>

In this paper, we will review the literature regarding physicians' reactions to the death or serious injury of their patients and the response of their colleagues and administrators to such an event. We will consider factors that may be of importance in the response to perioperative catastrophes and discuss strategies to minimize their psychological and professional impact.

## Anesthesiology: A High Stress Specialty?

Given the high suicide and drug abuse rates among anesthesiologists, some consider anesthesiology to be a high stress field.<sup>4</sup> Is there evidence, however, indicating that anesthesiology is, indeed, a high stress specialty? If so, are these issues relevant in the setting of perioperative catastrophes?

From the Department of Anesthesiology, University of Virginia Health System, Charlottesville, Virginia.

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Address correspondence and reprint requests to Farnaz M. Gazoni, MD, Department of Anesthesiology, University of Virginia Health System, Box 800710, Charlottesville, VA 22908. Address e-mail to Fjm6b@virginia.edu.

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Nyssen et al. conducted a survey to measure the level, sources, and effect of work-related stress and burnout among anesthesiologists.<sup>4</sup> A questionnaire combining various instruments to measure levels of stress, emotional exhaustion, burnout, self-reported physical health, working conditions, and job characteristics was administered to 151 Belgian anesthesiologists. Respondents included men and women anesthesiologists and residents at all levels of training. The results revealed a moderate mean level of stress among anesthesiologists (no higher than in other professional groups surveyed) and high levels of empowerment, work commitment, job challenge, and job satisfaction. However, 40% of respondents reported emotional exhaustion, with the highest rate reported in residents <30 yr old. There was significant inter-individual variability of scores, reflecting wide inter-individual variability of personalities, needs, support systems and personal coping strategies.<sup>4</sup>

If the mean level of stress reported by anesthesiologists is no higher than that reported by other working populations, how then, can the over-representation of anesthesiologists among physicians with drug and alcohol addiction or in the incidence of physician suicide be explained?<sup>5-14</sup>

An estimated 10%–15% of physicians are chemically dependent at some point in their careers.<sup>7,13,14</sup> Excluding alcohol, the estimated incidence is 1%–2%. This mirrors the prevalence in the general population. However, the incidence of physician substance abuse is not equally distributed among medical specialties. A study conducted in 1983 revealed that, while only 3% of physicians at that time were anesthesiologists, anesthesiologists represented 13% of physicians treated at a surveyed drug treatment facility.<sup>12</sup> In the state of Florida (1970–1995), anesthesiologists represented 5.6% of licensed physicians, but almost 25% of physicians with known substance abuse disorders.<sup>6</sup> A 30-yr retrospective study of 260 anesthesiologists who trained at the Medical College of Wisconsin found that 15.8% of respondents were dependent on alcohol, drugs or both.<sup>9</sup> A survey of 133 academic anesthesiology department chairs, conducted in 1997, examined the incidence of known controlled substance abuse between 1990 and 1997 and found an incidence of 1% among faculty members (34 of 3555) and 1.6% among residents (133 of 8111). Thirty individuals (18%) died or required resuscitation before any substance abuse was suspected. A study of anesthesiology residents between 1975 and 1989 found a 2% incidence of chemical addiction (alcohol and controlled substances). Death or near death was the presenting symptom in 7.2%.<sup>10</sup> These data reflect “discovered” cases only and under-estimate the problem. The true incidence and prevalence are unknown.

The relative risk of physician suicide compared to the general population is increased, with the relative risk of male physicians being 1.1–3.4 and women physicians, 2.5–5.7.<sup>7,8,11</sup> Anesthesiologists are over-

represented among physicians who commit suicide. Using the Physician Master File Database, a list of all United States (US) physicians, and the National Death Index (1979–1995), Alexander et al. conducted a cohort study of the mortality risks, adjusted for age, gender, and race of anesthesiologists ( $n = 40,242$ ) compared to internists ( $n = 40,211$ ). Standardized mortality ratios (for all causes of death except due to suicide or accidental poisoning) for all physicians as compared with the general population were well below 1, and the all-cause mortality ratios did not differ between anesthesiologists and internists. But, compared with internists, anesthesiologists had a 50% increased risk of death from suicide (RR = 1.45, 95% CI 1.07–1.97,  $P = 0.016$ ) and a more than doubled risk of drug-related deaths (RR = 2.79, 95% CI 1.87–4.15,  $P < 0.001$ ). Although the risk of drug-related deaths was highest in the first 5 yr after medical school graduation, it remained increased over that of internists throughout their careers. Overall, 2,108 yr of life were lost (before age 65 yr) due to drug-related deaths in the anesthesiologist cohort, compared with 715 life-years lost in the internist cohort.<sup>5</sup>

The triad of conditions required for drug addiction to occur are a genetic predisposition, exposure to the drug to which the predisposition exists and a triggering combination of environmental stressors.<sup>15</sup> Although the personality makeup of those physicians choosing anesthesiology may play a role, the relatively easy access to potent drugs and various aspects of the practice of anesthesiology may also be a factor. We propose that these increased rates of suicide and addiction suggest that, regardless of the cause, anesthesiologists lack sufficient mechanisms for coping with stress and/or that they lack access to adequate support systems. Learning how to cope with perioperative catastrophes and instituting guidelines for handling their aftermath is, perhaps, one way to help remedy this insufficiency.

In summary, despite average levels of work-related stress, anesthesiologists suffer from high rates of drug and alcohol addiction and suicide, suggesting that anesthesiologists may be less prepared to handle stress. Studies examining sources of stress in house staff and attendings in other fields have found patient death to be a significant source of stress. Taken together, these findings suggest that the perioperative death or serious injury of a patient, with the associated professional, legal, and emotional consequences, might have profound repercussions for the anesthesiologist involved.

## INCIDENCE OF PERIOPERATIVE DEATH

The reported rates of perioperative deaths vary widely by year and country, and anesthesia mortality studies are “plagued by confounding variations in definitions, relatively small sample sizes from selected institutions, and the lack of large population studies,

especially in the United States."<sup>16</sup> Current data suggest, however, that perioperative deaths due solely or largely to anesthesia in the United States (a perioperative death to which human error by an anesthesiologist contributed) are extremely rare and estimated to occur in 1 per 13,000 anesthetics.<sup>16,18</sup> The incidence of perioperative deaths, in general, is much higher at approximately 1 per 500 anesthetics.<sup>18</sup> Surveys conducted abroad estimate a rate of deaths due solely to anesthesia of 0.5–0.8 per 100,000 and a general perioperative death rate of approximately 1–30 per 100,000 anesthetics.<sup>3,17,19</sup> Consequently, the majority of practicing anesthesiologists will experience at least one perioperative death over the course of their careers. It is important to note that the definitions of "intraoperative" and "perioperative" deaths used by different authors vary widely, ranging from deaths that occur while in the operating room (OR), to deaths that occur within 30 days of surgery. In 1992, the Joint Commission on Accreditation of Healthcare Organizations defined perioperative mortality as "the death of patients during or within two postprocedure days."<sup>18,20</sup> Further, other catastrophes such as ophthalmologic, nerve or vascular injuries resulting from positioning or the procedure itself can also have a profound impact on the anesthesiologist involved. These types of events and their impact on anesthesiologists are not explored in any of the studies reviewed in this article. Finally, it is also important to note that, while the studies discussed refer to physician anesthesiologists, these issues certainly pertain to nurse-anesthetists as well who may have similar experiences to physician anesthesiologists. Due to space constraints and paucity of data, we will limit our discussion, however, to physician experiences.

A questionnaire of 300 residents as well as academic and private practice anesthesiologists in Britain found that 231 (92%) of the 251 respondents had experienced the intraoperative death of a patient.<sup>3</sup> Of these deaths, 60% were considered "expected" and 77% as non-preventable. The majority of these cases (80%) occurred during emergency surgery and 41% occurred during vascular surgery. Of the 19 respondents who had not experienced an intraoperative death, the majority were residents.

A 2005 survey by the Medical Protection Society [United Kingdom (UK)] of 200 each of orthopedic/trauma surgeons, cardiothoracic/general surgeons, anesthesiologists and OR personnel found that 82% of respondents experienced an intraoperative death. Thirty-six percent had experienced more than five intraoperative deaths. Eleven percent of subjects reported that the death had a lasting effect on their practice. Interestingly, investigators found a tendency of respondents in each group to "blame other members of the surgical team and to divide along specialty lines."<sup>21,22</sup>

Preliminary results of an on-line survey of 5,649 members of the Association of Anaesthetists of

Great Britain and Ireland (AAGBI) revealed that just over 80% of the 1,625 respondents had experienced the intraoperative death or serious injury to a patient. Twenty-five percent of respondents felt the incident was "probably preventable." Sixty percent of the catastrophes occurred during emergency surgery.<sup>22</sup> Another British survey, of 486 cardiac surgeons and anesthesiologists, found that 70% of the 371 respondents experienced an intraoperative death at least annually.<sup>23</sup> Unfortunately, no comparable data are available from the United States. Since practice patterns (including decisions about which patients to operate on) differ among countries, it would be important to have this information available.

## PHYSICIANS' RESPONSES TO THE DEATH OF A PATIENT

A considerable body of literature addresses the impact of patient death on health care providers, but most of it is in survey form, and essentially no prospective or interventional studies have been performed (Table 1). In this section, we will discuss the impact of patient death on physicians in general. Perioperative deaths will be discussed in the following section.

A 2000–2001 study examining the emotional response of medical students to their "most memorable" patient death found that, even when the students were not close to patients or had very limited contact with them, the patient's death was experienced as "emotionally powerful." Although 38% of the students were in contact with the patient for <24 h, 57% of the students rated the impact of the death as highly emotionally powerful, 29% as moderately powerful, and the remaining 14% as minimally emotionally powerful. Students who rated the deaths as emotionally powerful also were likely to describe the event as "disturbing." The "most memorable" patient death was the first death for 66% of students; the strong emotional reaction seemed to be tied to the newness of the experience. Patient deaths also caused the students to question their competence. Students worried that they were responsible, either because they had forgotten to do something or because they had done something wrong.<sup>24</sup>

A 2003 cross-sectional study of 188 academic internists (attendings, residents, and interns) sought to describe the emotional reactions of doctors to the recent death of a patient and to explore the effects of level of training on the doctors' reactions. Questionnaires were generated using various instruments for measuring stress, grief, and coping strategies. Thirty-one percent of the subjects rated the event as having strong emotional impact and 23% reported that the death was "very disturbing" to them. After patient deaths, junior residents reported needing significantly more emotional support than did senior residents and attending physicians, and they

**Table 1.** Review of Surveys Investigating Physicians' Attitudes Towards Perioperative Death

Reference	N	Physicians included	Response rate	Topic investigated	Main findings
AAGBI 2005 <sup>30</sup>	5649	54% anesthesiology attendings, 42% residents, 4% others (UK)	29%	Experiences with intraoperative catastrophes	80% experienced intraoperative death. 40% felt sense of responsibility, 24% required days to recover, 7% required years. 10% felt it compromised ability to provide anesthesia
Rhodes-Kropf et al.: Acad Med 2005 <sup>24</sup>	65	3rd-yr medical students (US)	49%	Experience of "most memorable" patient death	Most were not close with the patient. Still, 57% rate the death as highly emotionally powerful
Redinbaugh et al.: BMJ 2003 <sup>1</sup>	246	Attendings and residents (mostly internal medicine, US)	80%	Experiences in providing care and emotional reactions to patient death	Moderate levels of emotional impact of death. Stronger responses in women and those who had cared longer for the patient. Interns required more emotional support
Serwint et al.: J Ped 2006 <sup>25</sup>	88	Residents in pediatrics (US)	84%	Exposure and reactions to pediatric patient death, whether debriefing occurred	31% of residents expressed guilt, debriefing took place after only 30% of deaths
White and Akerele: Eur J Anaesthesiol 2005 <sup>3</sup>	300	53% anesthesiology attendings, 45% residents, 2% others (UK)	84%	Attitudes of anesthesiologists toward intraoperative death	92% had experienced intraoperative death, 87% had administered another anesthetic within 24 h. 71% felt it reasonable for medical staff not to take part in operations for 24 h after intraoperative death
Smith and Jones: BMJ 2001 <sup>29</sup>	44	100% attending orthopedic surgeons (UK)	70%	Attitudes of orthopedic surgeons toward intraoperative death	53% experienced an intraoperative death, 81% performed surgery that same day, 50% who experienced an intraoperative death believed that time off after an intraop death would be advisable. 80% of those who experienced an unexpected death believed that counseling should be offered
Goldstone et al.: BMJ 2004 <sup>23</sup>	486	100% cardiac surgery and anesthesiology attendings (UK)	76%	Attitudes of cardiac surgeons and anesthesiologists towards intraoperative deaths	53% of surgeons and 22% of anesthesiologists had stopped working for the rest of the day after an intraoperative death. 27% of surgeons and 26% of anesthesiologists thought they should stop working after an intraoperative death. 54% of surgeons and 52% of anesthesiologists wanted guidelines. 29% believed that an intraoperative death adversely affected their subsequent ability to work

AAGBI = Association of Anaesthetists of Great Britain and Ireland; UK = United Kingdom; US = United States.

tended to rely more on talking with each other rather than with an attending physician. The primary coping strategy, used by attendings and residents alike, was "getting emotional support" from

colleagues. Women doctors at all levels of training reported more psychological distress, more symptoms of grief and reported using more coping resources than their men counterparts.<sup>1</sup>

A cross-sectional survey of 74 senior pediatric residents at a large, academic, American medical center sought to describe residents' exposure and reactions to pediatric deaths, their debriefing experiences, and factors associated with debriefing. Thirty-one percent of respondents felt guilty about the patient's death. Nine percent felt responsible for the death. Female gender was weakly associated with increased feelings of guilt (95% CI 0.97–12.9,  $P = 0.06$ ). Remarks included statements such as "... I wondered if I should have done more. Did I miss something. . ." and "... I felt I should have done more, or been smarter, or been luckier . . ." An intern's perceived workload and sleep pattern were altered the night after patients died, "highlighting the importance of providing routine help to address feelings of grief and failure for residents who have experienced the death of a patient."<sup>25</sup> The authors recommended that "institutional commitments that allow scheduling of debriefing activities need to occur. Educators need to help train future physicians to recognize and accept their reactions, understand them as a normal part of their work, and acknowledge the importance of talking to others so they can incorporate these concepts into their professional development and utilize these skills throughout their careers."

Other survey studies confirm these results. Khaneja and Milrod reported that 61%–73% of pediatric attendings stated that they often perceived the death of their patients as a failure. One-hundred percent of resident physicians and 90% of attending physicians interviewed expressed a need for further support in dealing with death and dying. The authors recommended that debriefing should occur after every death.<sup>26</sup> Sack et al. found (via qualitative comments) that 25% of residents experienced guilt after the death of their patients.<sup>27</sup> In a longitudinal study, Firth-Cozens found that "dealing with death and dying" was the most commonly reported source of stress among junior house officers.<sup>28</sup>

In summary, studies show that approximately 25% to 75% of physicians suffer a strong emotional response to the death of a patient, even if they did not have a long-term relationship. The earlier physicians are in their training, the more significant the emotional impact. Almost all of those surveyed expressed the need for support from others in coping with this emotional response.

## PHYSICIANS' RESPONSES TO PERIOPERATIVE DEATHS

In 1998, a Falkirk Royal Infirmary orthopedic surgeon experienced two intraoperative deaths in the same day. During the subsequent "fatal accident inquiry," he was cleared of any blame. However, this event sparked a national discourse on how the aftermath of intraoperative deaths should be handled. Professor Sir Alfred Cuschieri described a death on

the operating table as a "harrowing experience for a surgeon" and advised that surgeons not operate for the rest of the day subsequent to an intraoperative death, given that they are not in an emotional or mental frame of mind to continue to operate. He called for national guidelines to protect surgeons who had experienced an intraoperative death. In 2001, the Royal College of Surgeons of Edinburgh published guidelines which recommended that, subsequent to an intraoperative death, surgeons (and perhaps the entire OR team) avoid further elective surgery that day.<sup>3</sup>

In response to this recommendation, a survey of 44 Welsh orthopedic surgeons was conducted and found that 53% of the 31 respondents had witnessed an intraoperative death. Eighty-one percent of those who had experienced an intraoperative death had performed further surgery that same day "... without subjective detriment to their operating skill." None of the surgeons admitted to compromised functionality, whereas 50% would have liked time off to reflect on the death.<sup>29</sup> A second survey, this time of cardiac surgeons and cardiac anesthesiologists, found that 25% believed they should stop work after an intraoperative death.<sup>23</sup>

The Medical Protection Society (UK) study, cited above, found that 55% of respondents thought that cases subsequent to an intraoperative death should be cancelled. Interestingly, there was a difference in opinion between specialties: 64% of OR personnel and anesthesiologists believed that all cases subsequent to an intraoperative death should be cancelled, as did 55% of orthopedic and trauma surgeons. Only 35% of cardiothoracic and general surgeons thought work should be ceased. The authors concluded that it would be unrealistic to set rigid guidelines as to how to handle the aftermath of an intraoperative death, given that the circumstances surrounding each case vary. They suggest that, while the opportunity to stop work should not be obligatory, it should be an option.<sup>21</sup>

The discussion initiated by the British surgical community resulted in the AAGBI survey of UK anesthesiologists discussed above.<sup>22</sup> Preliminary results revealed that 40% of the anesthesiologists who experienced an intraoperative catastrophe (death or serious injury to a patient) felt a sense of personal responsibility for the event. Reasons varied from feeling that "more could have been done" to believing that errors in judgment and mistakes were made. Deaths which involved children and mothers seemed to affect members the most. Although 24% of anesthesiologists reported that it took a few days to recover from the catastrophe and 7% said it either took them years to recover from the experience or that they never really recovered from it, only 10% thought that their ability to administer anesthesia was compromised in the immediate aftermath of the event. Seventy percent continued to provide anesthesia within the 24 h after the catastrophe, but many of these were not given other options or felt compelled to continue working.<sup>22</sup>

As for post-event support, only 39% of respondents had participated in informal debriefing with other involved members of the operative team, including both doctors and nurses. Debriefing was found to be “very helpful” by most. Formal departmental morbidity and mortality conferences and departmental support, in general, were also found to be helpful. Conversely, the majority of respondents who felt “deeply affected” by their events blamed their departments for lack of support. Others reported being “shunned” by colleagues. Only 23% of respondents discussed the catastrophe with family members, and of these, only 10% found this to be helpful.<sup>22</sup>

The comments collected revealed the heterogeneity of personalities, needs, and experiences of anesthesiologists. Although some anesthesiologists reported “living the nightmare from months to years,” others seemed immune to the experience, with one respondent commenting that anesthesiologists who “could not deal with deaths on the table” should consider changing careers. In fact, many residents reported colleagues who had left anesthesia for other specialties and attendings reported colleagues who considered early retirement. Anesthesiologists specializing in cardiac and vascular anesthesia and critical care seemed to be most “immune” to intraoperative catastrophes, reflecting, perhaps, a decrease in emotional response secondary to increased exposure to intraoperative deaths and/or better coping skills.<sup>22</sup>

Another survey of 251 UK anesthesiologists found very similar results: 35% of respondents felt a sense of personal responsibility after an intraoperative death, whereas 63% felt no responsibility at all. Although 87% delivered another anesthetic within 24 h and 77% did not feel that their ability to administer anesthesia was compromised, 71% of respondents believed that it would be reasonable that “medical personnel should not take part in operations in the 24 h after witnessing an intraoperative death.” Only 25%, however, thought this was practical.<sup>3</sup>

Again, fewer than one-third of respondents participated in debriefing, departmental morbidity and mortality conferences, or discussed the death with the patient’s family post-event. In fact, less than half of the anesthesiologists thought that speaking with the patient’s family after a death was appropriate. In contrast, 71% of respondents believed that informal debriefing with the surgical team involved would be appropriate, and 77% believed that the case should be discussed at departmental morbidity and mortality conferences.<sup>3</sup>

Another British study sought to examine not only physician attitudes toward intraoperative deaths, but also to evaluate their effect upon subsequent patients’ outcomes. Three-hundred-and-seventy-one attending level cardiac surgeons and anesthesiologists completed surveys. Seventy percent of respondents indicated that they experienced an intraoperative death at least annually. More surgeons (53%) than anesthesiologists (22%) had stopped working the day after an

intraoperative death. Factors influencing the decision to stop were similar in both groups, with fatigue being the most commonly cited, followed by emotion and advice from colleagues. Twenty-seven percent of surgeons and 26% of anesthesiologists thought that they should stop working after an intraoperative death and 54% of surgeons and 52% of anesthesiologists were in support of guidelines for how to handle the aftermath of an intraoperative death.<sup>23</sup>

The outcomes of 233 patients operated on by surgeons who had experienced an intraoperative death within the preceding 48 h were compared with 932 matched controls with regard to in-hospital mortality and length of hospital stay. No increased mortality was identified, but patients in the study group did have a statistically significant increase in length of intensive care unit and ward stay.<sup>23</sup> This study did not measure outcome variables in relation to whether or not the anesthesiologist had experienced an intraoperative death in the preceding 48 h.

These surveys find that physician responses to an intraoperative death are qualitatively similar to those reported after patient deaths in other settings; a significant fraction of anesthesiologists and surgeons is profoundly emotionally affected and will require support from others in order to cope adequately. At least half of those surveyed would have preferred not to work for at least some time after an intraoperative catastrophe, and some evidence suggests poor patient outcomes if the affected team continues operating.

## STRATEGIES FOR HANDLING THE AFTERMATH OF PERIOPERATIVE DEATHS: THE UK EXPERIENCE

At an AAGBI national conference, two panels convened to discuss the issues of intraoperative deaths and how the impact of intraoperative deaths on health care providers should be handled. It was decided that the AAGBI would produce practice guidelines. This spearheaded not only the online AAGBI survey discussed previously, but also the publication of a document in 2005, “Catastrophes in Anaesthetic Practice—Dealing with the Aftermath.” This document, launched at the AAGBI annual Congress in September 2005, was designed to inform anesthesiologists of the incidence of intraoperative deaths and the fact that every anesthesiologist is likely to be involved in an anesthetic catastrophe at some point in their careers. The document also advised that, although the majority of intraoperative deaths are “expected,” whether a death is “expected” or “unexpected” may be irrelevant, as any anesthesiologist may be emotionally affected by any intraoperative death or serious injury to a patient. The authors warn that the psychological impact of an intraoperative death or serious injury, against the background of high baseline stress in anesthesia practice, may tip the balance towards acute personal, psychological or physical disaster. They urge colleagues, departments, hospitals, families, and society in general

**Table 2.** Summary of Association of Anaesthetists of Great Britain and Ireland (AAGBI) Recommendations<sup>30</sup>

**Pragmatic recommendations**

- Keep accurate and contemporaneous records. They should be legible, timed, dated, and signed
- If a resident is involved, an attending should be present to handle the situation. The attending (or a private practitioner) should inform a colleague who should assist with the aftermath. A decision will need to be made as to whether or not the anesthesiologist(s) involved should continue with their clinical duties for that day
- If the patient survives the catastrophe, the anesthesiologist should take an interest in his/her progress by regular visits to the patient while still in house. Regular communication with the family is also helpful
- When breaking the news to family: never do so over the telephone and do not speak with the family alone or allow the surgical team to do this. A team approach is essential. If the cause is known, explain it in lay terms. If the cause has yet to be identified, do not speculate
- If appropriate assure the family that all that could be done was done to keep their relative alive and that their relative was not in pain or aware during the resuscitation attempts
- Inform them that a full investigation will take place
- An apology does not imply fault
- Team debriefing should occur at a time to suit all staff and preferably within a few hours of the catastrophe. The goals are to gain feedback while the details of the event are still clear and to allay anxieties or misconceptions experienced by the OR team

**What the department should do**

- Colleagues should listen to the individual involved and encourage him/her to talk, refraining from being judgmental and keeping all conversations confidential
- An experienced and sympathetic senior colleague should be assigned to act as mentor and provide support for as long as necessary
- Members of the department may have to take over the involved anesthesiologist's duties for a period of time
- At a later date, a departmental Morbidity and Mortality meeting may be useful to inform and learn lessons from the event

**For the anaesthesiologist involved**

- Common feelings to have after a traumatic incident include reliving the event, shock, restlessness, a sense of doom and gloom, anger, fear and guilt. Physical effects may also be experienced
- Be careful ... accidents happen more frequently after severe stress, especially at home or on the road
- Cooperate with all investigations
- Get support from a senior colleague or mentor and arrange regular meetings
- Talk about the event with your colleagues and relatives. Try not to isolate yourself
- Get colleagues to help with difficult cases and take up some of your duties
- Don't smoke or drink too much or self medicate. Consult with your General Practitioner if needed
- Give yourself time to recover
- You may want to ask for help if: you experience recurrent memories, dreams or images, overwhelming physical sensations (fatigue, palpitations, muscle tension), exhaustion, burn out, loneliness, isolation or if you feel your work performance is affected, you have nightmares or other sleep disturbance, you feel accident prone and cannot concentrate, your relationships suffer, or you find yourself relying on medication or alcohol

to provide practical help and support to anesthesiologists involved in these events according to the needs of that individual, as "part of good clinical and corporate governance and good risk management."<sup>30</sup>

The AAGBI document suggests pragmatic ways of dealing with the aftermath of a patient death or serious injury during anesthesia (Table 2). The document asserts that, to gain insight and feedback while details are still fresh, and to allay anxieties or misconceptions experienced by members of the OR team, debriefing of the entire OR team should occur at a time to suit all staff, preferably within a few hours of the catastrophe and in the presence of a trained counselor. Regardless of the type of debriefing process used, every hospital should ensure that any affected member of the staff has an opportunity to see a trained counselor within 72 h of the event.

Only general advice is given. It is recommended that a plan of action be made at the departmental level and tailored to suit the particular individual's needs. The importance of departmental recognition and support of the traumatized anesthesiologist is emphasized as "a stressed anesthetist will be more prone to

making errors."<sup>30</sup> The document also notes that an anesthesiologist working in private practice may feel particularly vulnerable when a catastrophe occurs and that assistance from the department and from colleagues should not be any less than if the catastrophe had occurred at a teaching hospital.

Advice is also offered directly to the anesthesiologist involved. The document warns that doctors are notoriously reluctant to seek professional help. It notes that, although hospitals have a duty of care towards staff and colleagues have a duty to recognize signs of stress in each other, ultimately each individual has a responsibility to ensure that he or she is fit to work and care for patients.<sup>30</sup>

**STRATEGIES FOR HANDLING THE AFTERMATH OF PERIOPERATIVE DEATHS: THE US EXPERIENCE**

Fewer studies on this topic have been performed in the United States. Several articles make recommendations as to how to handle the aftermath of intraoperative deaths, but no large-scale survey has been conducted, nor has a consensus statement been published.

The simulation-based training in Anesthesia Crisis Resource Management curriculum created by Gaba et al. uses simulation scenarios that require complex decision-making, interaction with different personnel, and debriefing sessions. During a “death scenario,” participants, unaware of what is about to unfold, experience the death of a patient under general anesthesia. The scenario continues with a role-playing exercise in which participants are asked to deliver the bad news to a simulated family member of the patient, to debrief and to perform appropriate administrative activities. The authors note that, although the simulated relative is an actor, “the requirement to explain to the ‘family’ what has just transpired is a major challenge. These sessions are often highly emotional and are moving to observe.” Questionnaire data evaluating the death scenario and debriefing component of the Anesthesia Crisis Resource Management were “extremely positive.”<sup>31</sup>

Many training programs have started incorporating similar educational opportunities into their curricula. The Program to Enhance Relational and Communication Skills at Boston Children’s Hospital, for example, is a multidisciplinary training program on communication and relational abilities that uses lectures, short films, and role playing exercises.<sup>32,33</sup>

Soto and Rosen recommended that the military “BICEPS” model be incorporated into anesthesiology training programs.<sup>34</sup> This model, used for soldiers who have suffered traumatic events on the battlefield, is an approach to handling post-combat stress, fatigue, and burn-out. The acronym, BICEPS, represents the following strategies:

- Brevity – dealing with the stressor will be brief and focused;
- Immediacy – Feelings of grief or guilt should be confronted soon after the traumatic event or as soon as symptoms are recognized;
- Centrality – discussions should take place with all affected personnel in a central location, in an organized manner;
- Expectancy – It should be clear that the expectation is that the affected individual will return to work and that a plan for returning to normal productivity will be outlined (specified time off, increasing supervision, decreasing patient acuity);
- Proximity–discussions and interventions should take place near the place of work to maintain friendships and bonding. Sending a worker home for a week can increase feelings of guilt and alienation;
- Simplicity–Discuss and treat only the current problem and avoid complicated recovery regimens.

Although the stresses confronting an anesthesiologist and a front-line soldier are quite different, the authors write: “we both deal with the loss of life, grief, sleep deprivation and guilt feelings. Our goal

should be returning anesthesiologists to the OR with a decreased risk of substance abuse, addiction and suicide.”<sup>34</sup>

Other authors emphasize the importance of open communication among colleagues and between physicians and patients and their families. Manser and Staender suggested that open discussion among colleagues is likely to mitigate psychological distress and can be a relief for health care providers.<sup>33</sup> Lack of open communication and adequate debriefing may induce feelings of incompetence and isolation, leading to psychological distress including depression, posttraumatic stress disorder, nightmares, irritability, and difficulty concentrating. As everyone has different needs, the efficacy of compulsory single session psychological debriefing interventions, such as Critical Incident Stress Debriefing has been challenged.<sup>33,35,36</sup> At the same time, adequate systems for team debriefing and incident analysis must be in place to learn from adverse events and to avoid recurrences. The main function of team debriefing should be to foster open communication and provide support for those who choose to participate.<sup>33</sup>

The importance of openly disclosing facts pertaining to a catastrophe with the patient and family is stressed by many authors. A discussion of open disclosure is beyond the scope of this article, but “breaking bad news” to families and speaking with them about adverse outcomes has not traditionally been part of anesthesia training. Even under ideal circumstances, disclosure is difficult and stressful. All health care providers need training in what to say and do when disclosing an adverse event, and in how to handle the reactions of patients and family members.<sup>33</sup>

The Anesthesia Patient Safety Foundation (APSF) desires to “promote thoughtful, compassionate, and open support for anesthesia providers who have been involved in a catastrophic anesthetic accident (even one with an eventual good outcome)”.<sup>37</sup> It is recommended that this should occur at the local level, within the institution, and concrete plans, widely disseminated to everyone in each department, should be in place so as to avoid confusion at the time of the event. They urge department leaders to immediately activate a pre-planned response to provide support and counseling, as well as specific advice and encouragement regarding open disclosure. “Administrative Guidelines for Response to an Adverse Anesthesia Event” is available online at [www.apsf.org](http://www.apsf.org).<sup>38</sup> This series of recommendations is intended to minimize patient injury and identify the cause(s) of an adverse event (Table 3). Enhanced vigilance and sympathetic support from co-workers was seen as the best strategy for avoiding the escalation of stress in the anesthesiologist that could result in harm to him/herself or to patients.<sup>37</sup> In addition, the ASA/APSF video series,

**Table 3.** Anesthesia Patient Safety Foundation Adverse Event Protocol: "The Basic Plan"<sup>39</sup>

Upon recognition of a major adverse event:

Call for help

The primary caregiver should continue and direct patient care, except in very unusual circumstances

An "incident supervisor" should be assigned who assumes overall direction and control of the event, organizes and assigns tasks to all in the operating room (OR), verifies the event has ended, involves consultants and advisors as indicated, coordinates and facilitates communications (with the surgical team in the OR, then with the surgeon and anesthesiologist, and, if appropriate, with the patient and/or family)

Close the OR for the day. If any equipment needs to be tested, do so. Discard nothing

Contact the facility's risk manager

Arrange immediate comfort and support for the patient and/or family. Share as much information as possible. (Given the medical-legal implications of full disclosure, the issue of immediate full disclosure is not addressed)

Designate a follow-up supervisor (who may or may not be the same as the Incident Supervisor) who will verify the elements of the protocol have been applied, consider whether to organize team debriefing, maintain ongoing communication with all caregivers involved, coordinating and facilitating as much integration as possible, pursue the accident investigation in conjunction with involved quality assurance and risk management systems and personnel

Document everything

Try to review formal reports submitted by the institution to the authorities

Continue involvement after the event when the patient survives: talk to the surgeons about care and make suggestions as indicated, be visible, supportive and not defensive with all involved, communicate as much as possible (see #6 above)

also available on the APSF website, includes an instructional video which addresses the aftermath of anesthetic catastrophes.

## CONCLUSIONS

Physicians are known for neglecting their own well-being to provide for their patients. Unfortunately, "self-neglect" often leads to personal suffering that may result in decreased performance and poor patient care. The aftermath of a perioperative catastrophe provides a good example: continuing "as if nothing happened" may lead to significant harm to the physician and also to suboptimal care for subsequent patients.

Current data show that anesthesiologists are likely to experience at least one perioperative death in their lifetime, that at least 30% are profoundly affected by such an event, and that the majority feel they require help from others after the event. Many feel they should stop work for the day. The earlier in training, the more stressful such an event is perceived. Anesthesiologists are possibly at higher risk for stress-related disorders as exemplified by drug abuse and suicide rates. Additionally, anesthesia training does not traditionally address patient death and how to communicate with families and other related parties after an adverse event. This may increase the risk for stress-related hazards in the aftermath of perioperative catastrophes.

The UK has adopted a consensus statement on how to deal with the aftermath of intraoperative catastrophes. Recommendations published by the APSF primarily focus on logistical issues. A US consensus statement with national guidelines is therefore needed. It should address 1) instruction, for anesthesiologists at all levels of training, in coping with the aftermath of poor outcomes, 2) suggestions for the creation of departmental infrastructure to provide customized support for affected individuals including

time out of the OR as needed, 3) an agenda for further research, particularly into the effects of a perioperative catastrophe on subsequent professional functioning of the OR team, 4) an agenda for incorporating skills related to handling the aftermath of perioperative catastrophes into anesthesia training programs.

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