

## Impact of adverse events on anesthetists' health: a Belgian case study

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**Abstract** :Background and objectives: an increasing number of studies have illustrated the potential impact of medical errors and patient injuries on healthcare providers. This has led clinicians to be considered as the “second victims” of patient harm. In this study, we explore the impact of adverse events on anesthetists' physical and mental health using a reporting database from the University Hospital of Liège in Belgium.

Methods: we collected information on the impact of adverse events on anesthetists' health using data from an incident/accident reporting system and from accident analysis meetings.

Results: feelings of anger, questioning, intrusive thoughts and feelings of guilt were the most frequently cited impacts on anesthetists' health.

Conclusions: Patient injuries can profoundly affect anesthetists' health. Debriefing in a climate of trust and empathy seems to be primordial.

**Key words** : Second victim, Healthcare Workers' Attitudes, Emotional impacts, Adverse events, M&M meetings

### INTRODUCTION

Medical errors and patient injuries may have a tremendous impact on healthcare providers, which has led clinicians to be considered as the “second victims” of patient harm (1, 2). However, to date, very little research has been devoted specifically to the impact of adverse events on anesthetists' well-being. Gazoni and colleagues (3) conducted a national survey among anesthetists in the United States, using postal self-questionnaires. This survey revealed that 84% of respondents had been involved in at least one serious injury of a perioperative patient over the course of their career. The majority of respondents acknowledged that after the adverse event they had experienced guilt, depression, anger, anxiety, sleeplessness, fear of litigation, and fear of judgment by colleagues. While the majority stated it took one week to emotionally recover from the event, 19% of respondents revealed that they have never fully recovered. These negative emotional

states may have an impact on performance and are often transferred into the anesthetist's personal life (4-7). White and Akerele (8) conducted a survey on anesthetists in England, also using a questionnaire. These results revealed that 92% of respondents had experienced the intraoperative death of a patient and 35% said that they felt responsible for the death, despite the fact that patient injuries are likely multifactorial in the operating theatre. Some healthcare institutions have implemented post-event support to clinicians. In 2001, the Royal College of Surgeons of Edinburgh published guidelines recommending that after a serious incident, surgeons should refrain from further elective surgery that same day. In the study of Gazoni et al. (3), more than 75% of respondents opined that talking with other anesthesia staff could be helpful after an adverse event.

Our aim was to study the impact of adverse events on anesthetists' health in Belgium, taking into account the fact that medical practices, support systems, attitudes, and legal systems differ from one country to another. In the majority of previous studies, interviews or self-questionnaires were used to collect information about the emotional impact, regardless of the time frame between the survey and the event. Therefore, these studies are prone to recall bias (memory reconstruction). In the present study, we aimed to explore the impact of the adverse event immediately after its appearance.

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## METHODS : THE INCIDENT/ACCIDENT REPORTING SYSTEM

We used data from the incident/accident reporting system that was implemented in 2000 in the anesthesia department of the University Hospital of Liège (Belgium). The reporting system has been previously described in Nyssen *et al.* (9). It covers all situations that have or could have adversely impacted patient safety. Incidents are reported by the anesthetist who experienced the event. There are two sections in the incident/accident report form: the first one asks for a narrative description of the event, and the second one asks for details of the contributing factors, the emotional impact on the anesthetist, and preventive actions taken to improve the anesthetist's well-being just after the event.

Alongside the reporting system, the anesthesia department organized one "safety meeting" per month, along the lines of the Morbidity & Mortality (M&M) meetings, to discuss the reported events. In addition to the anesthetist(s), all those involved in the case (e.g. surgeons, nurses, technicians, pharmacists, etc.) were invited to participate in this meeting. It was left to the discretion of the persons who were involved in the incident if they wanted to present the case or not. The meeting was organized and facilitated by an anesthetist trained in systemic accident analysis and debriefing techniques. The format of the meeting was designed to unravel the uncertainty of the context of the event and to promote understanding. The anesthetist who had experienced the case was asked to prepare a PowerPoint presentation with precise information, including patient data, monitored and recorded patient values. The facilitator controlled the meeting by interrupting the presentation of the facts, asking the audience to formulate diagnoses and plan future actions based on the information available at the time in order to minimize retrospective bias (or the influence of outcome knowledge on causality judgement (10)). A brief overview of the incident was presented at the end of the meeting, both to open the discussion on "best practices" and to facilitate generalisation and create emotional distance with the case that had been presented.

*Ethics*

Ethical approval for this study (Ethical Committee N° 98/3) was provided by the Ethical Committee of Liège University Hospital, Liège, Belgium (Chaired by Prof. Albert Dresse) on 20 January 1998.

*Statistical analyses*

We conducted Chi2, variance analyses and Student-t analyses using Statistica 13 software (StatSoft, Tulsa).

## RESULTS

From March 2002 to March 2003, 217 adverse events were reported and analysed in safety meetings. For our statistical analyses, 5 adverse events were removed because of missing data.

The immediate adverse outcomes for the patients were severe physiological disturbances (n = 60), minor physiological disturbances (n = 56), cardiac arrests (n = 26) and corporal injuries (n = 16). In 54 patients, no immediate adverse outcome was noted.

Long-term outcomes for the patient included no effect (n = 134), minor morbidity (n = 22), intensive care (n = 19), prolonged hospitalization (n = 17), death (n = 10), major morbidity (n = 7), and anesthesia awareness (n = 3).

Table 1 presents the emotional and physical impact of the adverse events on anesthetists' health. "Questioning", "intrusive thoughts" and "feelings of guilt" were the most frequently cited impacts on anesthetists' health.

In 41 cases, patients were classified as ASA class 1, 104 cases concerned patients with ASA class 2, 56 patients were ASA class 3, and 11 patients were ASA class 4. Our analysis showed that anesthetists reported significantly more feelings of guilt when the adverse event involved patients in higher ASA classes.

In 61% of the cases (n = 133), the incident was evaluated as being preventable. Anesthetists reported more emotional and physical impact ( $F(2,134) = 3.49, p < 0.05$ ) when the adverse event was perceived as being preventable ( $3.03 \pm 0.28$ ) as opposed to unpreventable ( $1.82 \pm 0.51$ ). Feelings of guilt were more present ( $\text{Chi}^2 = 7.45, p < 0.05$ ) when the adverse event was perceived as being preventable (1/3 of anesthetists) as opposed to unpreventable (1/20 of anesthetists). Similarly, anesthetists reported more ruminating and intrusive thoughts ( $\text{Chi}^2 = 6.17, p < 0.05$ ) when the event was evaluated as being preventable (1/3 of anesthetists) as opposed to unpreventable (1/7 of anesthetists).

In contrast, more questions were asked ( $\text{Chi}^2 = 7.93, p < 0.05$ ) when the event was evaluated as unpreventable (1/2 of anesthetists) as opposed to preventable (1/3 of anesthetists).

Statistical analysis showed no association between the degree of experience of the anesthetist who had experienced the adverse event and the emotional impact on the anesthetist's health. There was also no significant relationship between the immediate outcome for the patient and the emotional impact on anesthetists' health ( $F(4,127) = 0.54, p = 0.7$ ) (see Table 1). In contrast, long-term patient outcomes significantly influenced the emotional impact upon the anesthetist ( $F(6,120) = 2.28, p < 0.05$ ), more specifically, on feelings of anger ( $p < 0.05$ ), disturbed appetite ( $p < 0.05$ ) and loss of pleasure ( $p < 0.01$ ).

Regarding feelings of anger, 1/5 of anesthetists reported this feeling when there were no long-term consequences for the patient, 1/3 when the patient died, and 1/2 when major morbidity occurred.

Appetite disturbance was reported by 1/20 of anesthetists when there were no long-term consequences for the patient, 1/6 when major morbidity occurred and 1/3 when the patient died.

Regarding loss of pleasure, 1/10 of anesthetists reported a loss of pleasure when there were no long-term consequences for the patient, 1/6 when major morbidity occurred, and 1/2 when the patient died.

Higher emotional and physical impact was reported in relation to emergency procedures ( $3.92 \pm 3.12$ ) compared to non-emergency procedures ( $2.71 \pm 2.15$ ). More sleep disorders were reported when the incident had occurred during an emergency procedure ( $\text{Chi}^2 = 13.47, p < 0.0005$ ). Also, 1/3 of anesthetists reported concentration disorders when

the incident had occurred during an emergency procedure, as opposed to 1/10 when the procedure was scheduled ( $\text{Chi}^2 = 7.52, p < 0.01$ ).

Finally, we analysed the influence of the contributing factors cited by the anesthetist to explain the emotional impact of the event. These contributing factors were divided into three categories: organisational factors (such as communication difficulties, team coordination, etc.), individual factors (such as distraction, human error, etc.) and patient factors (such as the patient's physical health, etc.). Our results revealed a significant relationship between feelings of anger and the presence of organisational contributing factors ( $t(215) = -7.19, p < 0.000$ ) and/or patient related factors ( $t(215) = -2.35, p < 0.05$ ). Feelings of guilt were significantly related to individual contributing factors ( $t(137) = -2.69, p < 0.001$ ) but not to organisational ( $t(137) = 0.35, p = 0.72$ ) and patient related factors ( $t(137) = -1.58, p = 0.11$ ).

## DISCUSSION

Our results highlight the impact of adverse events experienced by anesthetists on their mental and physical health. Ullstrom et al. (11) classified the potential impact of adverse events into three categories: emotional reactions, professional performance and duration of impact. In our study, feelings of anger, questioning, intrusive thoughts and feelings of guilt were the most frequently cited

Table 1

Number of anesthetists who reported emotional and physical impacts of these accidents and their statistical links with immediate and long-term consequences for the patient.

Impacts of accident for the anesthetist	Number of anesthetists	Link with immediate consequences for the patient ( $\text{Chi}^2$ and p values)	Link with long-term consequences for the patient ( $\text{Chi}^2$ and p values)
Feeling of anger (total of all types of anger)	71	1.46, $p=0.83$	<b>13.62, <math>p&lt;0.05</math></b>
Questioning	56	2.94, $p=0.57$	5.66, $p=0.46$
Rumination and intrusive thoughts about the event	47	1.18, $p=0.88$	9.42, $p=0.15$
Feeling of guilt	33	3.73, $p=0.44$	4.49, $p=0.61$
Feeling of anger against the organisation	27	2.43, $p=0.66$	9.79, $p=0.13$
Fear	21	2.92, $p=0.57$	0.73, $p=0.99$
Feeling of anger against self	20	<b>16.66, <math>p&lt;0.005</math></b>	<b>17.79, <math>p&lt;0.01</math></b>
Feeling of anger against the team	20	3.39, $p=0.49$	8.83, $p=0.18$
Difficulty concentrating	17	3.05, $p=0.55$	9.46, $p=0.15$
Other	16	1.65, $p=0.8$	3.59, $p=0.73$
Loss of pleasure	13	2.94, $p=0.57$	<b>16.92, <math>p&lt;0.01</math></b>
Sleep disorder	11	2.56, $p=0.63$	7.69, $p=0.26$
Appetite disturbance	10	2.67, $p=0.61$	<b>14.18, <math>p&lt;0.05</math></b>
Feeling of anger against the equipment	4	6.55, $p=0.16$	3.62, $p=0.73$

emotional impacts by anesthetists immediately after the adverse event. Although we acknowledge that results may reflect the country of origin, our findings are similar to Gazoni's findings (3). More than 70% of American anesthetists indicated that they experienced obsession thoughts, anxiety and guilt after an adverse event. Scott *et al.* (12) described in detail the symptoms experienced by 31 second victims (American physicians, nurses and other clinicians). Two emotional symptoms characterized the second victim syndrome: the "mulling" (compulsive thinking about the event) and the "triggering" (recurrence of the emotional impact of the event due to a trigger). In psychopathological literature, ruminations and intrusive thoughts as well as guilt are used to define a traumatic state and are included in the diagnostic symptoms of Post-Traumatic Stress Disorder, PTSD (DSM 5). Our findings clearly indicate a risk of PTSD after the experience of an adverse event.

Our results revealed that the most critical elements from a psychopathological point of view were events leading to long-term consequences for the patient as well as events in patients with high ASA status. Generally speaking, patients in ASA classes 3 and 4 are surrounded by a number of safety measures in the operating theatre (extensive equipment, high level of expertise, etc.). This might explain why anesthetists felt particularly guilty when despite the precautions, things nevertheless went wrong.

By means of a survey in more than 3100 physicians from the USA and Canada, Waterman *et al.* (13) evaluated the impact of medical errors. They demonstrated that the likelihood of emotional distress in physicians increased with the severity of the error. However, even those involved in near misses experienced a high rate of emotional impact.

In a longitudinal study, West *et al.* (5) demonstrated that American residents reporting self-perceived errors had higher levels of burnout and depression. Attribution of causality appears to be an influential factor in the development of emotional distress. Since we focused on the emotional impact of an incident without specific reference to a particular human error, we cannot make any comparison with our study. Nevertheless, our results highlighted a significant relationship between feelings of guilt and the perception of responsibility. Anesthetists felt guilty when they perceived that individual factors had contributed to the adverse event, while they felt anger when the adverse event was attributed to organisational and/or patient-related factors. In the study from Engel

& *al.* (6), perception of responsibility was also associated with more intense reactions and greater personal anguish. Although sense of responsibility is a valuable competence among professionals, our results show the importance of creating a multi-causal model of accident analysis, in order to prevent feelings of guilt as well as intrusive thoughts and ruminations, which are characteristics of PTSD.

Surprisingly, the degree of experience of the anesthetist had no effect on the emotional impact in our study. Experienced anesthetists present more self-confidence and empowerment, which are two characteristics that have been demonstrated as moderators of stress (14, 15). Therefore, it could be assumed that experienced anesthetists would be able to better handle the emotional impact of adverse events. In the study by Scott *et al.* (12.) emotional symptoms did not differ between genders or professional groups.

Eighty percent of anesthetists in our study indicated that talking after the event could be beneficial. However, they stated that they do not seek for consulting a psychologist, as some hospitals currently offer, but instead that they would like to discuss the event within the medical team, in order to be able to clarify decisions, find answers to their questions, and also to put an end to rumours that might be devastating for the individual. In a study from Hu (16), physicians from different specialities were questioned about their needs after a serious adverse patient event. The first most likely source of support was to be able to thoroughly discuss the event with physician colleagues. Anesthetists were significantly more likely to seek support than surgeons or emergency medicine physicians. Other studies (17, 18) reported the need of anesthetists to discuss an adverse event with colleagues, hospital staff or even the patient or patient's family. However, at this stage, it is not clear whether this is genuinely helpful to second victims. It certainly depends on how the discussion is organised and on the climate of trust and safety in which the event is discussed. For example, Gazoni and colleagues (3.) demonstrated that American anesthetists who attended a debriefing of an incident were more likely to feel personally responsible, to be anxious and to experience fear of litigation. In a previous study (19), we interviewed Belgian anesthetists about their motivation to attend M&M meetings. Participation in organizational learning emerged as the principal motivation, followed by accident prevention and team relationships. However, we also found that guilt and fear of judgment by colleagues were the most frequent reasons for non-participation.

When we asked anesthetists how they felt, they reported a feeling of fear before the safety meeting, whereas after the meeting they reported a feeling of peers' understanding and empathy. This confirms the need for second victims to be able to talk about adverse events in order to put an end to their questioning and rumination processes. When lacking answers, the coping strategies may become rigid, increasing the risk of PTSD.

Although in many healthcare institutions, a significant progress is made to implement best practices around M&M meetings, many physicians have little experience with this concept and only few have had formal training in accident analysis and debriefing skills. As a result, accident debriefing rarely involves the entire staff team, enhancing feelings of judgment and blame among the staff. Furthermore, despite the intentional openness of M&M meetings, they are sometimes seen as an opportunity to display knowledge and authority instead of exchanging views.

Some healthcare institutions have implemented programs to support post-event trauma, such as disclosure training programs and trauma support services. Denham (20) described five rights of the second victim, using the acronym TRUST : Treatment, Respect, Understanding and compassion, Supportive care, and Transparency and the opportunity to contribute to learning. Scott et al. (21) described the development of a three step clinician support program that includes: 1) the training of the local managers and colleagues who provide immediate support, 2) the training of risk managers who provide accident debriefing support and 3) the training of clinical psychologists who ensure access to an individual support. The implementation of this type of support programs requires the commitment of the whole organization, including the management, in order to offer appropriate care to emotionally injured clinicians. However, the authors found that approximately 60% of clinicians recovered well if their problem was recognized by local support. This confirms our idea that M&M meetings can play a relevant role in preventing emotional distress. Creating a forum to discuss practices within a context of trust can provide physicians with tools to better manage the impact of adverse events. It might also create an internal feedback loop within the staff team, enhancing a shared understanding and team support. This suggestion corresponds with recent research (22) which has emphasised that, despite the grave repercussions of medical accidents, potential positive outcomes may arise, such as greater

experience, assertiveness, self-confidence and improved colleague relationships.

### Limitations

The present study has some limitations. The study focused on French-speaking anesthetists working in a Belgian University Network. It is possible that the results reflect the working conditions of this academic sample in this specific country. However, no significant differences with other countries were found. Further work should compare anesthetic groups from other networks. Furthermore, attempts should be made to compare different support programs in order to better understand the optimal support for the second victim and how to organise these programs in the short and long term.

### CONCLUSIONS

This study provides evidence that serious patient injuries can have a profound impact on anesthetists' health, which can be related to the syndrome of PTSD. The majority of anesthetists felt that talking to colleagues is a vital part of handling the aftermath of an adverse event. Debriefing, when conducted within a climate of trust and empathy, also appears to be a beneficial social support tool that can promote emotional wellbeing.

### REFERENCES

1. Wears R.L. and Wu A.W. 2000. Dealing with failure: the aftermath of errors and adverse events. *Ann. Emerg. Med.* 39 : 344-346.
2. Wu. A.W. 2000. Medical error: the second victim. The doctor who makes the mistake needs help too. *B.M.J.* 320 : 726-727.
3. Gazoni F.M., Amato P.E., Malik Z.M. and Durieux M. E. 2012. The Impact of Perioperative Catastrophes on Anesthesiologists: Results of a National Survey 2012. *Anesth. Analg.* 114 (3) : 596-602.
4. Fisseni G., Pentzek M. and Abholz H. 2007. Responding to serious medical error in general practice consequences for the GPs involved: analysis of 75 cases from Germany. *Fam. Pract.* 71 : 9-13.
5. West C.P., Huschka M.M., Novotny P.J., Sloan J.A., Kolars J.C. and Habermann T.M. et al. 2006. Association of perceived medical errors with resident distress and empathy: a prospective longitudinal study. *JAMA.* 296 : 1071-1078.
6. Engel K.G., Rosenthal M. and Sutcliffe K.M. 2006. Residents' responses to medical error: coping, learning, and change. *Acad. Med.* 81: 86-93.
7. Sirriyeh R., Lawton R., Gardner P. and Armitage G. 2010. Coping with medical error: A systematic review of papers to assess the effects of involvement in medical errors on healthcare professionals' psychological well-being. *Qual. Sal. Health Care.* 19 (6): 1-8.

8. White S.M. and Akerele O. 2005. Anesthetists' attitudes to intraoperative death. *Eur. J. Anesthesiol.* 22 : 938-41.
9. Nyssen A.S., Aunac S., Faymonville M.L. and Lutte I. 2004. Reporting Systems in Health Care from a Case-by-Case Experience to a General Framework: an Example in Anesthesia. *Eur. J. Anesth.* 21 : 757-765.
10. Ross L. and Anderson CA. 1982. Shortcomings in the attribution process: On the origins and maintenance of erroneous social assessments. In: *Judgment under uncertainty heuristics and Biases.* p. 129-152. Cambridge: University Press.
11. Ullstrom S., Andreen Sachs M., Hansson J., Ovreteit J. and Brommels M. 2014. Suffering in silence: a qualitative study of second victims of adverse events. *BMJ Qual. Saf.* 23 : 325-331.
12. Scott S.D., Hirschinger L.E., Cox K.R., McCoig M., Brandt J. and Hall L.W. 2009. The natural history of recovery for the healthcare provider "second victim" after adverse patient events. *Qual. Saf. Health Care.* 18 : 325-330.
13. Waterman A.D., Garbutt J., Hazel E., Dunagan W.C., Levinson W., Frasier V.J. and Gallagher T.H. 2007. The emotional impact of medical errors on practicing physicians in the United States and Canada. *Jt. Comm. J. Qual. Patient Saf.* 33 : 467-476.
14. Karasek R.A. 1979. Job demands, job decision latitude and mental strain: Implication for job redesign. *Adm. Sci. Q.* 24 : 285-308.
15. Nyssen A.S., Hansez I., Baele P., De Keyser V. and Lamy M. 2003. Occupational stress and burnout in anesthesia. *Brit. J. Anaesth.* 90(3) : 333-337.
16. Hu Y.Y., Fix M.L., Hevelone N.D., Lipsitz S.R., Greenberg C.C., Weismann J.S. and Shapiro J. 2012. Physicians' needs in coping with emotional stressors: the case for peer support. *Arch. Surg.* 147 (3) : 212-217.
17. Pratt S.D. and Jachna B.R. 2015. Care of the clinician after an adverse event. *Int. J. Obstet. Anesth.* 24 : 54-63.
18. Souter K.J. and Gallagher T.H. 2012. The disclosure of Unanticipated Outcomes of Care and Medical Errors: What Does This Mean for Anesthesiologists? *Anesth. Analg.* 114(3) : 615-621.
19. Nyssen A.S., Gillet A., Cayet A.-M., Van Erck J., Gillet P. and Christiaens G. 2012. Systèmes de retour d'expérience : "Faut-il vraiment copier l'industrie?". *Risques & Qualité IX* (2) : 85-91.
20. Denham C.R. 2007. TRUST: the 5 rights of the second victim. *J Patient Saf.* 3 : 107-18.
21. Scott S.D., Hirschinger L.E., Cox K.R., McCoig M., Hahn-Cover K., Hepperly K.M. and Philips E.C. et al. 2010. Caring for our own: deploying a systemwide second victim rapid response team. *Jt. Comm. J. Qual. Patient Saf.* 36 : 233-40.
22. Larsson J. and Sanner M. 2010. Doing a good job and getting something good out of it: on stress and well-being in anesthesia. *Br. J. Anesth.* 105 (1) : 34-7.