Point-of-Contact Assessment of Nurse Anesthetists’ Knowledge and Perceptions of Management of Anesthesia-Related Critical Incidents

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Most anesthesia providers will experience at least one perioperative critical incident during their career, potentially causing critical incident stress symptoms that may affect their ability to provide patient care. The purpose of this descriptive pilot investigation of Certified Registered Nurse Anesthetists (CRNAs) was to determine if their knowledge of the psychological and physical ramifications of critical incidents, coping strategies to deal with critical incident stress, and satisfaction with departmental handling of critical incidents improved when a formal, institutionally relevant critical incident stress management policy and protocol was developed and implemented. Knowledge of the effects of a critical incident, available coping strategies, and the perceived value of a stress management support protocol were assessed by surveys conducted before and after the implementation of a formal educational program.

The results demonstrated that knowledge of critical incident stress and coping strategies improved with a staff educational program, with 25 of 26 respondents (96%) reporting that having a departmental critical incident stress management policy and protocol in place was valuable. This pilot investigation indicates that supportive protocols and education programs for critical incident stress management are beneficial and increase the CRNAs’ confidence in their ability to cope with critical incidents.

Keywords: Anesthesia, critical event, critical incident, critical incident stress, debriefing, critical incident stress management.

Certified Registered Nurse Anesthetists (CRNAs) provide anesthesia care for patients of all ages and acuity levels undergoing surgical procedures in a variety of settings. Although anesthesia care is extremely safe, critical perioperative incidents do occur. Critical incidents are defined as events that either cause or have the potential to cause patient injury, if not identified and corrected in a timely manner. Gazoni et al. found that approximately 84% of all practicing anesthesiologists had experienced a critical patient incident during their career. Therefore, it is likely that most anesthesia providers will be involved in at least one critical incident that may lead to critical incident stress symptoms. Gazoni and colleagues found that the stress imposed by a critical incident on anesthesia providers has a profound and lasting emotional impact that may affect their ability to provide patient care. Critical incident stress is defined as any event that produces psychological and/or physiological reactions such as shock, anger, confusion, excessive fatigue, sleep disturbances, anxiety, depression, and difficulty concentrating. Wu identified a related second-victim phenomenon, in which healthcare providers involved in unanticipated patient events become traumatized by the event and develop symptoms of anxiety, depression, shame, and self-doubt. Evidence demonstrates that exposure to work-related critical incidents impacts psychological performance and physical well-being of healthcare providers and is positively related to posttraumatic stress symptoms such as anxiety, depression, excessive fatigue, avoidance, and difficulty concentrating.

Critical incident stress management (CISM) is a comprehensive program designed to help individuals maintain or restore their well-being following a critical incident. Core elements of CISM include precrisis intervention, on-scene support services, defusing through debriefing, community outreach, support for significant others, and individual and group follow-up services. The precrisis intervention phase occurs before a critical incident and includes stress management education and the development and strengthening of coping skills. Critical incident stress debriefing is a specific intervention process developed to help prevent or limit the development of posttraumatic stress in victims and first responders to a major event.
Crisis intervention performed with critical incident stress debriefing techniques is effective in reducing posttraumatic stress disorder symptoms in healthcare providers following critical incidents. Critical incident stress debriefing enables participants to understand that they are not alone in their reactions to a distressing event and provides them with an opportunity to discuss their thoughts and feelings in a controlled, safe environment. Gazoni and colleagues found that supportive protocols and guidelines after adverse clinical incidents are needed to help anesthesia providers handle the aftermath of these incidents. Dominquez-Gomez and Rutledge and Ireland, Gilchrist, and Maconochie reported that the use of CISM techniques lowers stress symptoms in healthcare providers.

Healthcare providers practice in complex environments and occasionally experience unexpected patient outcomes. Few anesthesia departments have established CISM policies, and many CRNAs report that they feel underprepared to cope with the effects of a critical clinical incident. Therefore, many CRNAs suffer alone without support after these events. When considering that most anesthesia providers will experience at least one critical incident during their career, it stands to reason that CRNAs are at high risk for developing critical incident stress symptoms and would benefit from a supportive structure and policy.

Critical incident stress management programs are effective for supporting the development of healthy coping mechanisms, are beneficial to both healthcare providers and patients, and are essential for ensuring the delivery of high-quality patient care. Based on the effects of critical incidents on anesthesia providers and the lack of programs to address these effects, we believe there is an urgent need for institutions and providers to develop an improved understanding of the impact of critical incidents on CRNAs and institute effective support strategies to help them cope with the aftermath.

The purpose of this descriptive pilot investigation was to explore and describe the knowledge and perceptions of CRNAs about CISM in a single institution. The impact of a departmentwide CISM policy and procedures on CRNAs was assessed in 3 key areas: (1) knowledge of the psychological and physical ramifications of critical incidents; (2) knowledge of the coping strategies associated with critical incident stress; and (3) satisfaction with the departmental handling of critical incidents.

Materials and Methods
This descriptive, institutional review board–approved pilot investigation used a pre/postsurvey design to assess the knowledge and perceptions of staff CRNAs regarding the physical and psychological effects of a critical incident along with their knowledge of available coping strategies. In addition, the value of a stress management support protocol and satisfaction with departmental handling of a critical incident was assessed before and after a formal educational program addressing these topics was provided to all staff CRNAs. Demographic data and data regarding prior exposure to a critical incident were also collected.

• Site-Specific Protocol Development. A CISM site-specific protocol was developed using the Medically Induced Trauma Support Services Clinician Support Toolkit for Healthcare Organizations as the foundation for the protocol. This online toolkit was created to assist organizations in the development of their own adverse incident clinician support programs. The toolkit was provided to key anesthesia department stakeholders including the Anesthesia Department chair, the chief CRNA, the assistant chief CRNA, and representatives from the departmental education committee. The key stakeholders were asked to examine the components of the toolkit and discuss their applicability to the facility at an initial meeting. Modifications of the toolkit were addressed, and participants were permitted to submit additional modifications for consideration. The final site-specific protocol was approved by all stakeholders for implementation. This protocol included the development of a debriefing team, a formal notification chain, and a staff education program.

• Formation of a Critical Incident Stress Debriefing Team. A critical incident stress debriefing team was formed from stakeholder recommendations, which led to the recruitment of 10 anesthesia staff volunteers. The team members met to develop site-specific policies and procedures for team function, roles, responsibilities, and obligations, as well as a debriefing checklist. Sample Medically Induced Trauma Support Services policies and procedures were used as a guide. Participants provided feedback and suggestions during the meeting and through an online discussion forum. The input was compiled and incorporated into the final debriefing policies and procedures. The debriefing team was trained to implement peer debriefing in the event of a critical incident. A provision for follow up and referral to a corporate employee assistance program was included in the debriefing process.

• Development of a Formal Departmental Notification Chain. A formal notification chain to be used in the event of a critical incident was established and operationalized with input from the chief CRNA, the assistant chief CRNA, the Anesthesia Department chair, and the director of surgical services. The notification chain serves as a means of alerting the Anesthesia Department leadership that a critical clinical incident has occurred, so that the debriefing process can be initiated following the established procedures.

• Staff Education Program Development. A staff education program was developed with input from the Anesthesia Department education committee, key site
stakeholders, and the hospital chaplain. A list of topics and presentation formats on issues such as the impact of critical incidents, critical incident stress, resilience, grief, adversity, and healthy coping mechanisms was created. The educational program format included video presentations, live PowerPoint presentations, and self-directed learning educational materials. The self-directed educational materials were emailed to all staff CRNAs. In addition, information regarding critical incidents and critical incident stress was distributed to staff CRNAs in the form of pamphlets and handouts.

All staff CRNAs were educated on the potential physical and psychological impact of a critical incident and evidence-based recommendations for management of an incident. When the study began, there was no departmental policy or protocol in place in the event of a critical incident, and a CRNA involved in a critical incident was expected to resume clinical duties immediately following the incident with no debriefing. However, as part of the implementation of a departmental CISM protocol and education program, staff CRNAs were informed that if they were involved in a critical incident, they would be immediately relieved from duties for a time deemed appropriate to the severity of the incident and would receive peer debriefing.

- **Survey.** Fifty-seven staff CRNAs in the Anesthesia Department of a southeastern United States level I trauma center consented to participate in the study. They were asked to respond to an anonymous electronic survey to assess their knowledge of critical incident stress, CISM, and the value of a departmental policy and protocol for managing a critical incident.

A presurvey was administered before institution of the departmental policy and protocol and implementation of the education program. The presurvey contained 8 demographic items and 7 items related to participant knowledge of critical incident stress, stress management, and critical incident–related departmental procedures. The demographic items consisted of gender, age, years of anesthesia practice experience, personal involvement in a critical incident, timing and reporting of the incident, type of symptoms experienced following an incident, and the presence or absence of a formal departmental CISM protocol at the time of the incident.

The postsurvey was administered immediately after the departmental policy and protocol was adopted and the education program was completed. It contained the 7 questions from the presurvey that related to knowledge of critical incident–related stress, stress management, and departmental policies and procedures. Each CRNA was provided a code number to enter the internet-based survey, and the number was used to match the presurvey and postsurvey responses. A reminder to complete the surveys was sent 1 week after the initial request. Of the 7 survey items on both the presurvey and postsurvey, 3 required participants to select from a specific list of responses, and the remaining 4 were scored with a Likert-type scale. The data were analyzed by using descriptive statistics and by comparisons of the percent of participants selecting the potential responses associated with each survey question before and after the education program.

**Results**

Of the 57 preintervention and postintervention surveys distributed to staff CRNAs, 41 responses were received for the presurvey and 31 responses were received for the postsurvey. Only those participants who completed both surveys with no missing data were included in the study. Of the 57 CRNAs who received surveys, 26 participants met these criteria and were included in the study sample for an overall complete response rate of 46%. Of the 26 participants, 21 (81%) were women, and 20 (77%) had less than 10 years’ anesthesia practice experience. The participants ranged in age from 25 to 66 years, with 73% (19 of 26) between the ages of 25 to 45 years (Figure 1).

Of the 26 participants, 25 (96%) reported being worried about being involved in a critical incident, and 15 (58%) reported actually being involved in a critical incident, with 80% (12 of 15) of these incidents occurring within the last 5 years. Of the 15 participants involved in a critical incident, 14 (93%) reported the critical incident at the time of occurrence. None of the study participants reportedly were debriefed following the incident, and there was no formal departmental critical incident stress debriefing policy in place in their institution at the time of the incident. Of the 15 participants who had experienced a critical incident, 9 (60%) reported feelings of self-doubt, 9 (60%) reported anxiety, 6 (40%) reported difficulty focusing, and 6 (40%) reported feelings of anger and irritability after the event (Figure 2).

In the presurvey, which was administered before the adoption of a CISM policy and protocol and participation in a staff education program, participants were asked to identify the institution’s current critical incident management practices and the services that they believed would
be beneficial in a departmental critical incident stress response program. None of the respondents indicated that there was a debriefing process in place, and only 1 respondent believed that a CRNA was relieved from clinical duties after a critical incident. Of the 26 respondents, 11 (42%) believed the practitioner involved would discuss the incident with departmental authorities, and 10 (38%) believed the practitioner involved would immediately return to clinical duties (Table 1). Seventy-three percent (19 of 26) responded that a safe opportunity to contribute insights for prevention of future incidents would be beneficial, while 65% (17 of 26) reported that a staff education program regarding critical incident stress symptoms and their management along with other related educational topics would be beneficial. Fifty-four percent (14 of 26) found immediate relief from clinical duties to be important, and 84% (24 of 26) responded that prompt debriefing and guidance was of great importance (Table 2).

When asked to characterize their knowledge of the physical and psychological effects of being involved in a critical incident, 73% (19 of 26) of the presurvey participants were only slightly or moderately familiar with these effects, while 85% (22 of 26) of the postsurvey participants stated that they were moderately or very familiar with the effects. When participants were asked to characterize their knowledge regarding coping mechanisms after a critical incident in the presurvey, 85% (22 of 26) responded that a safe opportunity to contribute insights for prevention of future events would be beneficial, while 65% (17 of 26) reported that a staff education program regarding critical incident stress symptoms and their management along with other related educational topics would be beneficial.

### Table 1. Survey Respondents’ (N = 26) Knowledge of Departmental Management of a Critical Incident Before Implementation of the Policy, Protocol, and Educational Program

<table>
<thead>
<tr>
<th>Services</th>
<th>Responses, No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occurrence of a critical event is not acknowledged</td>
<td>1 (4)</td>
</tr>
<tr>
<td>CRNA involved discusses critical incident with departmental authorities</td>
<td>11 (42)</td>
</tr>
<tr>
<td>CRNA involved completes a hospital incident report following the incident</td>
<td>2 (8)</td>
</tr>
<tr>
<td>CRNA involved has peer debriefing</td>
<td>0 (0)</td>
</tr>
<tr>
<td>CRNA immediately returns to clinical duties following critical incident</td>
<td>10 (38)</td>
</tr>
<tr>
<td>CRNA is relieved of clinical duties immediately following a critical incident</td>
<td>1 (4)</td>
</tr>
</tbody>
</table>

### Table 2. Survey Respondents’ (N = 26) Feedback Regarding Potentially Beneficial Services Associated With a Critical Incident Stress Management Program

<table>
<thead>
<tr>
<th>Services</th>
<th>Responses, No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff education program</td>
<td>17 (65)</td>
</tr>
<tr>
<td>Immediate relief from clinical duties following occurrence</td>
<td>14 (54)</td>
</tr>
<tr>
<td>Formal departmental critical incident notification chain</td>
<td>5 (19)</td>
</tr>
<tr>
<td>Prompt debriefing</td>
<td>12 (46)</td>
</tr>
<tr>
<td>Ability to discuss concerns and processes with supervisor and hospital risk manager</td>
<td>10 (38)</td>
</tr>
<tr>
<td>Supportive guidance and mentoring after return to clinical duties</td>
<td>6 (23)</td>
</tr>
<tr>
<td>Clear and timely information about processes after occurrence</td>
<td>9 (35)</td>
</tr>
<tr>
<td>Guidance about role in the processes following an occurrence</td>
<td>12 (46)</td>
</tr>
<tr>
<td>Safe opportunity to provide insight into prevention of future events</td>
<td>19 (73)</td>
</tr>
<tr>
<td>Employee assistance program counseling opportunities</td>
<td>7 (27)</td>
</tr>
<tr>
<td>Personal legal advice and support</td>
<td>8 (31)</td>
</tr>
</tbody>
</table>
reported slight to moderate familiarity, and 8% (2 of 26) reported no familiarity. In the postsurvey, which was administered after the staff education program, 81% (21 of 26) characterized their knowledge of coping mechanisms for critical incident stress as moderate to very familiar, and 0% reported no familiarity with these coping mechanisms. Following the implementation of the departmental CISM protocol and the education program, 96% (25 of 26) agreed or strongly agreed that having a departmental policy and protocol in place was valuable. However, satisfaction with departmental handling of critical incidents and critical incident stress showed only a slight improvement following adoption of the departmental policy and protocol and implementation of the education program, and 23% (6 of 26) continued to be not at all satisfied with the handling of critical incidents. When asked on the presurvey if the availability of a CISM plan at a potential employment site would be a factor in the decision to work in that institution, 46% (12 of 26) of participants either agreed or strongly agreed. This percentage increased modestly to 58% (15 of 26) in the postsurvey.

Discussion

• Presurvey Responses. Critical incidents are inevitable in healthcare and can potentially cause long-term health effects for patients and providers.12 In the present study, the percentage of women, years of practice experience, and age ranges of the CRNAs who completed both surveys, and were therefore included in the reported results, reflected the departmental demographics. More than half of the respondents had been involved in a critical incident within the past 5 years. Gazoni and colleagues2 reported similar findings, noting that 62% of anesthesiologists surveyed had been involved in an anesthesia incident in the last 10 years and 84% had been involved in at least one critical incident during their careers. Nearly all the CRNAs in the present study expressed concern over being involved in a critical incident, and the majority found value in having an Anesthesia Department CISM policy and protocol in place. However, none of the survey respondents reported ever working in a clinical setting that had a policy and process in place to address a critical incident or the associated stress. Approximately one-fourth to one-third of those involved in a critical incident reported physical symptoms and/or psychological issues associated with the experience, and these issues could impact their ability to return to practice and provide safe anesthesia care.

• Comparison of Presurvey and Postsurvey Responses. The postsurvey, which was administered after the educational program, showed increased knowledge of the potential physical and psychological consequences of a critical incident as well as increased knowledge of coping methods. There was a general lack of knowledge among the staff CRNAs regarding how a critical incident would be handled before the adoption of the policy and protocol, although all respondents were aware that there was no existing debriefing protocol, and almost all believed that there was no requirement for immediate relief from clinical duties. A large majority of the sample desired an organizational environment in which they could freely discuss their experience with a critical incident, believed that education related to critical incident stress and its management would be beneficial, and believed that prompt debriefing following an incident is important. The postsurvey also revealed that almost all the participants believed that having a department policy and protocol to address and manage a critical incident was valuable. However, only a slight majority believed that relief from clinical duties immediately following a critical incident as a part of the departmental policy was important. This finding may reflect the perception that being removed from the clinical setting assigns fault and stigmatizes the individual involved.

In addition, and somewhat surprisingly, there was minimal improvement in overall satisfaction with how a critical incident would be handled within the Anesthesia Department after the adoption of the management policy and protocol and implementation of the staff CRNA education program. The ability to show improvement in this metric is limited by the relatively short duration of the present study and the low frequency of critical incidents. Moreover, based on knowledge of the study site, we believe that these results may be related to the belief among the staff CRNAs that the protocol may not be activated or may not work as defined. Additionally, these results may reflect a lack of trust in the neutrality of existing hospital reporting policies for critical incidents. Finally, a slight postsurvey increase occurred in the number of participants who indicated that the existence of a departmental policy and protocol to manage a critical incident would be a factor in an employment decision. On this basis, we conclude that improved knowledge of CRNAs regarding the consequences and management of a critical incident did not greatly affect the decision-making process for employment.

• Limitations. The present study has several inherent limitations. The number of staff CRNAs who were direct care providers at the site was relatively small, and less than 50% of these CRNAs completed both the presurvey and postsurvey instruments. There is an inherent weakness in survey study designs in that individual respondents can interpret some items/questions and response options differently. Although the results are pertinent to the institution in which the study was conducted, they may have limited generalizability. Many of the staff anesthesiologists at the institution supported having a formal process in place to address CISM, but elected not to participate in the development and implementation of this protocol. Last, during the study period, the depart-
ment experienced changes in CRNA staff, department management, and practice policies that caused concern among the CRNAs participating in the study and may have impacted their responses.

When a critical incident occurs, the normal coping skills of a CRNA may be overwhelmed by the emotions of the event, leading to reduced work performance, burnout, sleep disturbances, inability to concentrate, excessive alcohol consumption, and thoughts of career change. The physical and emotional well-being of CRNAs is essential for the provision of high-quality patient care. Professional interventions in the workplace, similar to the interventions adopted in the present study, provide benefits to both providers and patients and are key elements for ensuring the delivery of high-quality healthcare.

**Conclusion**

Although this study was limited to a single institution, the results were similar to results of previous studies involving physician anesthesia providers. The profound and lasting effects of perioperative critical incidents on anesthesia providers may affect the quality of patient care that they subsequently provide. The focus in many anesthesia departments has traditionally been crisis avoidance and control rather than addressing the effects of critical incidents on CRNAs and anesthesiologists. Although the current national medical system incorporates therapeutic and supportive protocols into patient care, there are few measures in place for managing the effects of critical incidents on anesthesia staff. Further research with a broad sample of anesthesia providers is needed to validate these findings, but the present study indicates that CRNAs support policies and protocols for managing critical incident stress and believe that these policies and protocols would help them deal with the impact of exposure to critical incidents.

**REFERENCES**


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**DISCLOSURES**

The authors have declared no financial relationships with any commercial interest related to the content of this activity. The authors did not discuss off-label use within the article.