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Featured Article

Teaching Student Nurse Anesthetists to Respond to Simulated Anesthetic Emergencies

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KEYWORDS

anesthetic emergencies;
repetitive simulation;
high-fidelity simulation;
computerized learning;
nurse anesthetists

Abstract

Background: Life-threatening complications occur during anesthetic administration and student nurse anesthetists must know how to diagnosis and treat emergencies. Using high-fidelity simulation is one teaching method.

Purpose: This study compared if exposing students to the same performance criteria in simulated life-threatening anesthetic emergencies at three different intervals was statistically different from students who experienced the scenarios once.

Method: Using a checklist of required actions to diagnosis and treat the emergency, two faculty members documented the responses of the control group (n = 6) and study group (n = 6) as they performed the same 13 scenarios.

Results: Overall, the study group performed better on their third attempt at the scenarios than the control group who only performed the scenarios once.

Conclusions: Repeating anesthetic scenarios improves the overall outcomes for students in the simulated lab environment, but the financial impact must be considered if the required curriculum changes are to become sustainable. Further studies are needed to explore alternative teaching methods such as asynchronous computerized scenarios as a supplement to high-fidelity simulation.

Cite this article:

Henrichs, B., Thorn, S., & Thompson, J. A. (2018, April). Teaching student nurse anesthetists to respond to simulated anesthetic emergencies. *Clinical Simulation in Nursing*, 17, 63-71. <https://doi.org/10.1016/j.ecns.2017.10.007>.

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Funding: This study was supported by a grant from the American Association of Nurse Anesthetists Foundation, Chicago, IL (Grant number: 2014-F-12).

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Teaching student nurse anesthetists how to respond to anesthetic emergencies is a fundamental part of the curriculum. Confidence in how to treat such emergencies is a vital role for anesthesia providers when caring for surgical patients. Although modern anesthesia is safe, life-threatening complications may be unavoidable and must be treated emergently, or death may ensue (Anderson & LeFlore, 2008; Buckley & Gordon, 2011). Anesthesia providers need to respond immediately and start treatment to prevent an adverse outcome while waiting for help to arrive (Cooper & Murray, 2010; Murray, Boulet, Kras, Woodhouse, Cox, & McAllister, 2004; Robertson et al., 2009). Graduating students must be competent in managing life-threatening emergencies in the patient environment. This is a vital skill for patient safety as Certified Registered Nurse Anesthetists must diagnose and immediately initiate treatment as they are often the sole anesthesia provider in the operating room. Some emergencies are rare, and not all Student Registered Nurse Anesthetists (SRNAs) gain the needed experience during clinical rotations. A cost-effective method is needed to expose students to emergencies that they have not encountered and teach them the appropriate management before they graduate. High-fidelity human patient simulation is one method used to prepare SRNAs to diagnose and treat such emergencies in a timely fashion (Henrichs et al., 2009; Murray et al., 2004; Weller et al., 2014).

Key Points

- Simulation is an effective tool in teaching SRNAs to manage anesthetic emergencies.
- The financial impact must be considered if curriculum changes are to be sustainable.
- Future studies should explore asynchronous computerized scenarios as an alternative.

Although modern anesthesia is safe, life-threatening complications may be unavoidable and must be treated emergently, or death may ensue (Anderson & LeFlore, 2008; Buckley & Gordon, 2011). Anesthesia providers need to respond immediately and start treatment to prevent an adverse outcome while waiting for help to arrive (Cooper & Murray, 2010; Murray, Boulet, Kras, Woodhouse, Cox, & McAllister, 2004; Robertson et al., 2009). Graduating students must be competent in managing life-threatening

emergencies in the patient environment. This is a vital skill for patient safety as Certified Registered Nurse Anesthetists must diagnose and immediately initiate treatment as they are often the sole anesthesia provider in the operating room. Some emergencies are rare, and not all Student Registered Nurse Anesthetists (SRNAs) gain the needed experience during clinical rotations. A cost-effective method is needed to expose students to emergencies that they have not encountered and teach them the appropriate management before they graduate. High-fidelity human patient simulation is one method used to prepare SRNAs to diagnose and treat such emergencies in a timely fashion (Henrichs et al., 2009; Murray et al., 2004; Weller et al., 2014).

Background

Realistic recreations of anesthetic clinical scenarios in high-fidelity simulation centers allow students to make mistakes, learn, and be evaluated in a safe environment without harming or placing patients at risk (Cooper & Murray, 2010; Gaba, Fish, Howard, & Burden, 2015; Kemper et al., 2016). An educational experience outside the patient environment helps students become more familiar and adept at administering anesthesia in the clinical setting and managing emergencies as they transition to practicing certified registered nurse anesthetists. Simulation that replicates complex patient events allows students to gain experience in managing high-risk episodes (Orledge, Phillips, Murray, & Lerant, 2012; Schmidt, Goldhaber-Flebert, Ho, & McDonald, 2013), along with improved patient outcomes and team performance (Orledge et al., 2012). Additional studies show that repetitive simulation experiences improve memory and adherence to best practices in health care

(Auerbach, Kessler, & Foltin, 2011; Ironside, Jeffries, & Martin, 2009; Paige & Daley, 2009).

Simulation provides students with many benefits that are transferable to the clinical environment. Students can demonstrate clinical judgment and make decisions in a safe environment while witnessing the consequences and evaluating the effectiveness of their actions (Benner, 2001; Benner, Sutphen, Leonard, & Day, 2010; Lasater, 2007). Simulation is an evidence-based pedagogy that facilitates the learning of important aspects of quality patient care (Henneman, Nathanson, Roche, & Henneman, 2010; Jeffries, 2005; Sears, Goldsworthy, & Goodman, 2010). Zimmermann and House (2016) suggest that simulation might represent the most useful strategy to decrease medication errors. The Institute of Medicine supports clinical simulation (Benner et al., 2010; Kohn, Corrigan, & Donalson, 1999) as an approach to improve patient safety and enhance performance in the clinical setting. In addition, simulation can have significant educational benefits for increasing knowledge and improving clinical skills, including the amount of time to complete a skill such as central venous catheter placement (Ma et al., 2011). However, questions arise such as how to verify if knowledge and behavior is transferred to the clinical environment, or how to verify that students taught to respond to an anesthetic emergency in the simulated setting will respond appropriately in the clinical setting. Research studies that achieve these goals are difficult to design and execute (McGaghie, Issenberg, Petrusa, & Scalese, 2010) and those that report the knowledge was transferred from the simulated setting to the real patient care setting and improved patient care are likely stretching the endpoint (McGaghie, 2008, p. 997). However, research has reported that simulation is an effective tool for teaching the management and treatment of life-threatening anesthetic emergencies (Cooper & Murray, 2010; Gaba et al., 2015; Henrichs et al., 2009; Kemper et al., 2016; Murray et al., 2004; Murray, Boulet, Kras, McAllister, & Cox, 2005; Robertson et al., 2009; Wunder, 2016; Yee et al., 2005).

Although simulated recreations of anesthetic events are an opportune environment for researchers and faculty to assess both student behavior and performance as the SRNA progresses and matures throughout the program (Cooper & Murray, 2010; Gaba et al., 2015; Murray et al., 2004, 2005), this could be considered an unrealistic expectation in many SRNA programs because of the nursing faculty shortage (Feldman, Greenberg, Jaffe-Ruiz, Kaufman, & Cignarale, 2015; Nardi & Gyurko, 2013). In addition, limited availability of simulation facilities and the related costs to operate simulation services might also be unrealistic for some programs. According to the American Association of Colleges of Nursing (AACN), nursing schools in the United States rejected 68,938 qualified applicants in 2014 mainly because of faculty shortages (AACN, 2015). Considering the national shortage of doctorally prepared faculty in general, barriers such as both the increased cost and availability of qualified faculty with the expertise to teach anesthetic

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