

Enhancing Peripheral Intravenous Access Skills: Simulated Ultrasound Training for Student Registered Nurse Anesthetists

Calli Lemke, BSN, RN, CCRN & Heejin Kim, BSN, RN, CCRN

Background and Significance

- The American Association of Nurse Anesthesiology (AANA, n.d.) defines an aspect of the scope of practice of a nurse anesthetist as the ability to “use and supervise the use of ultrasound, fluoroscopy, and other technologies for diagnosis and care delivery.”
- In 2021, the Council on Accreditation of Nurse Anesthesia Education Programs (COA, n.d.) revised their standards to include the use of point-of-care ultrasound for for both regional and vascular access use as a requirement.
- In the perioperative period it is essential for patients to have reliable intravascular access.

Gap and Purpose

- Project identified a learning gap in the simulation curriculum
- Lack of confidence utilizing ultrasound for PIV access when entering the clinical setting
- Many incoming students practiced at hospitals that have teams specifically for obtaining PIVs on patients who are "hard sticks"
- Project aims to investigate the effectiveness of simulated ultrasound training in improving PIV access skills and confidence among student nurse anesthetists, ultimately leading to improved patient satisfaction outcomes by reducing the number of attempted PIV insertions and increasing their success rate.
- Improved knowledge on ultrasonography

Evidence Synthesis

- PICO Question: "Will students report a significant increase in their confidence level in manipulating ultrasounds and performing PIV insertions using ultrasound after participating in the simulation training?"
- CINAHL, PubMed
- Keywords: 'Peripheral intravenous access', 'ultrasound-guided', 'simulation', 'CRNAs', 'SRNAs'
- Exclusion: last 10 years (2014-2024), non-English, duplicate studies, pediatric population, central lines, restriction to lower extremities
- 20 articles from CINAHL and 55 articles from PubMed found; titles were review and articles were scanned in detail for relevance
- 14 articles found

Literature Findings

- USGPV has been shown to decrease the need for central line placement, increase the rate of first-attempt success, faster time to intravenous access, and higher patient satisfaction (Bortman et al., 2019).
- USG PIV insertion reduces perceived difficulty and improves vein cannulation success compared to traditional landmark techniques (Vitto et al., 2015)
- Nurse-managed USGPV initiatives demonstrated effectiveness and reduced the necessity for physician intervention. The study also concluded that ultrasound-guided IV insertion program for nurses improve patient outcome (Davis et al., 2021)

Methods, Setting, and Data Collection

- Quality Improvement project
- Setting: Marquette University simulation center
- Population: Convenience sample of 14 first-year SRNAs in an anesthesia program in Wisconsin
- Methods:
 - Prior to simulation: Delivery of 15-minute didactic lecture on ultrasonography, "knobology", probe orientation/manipulation, process and steps of obtaining success utilizing USGPV
 - The students will be split into two groups for hands-on training in a nurse anesthesia simulation center.
 - The groups will utilize the simulation center on separate days to ensure a proper allotted time commitment for students to perform USGPV attempts
 - Each student will have 5 insertion attempts with the ultrasound on a mannikin
- Data Collection:
 - Pre- and post-survey design with skills checklist for data collection
 - Anonymous data collection
 - Pre/post-survey will utilize a 5-point Likert scale from "strongly agree" to "strongly disagree"

Measures

- 50% increase in self-reported confidence level in manipulating ultrasound equipment and performing PIV insertions using ultrasound guidance
- 10% improvement in the success rate of first-attempt PIV insertions on mannequin using ultrasounds

Timeline

- Sep.-Oct. 2024
- Implement simulation interventions Dec. 2024
- Analyze data collection May 2025
- Disseminate findings



References

