Ultrasound Guided Peripheral Intravenous Access Training in Rural Setting

Eric Christiansen, BSN

UNIVERSITY OF WISCONSIN OSHKOSH

Introduction

A quality improvement project

The aim of the project is to provide education that result in registered nurses (RNs) competent in the use of ultrasound guidance (US or USG) peripheral intravenous (PIV) cannulation.

- Successful intervention would document increased confidence with the use of US for PIV placement, reduced use of CRNA staff for PIV insertion, successful PIV cannulation using ultrasound guided techniques.

Problem Statement

The PICOT question to address this project is:

- In bedside nursing staff (P)
- How does providing didactic and hands on training in the placement of a PIV with ultrasound (I)
- Compared to no training (current state/control) (C
- Impact the cannulation success rate and need for rescue call out (O)
- Over an eight-week time period (T)

Review of Literature

- Ultrasound guided peripheral IV access is a cost-effective tool which can improve patient outcomes for PIVC placement (Kaganovskaya & Wuerz, 2021)
- Benefits of USG for IV placement include increased patient satisfaction and reduced use of central lines (Morata & Bowers, 2020)
- Trainees with no prior ultrasound guided experience can achieve competency when given a dedicated training with close supervision. (Van Loon et al., 2019)
- Small group teaching is found to increase student interest and participation while also promoting retention of new knowledge (McMenamin et al, 2021)
- The call for access rescue in addition to the workload associated with around the clock anesthesia coverage can lead to provider burnout in critical access settings. (Cohen et al., 2021)

Design and Methods

- Teaching and practice with vein model was held on site with an ultrasound machine provided by the facility
- Classes were scheduled to be one hour and thirty minutes in duration
- Pretest is administered prior to didactic instruction
- Class and guided practice with the vein model occurred within the session
- Didactic instruction discussed the physics of ultrasound, operation of the ultrasound machine, and anatomy identification of target veins
- Post-test administered after didactic and practice with vein model

Implementation

- Discussion with facility anesthesia department and education department to assess need for intervention
- Coordination with facility specific educational leader and department leadership to recruit interested registered nurses
- Selection of appropriate day and several classes to allow for increased access and across day and night shift
- Follow up with anesthesia department to assess improvement in USG-PIV evidenced by decreased need for call-back

Results

- Results demonstrate data from first round of implementation
- Data from single site with small sample size (n=9) of registered nurses from emergency department, inpatient, and house supervisor(s)
- Pre-intervention score = 7.439/10
- Post intervention = 8.375/10
- An increase of 0.936; p =.221 insignificant finding

Paired T test stats	N	Mean	SD	SEM
Test score 1	10	74.39	25.68	5.61
Test score 2	10	83.75	17.73	8.12

Outcomes Analysis

- Paired sample T-test to analyze pre/post evaluation scores
- One-sided p = .111; Two-sided p =.221
- Awaiting data on CRNA call for rescue ultrasound IV access
- Demographic data and RN confidence scores with project completion for discussion

References

- Cohen, C., Baird, M., Koirola, N., Kandrack, R., & Martsolf, G. (2021). The surgical and anesthesia workforce and provision of surgical services in rural communities: A mixed-methods examination. *The Journal of Rural Health*, *37*(1), 45-54.
- Kaganovskaya, M., & Wuerz, L. (2020). Development of an Educational Program UsingUltrasonography in Vascular Access for Nurse Practitioner Studensts. Journal of the Association for Vascular Access, 25(4), 18-26.
- McMenamin, L., Brown, F. E., Arora, M., Barnard, J., Smith, L. E., Stockell, D. J., ... & Wolstenhulme, S. (2021). Twelve tips for integrating ultrasound guided peripheral intravenous access clinical skills teaching into undergraduate medical education. *Medical Teacher*, *43*(9), 1010-1018.
- Morata, L., & Bowers, M. (2020). Ultrasound-Guided Peripheral Intravenous Catheter Insertion: The Nurse's Manual. *Critical Care Nurse*, *40*(5), 38-46. Morata, L., & Bowers, M. (2020). Ultrasound-Guided Peripheral Intravenous Catheter Insertion: The Nurse's Manual. *Critical Care Nurse*, *40*(5), 38-46.
- Van Loon, F. H., Scholten, H. J., Van Erp, I., Bouwman, A. R., & Van Daele, A. T. D. (2019) Establishing the required components for training in ultrasound guided peripheral intravenous cannulation: a systematic review of available evidence. Medical Ultrasonography, 21(4), 464-473.