Revolutionizing Acute Pain in the ED: Implementing a Curriculum for Residents

Jonathan Brewer, MD[1]; Joseph Marvin, MD[2]; Steven Field, MD[3], Robert Barnes, MD[4],

UT Southwestern Medical Center, Department of Emergency Medicine[1,2,4]

UT Southwestern Medical Center, Department of Emergency Medicine – Division of Ultrasound[3]

Jonathan.brewer@phhs.org[1], joseph.marvin@phhs.org[2], Steven.Field@utsouthwestern.edu[3], Robert.barnes@bswhealth.org[4],

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Author Contributions:

JB – Created study concept, designed, acquisitioned data/analysis, and drafted manuscript

JM – Assisted with creating study design and aquisitioning data/analysis, Critically revised manuscript

SF – Critically revised manuscript

RB – Critically revised manuscript, Supervised

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Address for Corresponding Author:

Dr. Jonathan Brewer

Department of Emergency Medicine

5323 Harry Hines Boulevard

E4.300

Dallas, TX 75390-8579

Phone: 214-769-8632

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Introduction:

Ultrasound-guided regional anesthesia (UGRA) is a safe and effective modality of pain control well-suited to the ED setting. Implementing UGRA in the emergency department (ED) has been shown to decrease disposition times, increase patient satisfaction, and decrease need for opioid usage in the ED[1]. While point of care ultrasound (POCUS) is taught to all emergency medicine (EM) residents, few programs teach the concept of regional anesthesia. Studies show that nerve blocks can be effectively taught to residency programs in simulation sessions[2], and acquisition of key techniques and knowledge can be measured using a pre- and post-test. In this manner we demonstrated effective implementation of a nerve block curriculum in our residency program.

Purpose:

Demonstrate an effective curriculum design for implementation of regional anesthesia in the ED

Methods:

The design of our curriculum was compiled based on an expert panel recommendation that comprised 13 ultrasound faculty members from 12 institutions[3]. Using these recommendations, an IRB-exempt curriculum was created for the UT Southwestern Emergency Medicine program. We began by designating specific nerve blocks that we felt that our residents should know into three various simulation sessions based on block distribution (Figure 1).

Prior to each simulation date, we developed a pre-test (Figure 2) comprised of questions pertaining to safe administration of nerve blocks and administered it to trainees. Residents then attended a session where they learned the anatomy of each block on standardized patients. Longitudinal needle guidance was

taught by ultrasound faculty with the use of an ultrasound guided IV simulator. After the session, residents took a post test to analyze retention.

Throughout the year, procedural data was collected on how many blocks were conducted in the ED. Our ultrasound faculty provided quality assurance review for every block.

Results:

Through this spaced repetition-style education, retention was demonstrated with a marked improvement on pre and post-tests. Subsequently, this education has led to a large increase in the use of regional anesthesia to treat pain in patients in our ED. We have seen preliminary data indicating decreases in need for procedural sedation and increase in patient satisfaction so this is a concept that we hope to continue to refine at UT Southwestern.

One of the most difficult aspects of creating our curriculum though was delineating which blocks the general emergency physician should know. We have noticed through retrospective analysis that some blocks are being used more than others but it is difficult to say whether this is by happenstance of patient presentation or provider preference. Further surveys and internal research will need to be conducted.

Conclusion:

An ultrasound-guided nerve block curriculum can be safely implemented in a residency program, but a systematic approach must be taken to ensure that physicians are properly trained. Displaying and justifying the steps for each part of the process helps to demonstrate a proven method of introducing US-guided nerve blocks to a residency.

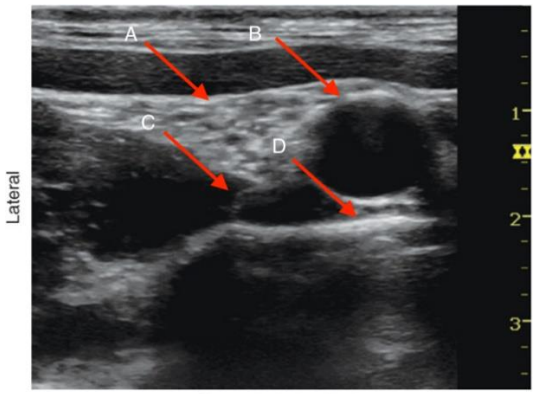
Nerve blocks are currently underused in the ED despite their potential to reduce opioid use and provide more pain control options to better serve our patients. We have an opportunity to broaden our practice by introducing nerve block education programs in residencies to improve patient care.

Figure 1:

Simulation Session	Specific Nerve Block
Upper Extremity	Interscalene/Supraclavicular
Upper Extremity	Median/Radial/Ulnar
Truncal	ESP/Serratus
Truncal	Rectus Sheath/TAP
Lower Extremity	Adductor Canal/Popliteal Sciatic
Lower Extremity	Fascia Iliaca

Figure 2:

1. Which Structure Below is a Nerve?



Supraclavicular block

2. What is required for monitoring patients during nerve blocks?
    a. Pulse oximeter
    b. End-tidal CO2
    c. Cardiac Monitoring
    d. Blood Pressure Cuff Monitoring
    e. All of the Above
3. What is proper patient positioning during an Interscalene Nerve Block?
    a. Patient sitting at a 45 degree angle
    b. Left Lateral Decubitus
    c. Patient sitting at 90 degree angle
    d. Lying Flat
    e. Trendelenburg
4. Select complications that may occur from nerve blocks
    a. Local Anesthetic Systemic Toxicity
    b. Intraneural Injection
    c. Hemorrhage

d. Injection Site Infection
e. Intravascular Injection

5. What is the maximum dose for Ropivicaine 1% without epinephrine?
    a. 2 mg/kg
    b. 3 mg/kg
    c. 4.5 mg/kg
    d. 6 mg/kg
6. What is the usual initial sign of local anesthetic systemic toxicity?
    a. Seizures
    b. Numbness/Perioral Tingling
    c. Dysrythmias
    d. Loss of Consciousness

Figure 3:

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