

Increasing Emergency Medicine Resident Utilization of the Fascia Iliaca Nerve Block Through an Early Education Intervention

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ABSTRACT

BACKGROUND: Ultrasound-guided nerve blocks are a core skill for emergency medicine (EM) physicians in the treatment of pain. Despite this, there is a dearth of education on the topic during EM residency training.

METHODS: We implemented a 2-hour hands-on teaching session for the fascia iliaca nerve block (FINB) during orientation for 14 new EM interns. We assessed if this increased their confidence in performing the FINB, if they retained their knowledge based on a structured assessment of performing a simulated FINB at 0, 2, and 8 months, and if the number of FINBs performed increased compared to the previous year's intern class who did not receive the same structured educational teaching session.

RESULTS: Confidence levels of EM interns in performing the FINB increased after the hands-on session on a 1–5 scale from 1.69 to 2.93 ($P < .001$). Their performance and knowledge of the FINB based on a structured hands-on assessment showed a slight drop at 2 months and then remained constant at 8 months. There was an increase in the number of FINBs performed by the EM interns from two to 11 during their first year of training compared to the previous year's interns.

CONCLUSION: Implementing a hands-on FINB training session during intern orientation for EM residents increased their confidence in performing the procedure, showed retention of the taught knowledge at 8 months, and increased the number of FINB procedures performed during their first year of training.

KEYWORDS: Regional anesthesia; resident education; emergency medicine; ultrasound; fascia iliaca nerve block

INTRODUCTION

Ultrasound-guided nerve blocks (UGNBs) are an established part of pain management in the emergency department (ED).^{1,2} These procedures offer non-opioid analgesia and have been shown to improve outcomes in patients with hip fractures.^{3–6} They have also been shown to be extremely safe, with low complication rates when performed in the ED.⁷ Despite this, most emergency medicine (EM) residencies offer little

to no formal education on this topic.^{2,8} The need to improve this has been recognized, such that Accreditation Council for Graduate Medical Education (ACGME) has proposed to make it mandatory for EM trainees to perform 10 UGNBs before graduation, with up to five of these allowed to be simulated.⁹ To assess the state of resident education and confidence level in performing UGNBs at our institution, a needs assessment survey was performed on graduating fourth-year EM residents. Of the six residents who responded to the survey, all six respondents indicated that they would not have met this proposed ACGME requirement. One of the respondents indicated they had never performed a UGNB, while another respondent indicated they had only performed one. In response to this demonstrated educational need, we created and implemented a fascia iliaca nerve block (FINB) teaching session as part of our intern orientation during the first month of residency. Unlike previously published nerve block educational curricula, we focused only on one nerve block.¹⁰ We chose to do this for a few reasons. The FINB has the largest body of evidence and guidelines supporting its use, such that it is the standard of care in patients with hip fractures in the emergency department and is strongly supported by the American Academy of Orthopedic Surgeons.^{11–14} It is also the most performed nerve block in our ED, with 91 out of 146, or 62.3% of the ultrasound-guided nerve blocks performed between 01/2022 and 08/2024, being FINBs. As it is the most performed block, it has the highest number of opportunities for being performed by the trainees. We hypothesized that by increasing the confidence in this procedure early in EM residents' training, residents will be able to perform it more often when the opportunity arises.

METHODS

Study design

This was a prospective cohort study aimed at assessing if a 2-hour hands-on session at the start of training during EM residents' intern orientation increased the number of nerve blocks performed during their intern year compared to the prior intern class and improved self-reported provider procedural comfort, and if that knowledge was retained on a 2- and 8-month reassessment. The primary outcome was to assess if there was an increased number of FINBs performed in the year that the educational intervention was introduced.

Institutional Review Board approval was obtained before the initiation of this study. Informed consent was obtained from the participants.

Setting

During the EM intern orientation in July of 2024, a 2-hour teaching session on the FINB was implemented. All 14 EM interns participated in this session. Previously, there was no formal nerve block education included in the intern's educational curriculum. Before starting the session, all participants received a pre-course survey, shown in **Table 2**, which asked them to self-report their previous experience with nerve blocks and their comfort in performing the FINB. Institutional Review Board approval was obtained before initiation of this study.

Table 1. Assessment, including the knowledge assessment and OSCE. Each question/observed clinical evaluation is worth one point. Possible score ranges from 0–17.

Assessment
1. Obtains patient consent through an adequate explanation of benefits and risks (3 points): a. Counsels the patient with realistic expectations, that pain will not be completely relieved but decrease the need of other analgesics b. Risk of nerve injury, rare and almost always self-resolve c. Adequate discussion of LAST
2. What is the most common indication in the emergency department for this procedure? Femur fracture
3. Does it cause motor blockade? Yes
4. What monitoring should the patient be on? Telemetry, SpO2 monitoring
5. What are the symptoms of LAST toxicity (name 2)? Numbness of tongue, lightheadedness, auditory disturbances, seizure, coma, respiratory arrest, cardiac arrest
6. What is the treatment of LAST? Intralipid and supportive care
7. What is the volume of anesthetic used in this procedure for an adult patient? Will vary based on weight of patient and max dose of anesthetic. Total volume (anesthetic plus an sterile saline) typically 30–40cc
Observed Structured Clinical Exam
8. Maintains sterile technique
9. Pre-flushes needle and tubing to displace air bubbles
10. Places the linear probe in the correct location and orientation
11. Identifies target fascia iliaca plane, femoral artery and vein
12. Inserts needle along correct path
13. Only advances needle if able to visualize needle tip through the procedure
14. Injects only once needle is in correct position
15. Does not puncture any vessels

Curriculum

During this session, a 20-minute lecture was given introducing the mechanism of anesthetics, risks of regional anesthesia, and how to perform the FINB. Participants then practiced performing the FINB using meat models guided by an educator. Three meat models were created by the instructors to simulate the typical anatomy of the appropriate muscle and fascial plane layers of the FINB. These models are inexpensive and replicate the anatomy and sonographic landmarks of the FINB.¹⁵ It is also possible to inject saline into these models under the simulated fascia iliaca plane, replicating the entire process of performing the FINB. These models took 1 hour to create before the session. They were created using 2–3 lbs of boneless pork tenderloin, straws, ultrasound gel, meat glue, yarn, and chewing gum. Detailed instructions on how to create the meat models are described by Naraghi et al.¹⁵

During the hands-on session, learners were guided by educators to focus on practicing anatomy identification, ultrasound-guided needle visualization and control, and hydrodissection. After demonstrating being able to guide the needle to the correct target under ultrasound, followed by successful hydrodissection of fluid under the simulated fascia iliaca layer in the meat model, the next participant would be rotated in. The participant who completed the session would then immediately complete an assessment, which can be found in **Table 1**. This assessment involved both a knowledge assessment through questions and an objective structured clinical examination (OSCE) with a score ranging from 0–17. The assessment evaluated if the learners know what concepts are needed to properly consent participants before performing a FINB, what the indication for performing a FINB is, what level of monitoring the patient should

Table 2. Pre-survey

What is your comfort level in performing a fascia iliaca compartment block?
1 – not at all comfortable even with supervision
2 – uncomfortable but would be willing to try with supervision
3 – neither comfortable nor uncomfortable
4 – comfortable to do on own without supervision
5 – comfortable enough to teach another learner

Table 3. Post-survey

After performing this hands on session, what is your comfort level in performing a fascia iliaca compartment block?
1 – not at all comfortable even with supervision
2 – uncomfortable but would be willing to try with supervision
3 – neither comfortable nor uncomfortable
4 – comfortable to do on own without supervision
5 – comfortable enough to teach another learner

be on, and information on the presentation and treatment of Local Anesthetic Systemic Toxicity (LAST). The OSCE portion assessed whether the learners were able to perform a FINB without instructor guidance. The same meat models used during the teaching session were also used for the OSCE to ensure consistency between models. Following the session, all the participants completed a post survey assessment of their confidence in performing a FINB, as seen in **Table 3**.

Educators included three faculty members and two emergency medicine residents. Two out of the three faculty members were ultrasound fellowship trained. The two emergency medicine residents included a Post Graduate Year (PGY-3) and PGY-4, both of whom had previous experience in performing at least one FINB. The initial lecture and assessment were administered by the three faculty members, while both the resident educators and faculty members participated in teaching the hands-on portion.

Follow-up

Participants repeated the same assessment seen in **Table 1** at 2 and 8 months after the initial training session. No additional formal FINB instruction was given in the interim. After 1 year, the electronic medical record was retrospectively queried for all FINBs performed by trainees in their first year of training during the academic periods of 2023–2024 and 2024–2025 to assess if there was a change in the number of these procedures performed.

An unpaired *t*-test was used to assess if there was a change in the assessment score between the three sessions. The pre and post-survey results were analyzed using a paired *t*-test.

RESULTS

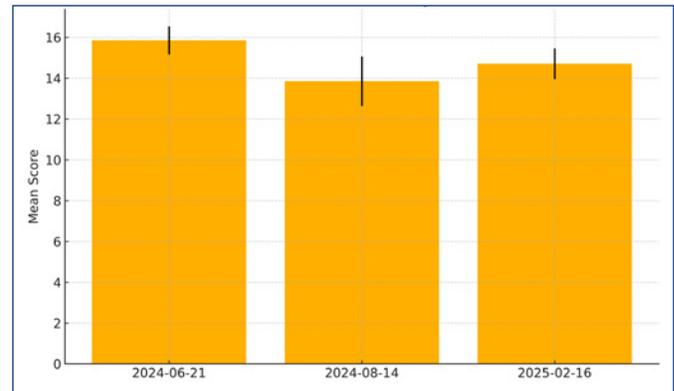
Participant demographics

All 14 of the EM interns at our program completed the hands-on instructional session in the first month of their training in July and the pre- and post-test surveys. Eight of the participants were female (57%), and six of them were male (43%). Two of the interns (14%) reported having performed a UGNB prior to the session, with one of them (7%) having performed a FINB.

Number of nerve blocks performed

There was an increase in the number of FINBs performed by the intern class from two in the 2023–2024 year to 11 in 2024–2025 after implementing this hands-on teaching session. Seven different interns in the class of 2024–2025 performed these 11 blocks. This represents a 450% increase. The total number of FINBs performed in our ED did not significantly change between the two periods, with 37 having been performed in 2023–2024 and 39 in 2024–2025.

Figure 1. Assessment score results on 06/21/2024, 08/14/2024, and 02/16/2025.



Assessment scores

On the assessment performed immediately after the instructional session, participants scored an average of 16, or 94% of the questions correctly (95% CI = 15.18 to 16.82) as seen in **Figure 1**. Seven participants completed the 2-month reassessment and scored an average of 13.71 (95% CI = 11.67 to 15.76). Four participants completed the 8-month reassessment and scored an average of 13.75 (95% CI = 9.57 to 17.93). There is a statistically significant difference between the initial assessment and the 2- and 8-month reassessments using an unpaired *t*-test, with $P < .05$ in both cases. There is no statistically significant difference between the 2- and 8-month reassessments ($P = .98$).

Impact on FINB procedural confidence as assessed by surveys

When asked on the pre-survey, as seen in **Table 2**, what their comfort level is in performing a FINB, the participants indicated a mean score of 1.69. When asked a follow-up question on the post-survey seen in **Table 3**, administered immediately after the teaching session, the participants indicated a mean score of 2.93. Using a paired *t*-test, this represents a statistically significant increase in comfort level between the pre- and post-surveys from 1.69 to 2.93 ($P < .001$).

DISCUSSION

We have shown that by focusing on the FINB and introducing this block early in training, it greatly increased the frequency with which first-year EM residents performed this procedure. It also improved their confidence in performing this procedure. Before the teaching session, our learners indicated that they were not at all comfortable performing the FINB, even with supervision. After the session, they indicated that they were willing to try with supervision and were more comfortable with the procedure. This likely led to the increased frequency with which they performed the

FINB compared to the previous year's cohort of residents. Additionally, after a slight drop at 2 months after the teaching session, the knowledge learned remained constant when reassessed after 8 months.

Despite agreement on their clinical benefit and importance, there is currently no widely accepted educational curriculum for UGNBs in emergency medicine. There are many microskills required to achieve mastery of these procedures. This includes using in-plane needle guidance to advance a needle through multiple facial planes, hydrodissection, depositing local anesthetic into a target anatomic area, and recognizing the correct appearance of the tissue after successful anesthetic spread. Like other UGNBs, the FINB requires knowledge of all of these microskills. Mastering the FINB early on in training likely allows for easier mastery of other less commonly performed blocks later in training and increases the number of UGNBs performed. The findings of this study support implementing a hands-on teaching session focusing on the FINB early in emergency medicine residency training.

While we showed that an early educational intervention results in increased EM interns' knowledge, confidence, and utilization of the FINB, longitudinal reinforcement is key to ensuring skill retention. Methods to achieve this for the FINB include annual refreshers during residency conference and including regional anesthesia education on scan shifts and ultrasound tape review.

Future studies could assess whether introducing this educational session early in training improves the clinical outcomes of the blocks performed. They could also investigate if the trainees ultimately perform a greater variety of blocks during their emergency medicine residency.

LIMITATIONS

One limitation is that not all the participants completed the 2- and 8-month reassessments. It is possible that only the interns who got the experience of performing a FINB or those who continued to feel more confident in their skill-set completed the repeat assessments. There may also have been a selection bias where the interns more interested in ultrasound or regional anesthesia completed the follow-up. However, all the interns who showed up to their regularly scheduled conference, which was held the same day as our study activities, also completed the repeat assessments. The interns who did not complete the repeat assessments were the ones who did not show up to conference, which usually occurs when they have vacation or worked the night before. It would be unusual for an intern to not show up to conference because they were not interested in the educational material offered that day. Ten interns completed the reassessment across the two sessions, with only one intern completing both. This means the majority, or 10/14 of the participants, completed a reassessment.

It is also possible that the participants received FINB education separate from our intervention. It is also possible that the culture around the performance of ultrasound guided nerve blocks changed between the 2023–2024 and 2024–2025 academic years. To our knowledge, however, there was no other formal or informal education on the topic, other than that encountered during clinical work. There were also no differences in the ultrasound fellowship-trained faculty members, who perform the majority of the FINBs in our department, between the 2 years that were compared.

CONCLUSION

We have shown that by focusing on the FINB and introducing this block early in training, it greatly increased the frequency of and confidence with which first-year EM residents performed this procedure. This supports implementing a hands on teaching session focusing on the FINB, which was relatively inexpensive and easy to implement, early on in emergency medicine residency training.

Future studies could assess whether introducing this educational session early in training improves the clinical outcomes of the blocks performed. They could also investigate if the trainees ultimately perform a greater variety of blocks during their emergency medicine residency.

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