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Education

A BRIEF EDUCATIONAL INTERVENTION IS EFFECTIVE IN TEACHING THE FEMORAL NERVE BLOCK PROCEDURE TO FIRST-YEAR EMERGENCY MEDICINE RESIDENTS

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☐ **Abstract—Background: Hip fractures are a painful condition commonly encountered in the emergency department (ED). Older adults in pain often receive suboptimal doses of analgesics, particularly in crowded EDs. Nerve blocks have been utilized by anesthesiologists to help control pain from hip fractures postoperatively. The use of nerve stimulator with ultrasonographic guidance has increased the safety of this procedure. Objectives: We instituted a pilot study to assess the ability of Emergency Medicine (EM) resident physicians to effectively perform this procedure after a didactic and demonstration session. Methods: First-year EM residents from three urban training programs underwent a 1-h didactic and hands-on training session on the femoral nerve block (FNB) procedure. A written pretest was used to assess baseline knowledge; it was administered again (with test items randomized) at 1 and 3 months post training session. A critical actions checklist (direct observation of procedure steps via simulated patient encounter) was used to assess the residents after the training session and again at 3 months. Results: A total of 38 EM residents were initially evaluated. Thirty-three successfully completed 1-month and 3-month written test evaluations; 30 completed all written and direct observation evaluations. The mean written pretest scores were 66% (SD 9); post-test 92% (SD 5), 1-month 74% (SD 8), and 3-month 75% (SD 9). After initial training, 37 of 38 (97%) residents demonstrated competency (completing ≥ 15 of 19 critical actions) in the FNB procedure determined via direct observation. At 3 months, 25 of 30 residents (83%) continued to retain 85% of their initial critical action skills, and 3 of 30 (10%) saw an improvement in their proficiency. Conclusion: A 1-h training and demonstration module yielded high competency rates in residents performing critical actions related to the FNB; these skills were well maintained at 3 months. An ongoing study will attempt to correlate this competency with procedures performed on patients.** © **2013 Elsevier Inc.**

☐ **Keywords—ultrasound; nerve block; femoral nerve block; education; resident; emergency medicine; hip fracture**

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INTRODUCTION

Hip fractures in older adults are a painful orthopedic condition commonly encountered in the emergency department (ED). In 2007, there were 281,000 patients older than 65 years of age admitted with a hip fracture. Over 81% of older adults with hip fracture report pain while in the ED (1). Undertreated and untreated acute pain in the setting of hip fracture have been associated with a number of adverse outcomes including increased patient suffering, higher rates of delirium, increased length of hospital stay, delayed functional recovery, and chronic pain (2,3). Whereas opioids remain the gold standard for the treatment of pain, their complicated side effect profile (e.g., nausea, constipation, sedation)—particularly in older adults—and misperceptions about the risk of psychological dependence in both patients and health care providers inhibit their appropriate use in many settings, including the ED. Indeed, several studies demonstrate the necessity of treatment with opioids and show that older patients in pain who are being treated in a crowded ED often receive suboptimal doses of analgesics (1). Regional nerve blocks present an attractive alternative to systemic opioids given their immediate effect, lack of systemic side effects, and overall superb analgesia. The efficacy of a femoral nerve block (FNB) in the peri-operative time period in treating hip fracture pain has been previously demonstrated (4,5).

As part of a larger study examining the effect of regional anesthetic techniques on outcomes after fractures, we designed a training program for ultrasound and nerve stimulator-guided femoral nerve blocks for emergency medicine (EM) residents. Nerve blocks traditionally have been performed using nerve stimulators. Emergency physicians do not receive formal training in the use of nerve stimulators, and this may be one of the reasons that regional nerve blocks are not often performed in the ED. However, emergency physicians are increasingly facile with using bedside sonography as part of the clinical care they provide. Over the past few years, multiple studies have demonstrated the utility of sonographic guidance for invasive procedures such as central venous catheter placement, performed in the ED (6,7). The addition of ultrasonographic guidance to a nerve block decreases the amount of local anesthetic needed to perform the block, improves the efficacy of the block, and decreases the amount of time to block onset (8,9). One previous study demonstrated that the addition of ultrasonographic guidance to a nerve stimulator was effective in helping anesthesia residents learn how to perform a variety of peripheral nerve blocks with fewer needle insertions required and less trauma to surrounding blood vessels (10). The goal of this pilot study was to assess the ability of EM residents to effectively perform an FNB after a didactic and demonstration session, and to determine their knowledge retention 1 and 3 months later. We chose a 3-month time period as this time period is routinely used in the educational literature (11,12).

MATERIALS AND METHODS

Study Design

This was a pre-post observational assessment of the medical knowledge and clinical skills of EM residents regarding the FNB procedure. Residents were required to take a written pretest to assess baseline knowledge. They then attended a 1-h didactic session followed by a 30-min hands-on training session on the same day. The written test was administered again at 1 and 3 months with the test items randomized. A critical actions checklist with direct observation of procedure steps via a simulated patient encounter was utilized after the training session and again at 3 months. The simulated patient encounter consisted of utilizing a vascular gel mold with ultrasound-guided needle placement. The checklist of these critical actions is provided in Table 1. The study was approved by the institutional review board at all three study sites.

Setting

The study was conducted at three urban, academic EM residency training programs in New York City. Two of the hospitals are Level II trauma centers, Beth Israel Medical Center and Mount Sinai Medical Center, with annual ED visit volumes of 114,000 and 96,000, respectively. The third site, Maimonides Medical Center, is a Level I trauma center with an annual ED census of 115,000.

Training

In July 2010, EM resident physicians in their first year of training were selected for the study from each site. The EM residents initially took a written pretest to assess their baseline knowledge regarding the FNB procedure. The residents subsequently underwent a 1-h didactic and hands-on training session on the procedure. Key elements of the procedure including indications, anatomical landmarks, drug information, and complications were reviewed during this educational process. A 19-item critical actions checklist that incorporated direct observation of procedure steps was utilized during a simulated patient encounter (Table 1). A priori, it was decided that, at minimum, > 75% of these critical actions needed to be performed for the resident to achieve acceptable competency. This checklist integrated important steps