

# Survey of Current Practices: Peripheral Nerve Block Utilization by ED Physicians for Treatment of Pain in the Hip Fracture Patient Population



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## ABSTRACT

### Background

In 2010-11 approximately 968 hip fracture patients presented to emergency departments in the Greater Toronto Local Health Integration Network (GTA-LHIN). Optimal pain management is a frequently overlooked aspect of hip fracture patient care, which may contribute to patient outcomes.

Although recommendations have been published, there is currently not a standardized approach to the analgesic management of pain in the hip fracture patient. Nerve blocks, including the fascia iliaca compartment block (FICB), are more effective than traditional opioid analgesics in reducing pain after hip fracture. Research suggests that analgesia via nerve blockade is best initiated early, upon arrival to the emergency department.

Emergency physicians are trained in ultrasound, and do utilize regional anaesthesia; however, the frequency of block utilization and techniques used for block insertion are unknown. We sought to undertake the first survey of Emergency Department (ED) staff and resident physicians across the GTA-LHIN, looking at the current ED practice of nerve block analgesia in hip fracture patients.

### Purpose

The primary aim was to determine the prevalence and range of techniques utilized. The secondary aims were to determine the extent of training in nerve block insertion techniques, to gauge opinion on the most important objectives for future training courses, and to seek an understanding of the barriers to establishing a standardized approach for nerve block utilization in hip fracture patients.

## Conclusions

This data will be used to develop a multidisciplinary training program specifically for use by ED physicians. ED physicians and anesthesiologists will collaborate to standardize nerve block insertion techniques and develop an optimal analgesic management plan of hip fracture patients at Sunnybrook Hospital.

**Key words:** fascia iliaca, nerve block, regional anaesthesia, emergency department, survey, hip fracture

## INTRODUCTION

Hip fractures are common, affecting approximately 30,000 Canadians annually.<sup>(1,2)</sup> Hip fractures primarily affect older people—87.6% of hip fractures in Canada occur among patients 65 years of age or older, and the rate of hip fractures increases exponentially with age, more than quadrupling from age 65 to 85.<sup>(3,4)</sup> Women account for 75% of all hip fractures.<sup>(4,5)</sup> In 2006, the Ontario Bone and Joint Health Network developed a model of care for hip fracture patients across the province to reduce post-operative complications and prevent prolonged lengths of stay.<sup>(6)</sup> These recommendations included multidisciplinary care, ideally commencing upon the patients' arrival to the emergency department. The key interventions include optimal pain management, timely surgery, and close attention to patients' post-operative care, namely an interdisciplinary focus on interventions which shorten the acute care length of stay. Not surprisingly, hip fracture patients are at increased risk for a range of complications during their hospital admission, including delirium, urinary tract infections, heart failure, and chest infections—all of which contribute to the high rates of mortality.<sup>(6)</sup> Optimal pain management

is a frequently overlooked aspect of hip fracture patient care that may contribute to improving patient outcomes. A recent systematic literature review and meta-analysis on the effectiveness of different pain management techniques for hip fractures concluded that there was moderate evidence that regional anaesthesia was effective for managing acute pain, and that perioperative use of regional anaesthesia independently reduces the severity and duration of delirium.<sup>(7-9)</sup>

Despite this, optimal analgesia is seldom achieved.<sup>(10)</sup> A number of factors may contribute to physicians' tendency to limit strong opiate analgesics including a perception that patients may not tolerate these medications well or may have a reduced capacity to metabolize and eliminate these drugs, poly-pharmacy interactions,<sup>(11)</sup> or concerns about opioid side effects such as delirium.<sup>(10,12)</sup> Unfortunately, this avoidance of, or administration of, suboptimal doses of opioids is also a predictor for the onset of delirium.<sup>(10)</sup> Similarly, patients have an increased occurrence of delirium when experiencing higher pain scores at rest,<sup>(13)</sup> as well as experiencing moderate to severe pain in the immediate post-operative period.<sup>(14)</sup> Delirium in and of itself can increase risk for poor outcomes, which may include an increased mortality rate.<sup>(15,16)</sup> An ideal solution is to provide the physician with an alternative to opioid-based analgesia, thereby effectively treating the pain and minimizing the risk of suboptimal analgesic dosing.

Hip fracture pain is amenable to nerve block analgesia, and both the femoral nerve block or fascia iliaca compartment block are effective.<sup>(17)</sup> Advantages over standard analgesic strategies include improved pain control, faster onset of analgesia, minimizing the use of opioid analgesics and their side effects, minimizing sedation,<sup>(17,18)</sup> and reducing the rate, severity, and duration of delirium.<sup>(8,9,19,20)</sup> Traditionally, nerve block analgesia has been the domain of anesthesiologists. However, with greater emphasis on early pain management and the availability of tools such as the portable ultrasound to improve block safety and success, there is renewed interest in the training of emergency department physicians to provide such care.

Before commencement of a multidisciplinary (anaesthesia, orthopedics, emergency) education program to train emergency physicians from academic Toronto hospitals in the practice of nerve block analgesia for hip fracture patients, we undertook a survey to determine their current practices, level of training, and attitudes. We hypothesized that there was an underutilization of nerve block techniques in the analgesic management of hip fracture patients and when it is performed, there is an inconsistent approach that limits effectiveness.

## METHODS

Ethics approval was obtained from the Sunnybrook Health Sciences Centre Research Ethics Board to undertake a survey of all ED staff and resident physicians from three teaching hospitals across Toronto. Amongst these hospitals, there are approximately 550 patients presenting with hip fracture per

12-month period.<sup>(21)</sup> Potential participants were identified from comprehensive lists of ED staff and residents physicians that were made available by department directors at each participating institution. Potential participants were assigned a unique study number that was kept on a separate database to ensure duplicate surveys were not received from the same respondent. From the three participating hospitals, a total of 107 staff physicians and 47 resident physicians were identified as potential candidates for the survey. Participants were aware that the information they provided individually would be held confidential, but that the pooled information would be analyzed and would undergo publication.

An ED staff lead at each site, an orthopedic lead physician, and anaesthesia staff prepared questions for the survey. The survey questions were designed to determine the current practices and frequency of nerve block utilization for hip fracture patients. The paper survey was organized into five major sections: (1) demographics (hospital, years of ED experience, work shifts per month, availability of a block area); (2) nerve block experience (how frequently blocks are performed, preferred techniques, confidence in block success, preferred timing of block during patient care); (3) attitudes (importance of nerve blocks, factors limiting more widespread nerve block utilization); (4) block training (satisfaction with current knowledge, training already undertaken, list key learning objectives); and, (5) appreciation of scientific evidence for nerve block analgesia.

The survey was conducted in January and February 2012 via convenience sampling. Surveys were distributed to ED staff physicians at their three departmental business meetings (one held at each study site) and to ED residents at their city-wide educational rounds. Surveys were distributed by the study investigator (L.H.) at the start of these meetings and collected at the end of the meeting on the same day. A small number of surveys not received during the meeting were returned by mail (four surveys).

Survey responses were entered into a database (Microsoft Excel, Microsoft Corporation) for analysis. The resultant data is summarized by proportion, percentages, and standard deviations, and rounded to the nearest whole number.

## RESULTS

### Demographics

Of the potential 154 potential survey candidates, a total of 100 surveys were distributed amongst 71/107 (66%) ED staff and 29/47 (62%) ED resident physicians. Of these, 74 were completed and returned (48 ED staff and 26 ED resident physicians) for an overall response rate of 74%. ED staff physician respondents were evenly spread between the three surveyed institutions—with 17, 13, and 18 at site A, B, and C, respectively (Table 1). Site B had five fewer respondents, leading to a significant difference in the number of surveys collected between sites ( $p = 0.04$ ).

TABLE 1.  
ED Staff physician response rates

Staff Physicians	# of Hip Fracture Admissions 2010-11	Potential # Respondents	Actual # Respondents	Response Rate
Site A	235	32	17	53%
Site B	148	21	13	62%
Site C	167	54	18	33%
Total	550	107	48	45%

Of the 48 ED staff physician respondents, the mean experience as a staff physician was 11 (SD  $\pm$  9) years, and they work a mean of 11 (SD  $\pm$  4) shifts per month. ED resident respondents ranged in experience; three were postgraduate year 1 (PGY1), five PGY2, nine PGY3, four PGY4, and five were PGY5 or Fellow status.

## Experience

Considering both staff and resident ED physicians, the total number of clinicians providing nerve block analgesia for hip fracture patients is 22/74 (30%). Thirty-two out of 48 (67%) staff ED physicians and 20/26 (77%) resident physicians indicated that they ‘never’ perform nerve blocks (Table 2).

The 16/48 (33%) ED staff physicians that utilize nerve block analgesia in hip fracture patients were asked to estimate how many blocks they perform in an average month. Eleven of sixteen (69%) perform 1–2 blocks a month, and 2/16 (13%) respondents indicated that they perform  $>$  10 per month; the remaining 3/16 (18%) indicated they performed between 3 and 5 blocks per month.

Respondents who utilize nerve block analgesia were asked to indicate which technique they use. Blocks used are either femoral nerve block, ultrasound guidance, or femoral nerve block technique, landmark guided. No respondents reported using the fascia iliaca compartment block (FICB) technique (Table 2).

When ultrasound is used, the most common needle-nerve orientation was an out-of-plane (needle perpendicular to the ultrasound probe) technique in 7/15 (47%), while 8/15 (53%) used the in-plane (needle parallel to the ultrasound probe) technique. The most frequently used local anesthetic was bupivacaine in 19/22 (86%). Local anesthetic volumes used varied widely from 5 mL to 20 mL, with a median volume of 15 mL (SD  $\pm$  6 mL). The mean duration of analgesia that respondents expected from their nerve blockade procedure was 7 hours (SD  $\pm$  2 h).

When respondents were asked to rate confidence in their ‘ability to provide safe and successful blockade’, a range of responses were reported (Table 2).

TABLE 2.  
Experience

How often do you perform a block in hip fracture patients?	Staff (n = 48)	Resident (n = 26)
	Never	32 (67%)
Seldom	4 (8%)	3 (12%)
Sometimes	9 (19%)	3 (12%)
Often	0 (0%)	0 (0%)
Almost always	3 (6%)	0 (0%)
<i>Preferred Technique</i>		
	Staff (n = 16)	Resident (n = 6)
Femoral block, US guided	10 (63%)	5 (83%)
Femoral block, landmark guided	6 (38%)	1 (17%)
FICB, US guided	0 (0%)	0 (0%)
FICB, landmark guided	0 (0%)	0 (0%)
<i>When is the nerve block usually administered?</i>		
	Staff (n = 16)	Resident (n = 6)
Only after x-ray confirmation of fracture	14 (88%)	2 (33%)
Immediately after triage, after medical assessment	2 (13%)	3 (50%)
Immediately before transfer to the ward	0 (0%)	1 (17%)
After extensive medical assessment and investigation	0 (0%)	0 (0%)
Only after orthopedic team assessment	0 (0%)	0 (0%)
<i>Confidence in provision of a safe and effective block</i>		
	Staff (n = 16)	Resident (n = 6)
Extremely confident	1 (6%)	0
Very	5 (31%)	4 (67%)
Moderately	9 (56%)	2 (33%)
Somewhat	1 (6%)	0
Not at all confident	0 (0%)	0

## Attitudes

Overall, 66/74 (89%) of respondents were ‘in favour of’ nerve blocks for hip fractures while 1/74 (1%) was ‘not in favour’; 7/74 (9%) did not respond to the question.

Respondents were then asked to rate the importance of nerve block analgesia in the management of hip fracture patient pain on a 5-point rating scale (Table 3).

Respondents were also asked to rank the priority of nerve block analgesia alongside five other essential steps in the management of an ED patient with possible hip fracture. Staff and residents prioritized tasks differently. Medical assessments were ranked as first priority in both groups (Table

TABLE 3.  
Attitudes

<i>Importance of a nerve block</i>	<i>Staff</i>	<i>Resident</i>
	<i>(n = 48)</i>	<i>(n = 26)</i>
Extremely important	2 (4%)	0 (0%)
Very important	12 (25%)	9 (35%)
Moderately important	28 (58%)	16 (62%)
Of little importance	4 (8%)	1 (4%)
Unimportant	2 (4%)	0 (0%)

  

<i>Prioritization of tasks, identified by highest respondent rate</i>	<i>Staff</i>	<i>Residents</i>
	<i>(n=16)</i>	<i>(n=6)</i>
	<i>Ranking</i>	<i>Ranking</i>
Medical assessment	1	1
Referral to orthopedic team	2	6
Blood work	3	4
X-ray hip	4	3
Provide parenteral analgesia	5	5
Nerve block analgesia	6	2

2). Respondents were asked to identify with narrative what factors they felt limited more widespread use of nerve blocks in hip fracture patient management. Common themes included 'lack of familiarity with nerve block techniques'; identification that they felt the block 'took an extended length of time to perform', and 'lack of confidence' or 'in need of more training' for improved success of nerve block techniques.

### Training

Overall 32/74 (43%) of respondents indicated that they had received some training in nerve block analgesia techniques for hip fracture pain management. Among these, the training method and individual satisfaction with this training was elucidated (Table 4).

When asked to identify with narrative the central learning objectives that would be valuable in a new nerve block in hip fracture training course, the majority of respondents stated they would like to review landmark and ultrasound techniques, and learn an effective technique which can be performed in a short timeframe.

### DISCUSSION

The utilization of nerve block analgesia with hip fracture patients has been demonstrated to significantly reduce pain levels and decrease the required quantity of oral analgesia, and may also minimize risks of complications such as delirium, particularly if initiated early in patient care.<sup>(18)</sup> While the provision of nerve block analgesia has traditionally been the domain of anesthesiologists, with basic training the skill can be safely and successfully performed by other physicians,

TABLE 4.  
Training

<i>Method of nerve block education</i>	<i>Staff</i>	<i>Resident</i>
	<i>(n = 16)</i>	<i>(n = 6)</i>
Colleague	6 (38%)	2 (33%)
Course or workshop	4 (25%)	0 (0%)
Self- taught	2 (13%)	0 (0%)
Unidentified method	4 (25%)	4 (67%)

  

<i>Satisfaction with extent of training in nerve block techniques</i>	<i>Staff</i>	<i>Resident</i>
	<i>(n = 16)</i>	<i>(n = 6)</i>
Very satisfied	1 (6%)	0 (0%)
Satisfied	5 (31%)	0 (0%)
Neither satisfied nor dissatisfied	4 (25%)	1 (17%)
Dissatisfied	2 (13%)	1 (17%)
Very dissatisfied	3 (19%)	0 (0%)
Not answered	1 (6%)	4 (67%)

including ED staff. ED physician utilization of the fascia iliaca compartment block is ideal for this patient population as it is simple to learn, easy to use, and exhibits a fast onset. The nerve block is considered to be safe, as the site of injection is away from any nerves or blood vessels, thereby decreasing the possibility of intravascular or intraneural injection.<sup>(8)</sup>

Our institution is seeking to write and implement an education and training program for ED physicians on nerve block analgesia in hip fracture patients to be led by regional anesthesiologists. Prior to the educational intervention, this survey was distributed to ED staff physicians and residents across the Greater Toronto Area to assess current experience with nerve block analgesia, attitudes, understanding of medication dosing and techniques, previous educational experiences, and to obtain feedback on perceived barriers to use of nerve block analgesia in the hip fracture population.

When looking at historical rates of patient admission for hip fracture, ED physicians from these three sites had access to a sufficient number of patients to learn and maintain competency in the nerve block technique. Within the last year, the three surveyed GTA-LHIN institutions treated more than 50% of the total hip fracture patients (550 patients of 968 GTA-LHIN admissions). Although there was a significant difference noted in the response rates, we analyzed the results together as the hospitals are in similar urban regions, exposed to similar populations, have similar treatment protocols, as well as meeting the same length-of-stay benchmarks. The ED resident respondents work across any of the three sites during their education at the University of Toronto.

The most important finding from our survey is that as a primary pain management tool for hip fracture patients in the ED, nerve block analgesia is grossly underutilized. Sixty-seven per cent of staff ED physicians and 77% of resident physicians indicated that they 'never' perform nerve blocks.

Interestingly, of those physicians that do utilize nerve block analgesia, a large proportion perform more than 10 blocks per month, demonstrating that once nerve block skill and confidence is acquired, it becomes a common part of practice. Respondents also noted that they perform the femoral nerve block using ultrasound guidance; currently no respondents said that they use the fascia iliaca compartment block.

The survey also provided information as to the anesthetic used, and ED physician's expectations for duration of action. A wide range of local anesthetic volumes are utilized (median volume of 15 mL); some respondents used such low volumes that block efficacy may be compromised. Bupivacaine was the most widely used local anesthetic despite the availability of safer alternatives. Current evidence suggests that a fascia iliaca compartment block has an analgesic duration of 8 hours with a solution of 0.3 mL/kg of 0.25% bupivacaine,<sup>(22)</sup> with the possibility of longer duration as demonstrated by a continued tolerance to hip flexion.<sup>(23)</sup> Respondents said they would expect the block to last a mean of 7 hours.

The majority of respondents indicated that the nerve block would be carried out only after X-ray confirmation of a fracture. Since clinical diagnosis of hip fracture can be made with a high degree of certainty in the majority of patients, there is a strong argument for increasing the priority of nerve block analgesia in ED management of these patients. Research has demonstrated the benefit of the fascia iliaca block as a part of pre-hospital care.<sup>(24)</sup> Frequently, patients can experience delay waiting for X-rays, and the nerve block will improve patient comfort during positioning for these procedures. Even without data available on the rates of the clinically suspected hip fractures that go on to have 'negative' X-rays, a recently published comprehensive hip fracture program<sup>(6)</sup> suggests immediate implementation of a nerve block in those patients presenting with clinical signs of hip fracture, prior to hip X-ray. A small number of physicians rated nerve block analgesia as having little or no importance in the management of the hip fracture patient.

The majority of respondents did not report a high degree of confidence in their ability to provide safe and effective nerve block analgesia. A 'moderate' level of confidence predominates amongst surveyed ED physicians and this suggests that further training and education is required. Ideally, further education and hands-on training would greatly improve confidence levels and ultimately lead to an increase in nerve block utilization.

A number of barriers to utilization of nerve blocks were listed by the respondents that indicate the blocks take too long to perform, or similarly, that physicians don't have the time to focus on a nerve block insertion, highlighting the need for an efficient and effective technique for the nerve block procedure in ED.

Overall, we believe the lack of a consistent approach for safe, simple, and efficacious nerve block technique may be due to a lack of knowledge, confidence, and education.

## CONCLUSION

It has been found in our three selected sites that nerve block analgesia in the ED for this patient population is underutilized and performed with varying degrees of confidence. Regional anaesthesia via nerve blockade has been recognized as an optimal way to provide analgesia for these elderly patients.<sup>(6,11)</sup> Early implementation of an optimal analgesic plan, inclusive of utilization of a fascia iliaca block at time of admission, when combined with a comprehensive pain protocol, can aid in early patient mobilization and decrease the acute length of stay.<sup>(25)</sup>

The FICB was poorly appreciated and underutilized by our study population even though it is safe, effective, and simple to learn.<sup>(8)</sup> We believe that a simple skill set, the speed and ease of insertion, and low risk of complications makes FICB the most viable option for ED physicians seeking training in nerve block analgesia for the treatment of pain associated with hip fractures.

Ultrasound training has recently become a formal part of the ED training curriculum. The ED physicians are increasingly utilizing ultrasound and have identified an interest in improving their skills and confidence in utilization of this type of block. It is hoped that this improved understanding of current practice and attitudes will assist in the development of an effective multidisciplinary training program in these techniques, through collaboration with regional anaesthetists at the Department of Anaesthesia, Sunnybrook Hospital. A training program, designed with the input from anesthesia and ED staff physicians, can provide clinical pearls, and effective and efficient methods to increase confidence, ensure standardization of doses, and serve to enhance interprofessional communication between specialties. This will result in an effective peri-operative pain management plan and—ultimately—better patient outcomes.

## CONFLICT OF INTEREST DISCLOSURES

The authors declare that no conflicts of interest exist.

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