


Educational e-Learning Tool to Improve Fascia Iliac Block Uptake for Neck of Femur Fracture Patients: A Multi-Disciplinary Approach

This article was published in the following Dove Press journal:
Journal of Multidisciplinary Healthcare

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Background: There are 75,000 neck of femur (NOF) fractures that occur each year in England and Wales. Prompt, adequate analgesia is a major priority in hip fracture management to reduce the risk of delirium and facilitate earlier return to mobility and independence. NICE guidelines recommend the use of fascia iliaca block (FIB) for NOF fracture patients. Current literature suggests that FIB significantly improves pre-operative pain scores; however despite this, the uptake of FIB still varies between centers.

Objective: The study aimed to review pre-operative analgesia management of NOF patients in our center. The primary endpoint was to improve uptake of regional fascia iliaca block (FIB) in NOF patients by means of an educational e-learning tool.

Study Design and Methods: We performed a prospective review of all patients with NOF fractures admitted via the emergency department from September to October 2018 in a single district general hospital in the UK. We recorded patient demographics, time of admission, grade of physician performing block and pain scores and total FIB uptake. A multidisciplinary-led, short interventional training program of FIB administration was then developed and delivered to all relevant staff. Pain management and pain scores were recorded in a second prospective cycle along with uptake of FIB.

Results: There was a 53.2% reduction in pain score in the group that received FIB compared to 26.7% in patients who received oral analgesia only, consistent with current literature (p value = 0.0046). There was a significant increase (2.66x) in FIB administration by orthopedic doctors (27.3% in cycle 1 to 100% in cycle 2) after the educational session intervention.

Conclusion: This study shows that with the use of an educational training tool, all members of the multidisciplinary team can successfully administer FIB without any complications. Our educational tool has enabled a significant increase in delivery of FIB.

Keywords: multidisciplinary, fascia iliaca block, neck of femur fracture, emergency medicine, orthogeriatrics, orthopaedics, pain management

Introduction

There are 75,000 neck of femur (NOF) fractures that occur each year in England and Wales.¹ Prompt adequate analgesia is a major priority in hip fracture management as per blue book.² This facilitates earlier return to mobility and independence.³ Paracetamol, non-steroidal anti-inflammatory agents, and opioids are routinely used over regional nerve blocks for analgesia management in hip fracture patients.⁴ However, there are numerous significant side effects such as constipation, respiratory depression, upper gastrointestinal bleeding, and delirium.⁴ These side effects can delay

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surgery and increase morbidity.⁴ NICE guidelines for hip fracture management state that analgesia should be offered immediately including paracetamol and opioids and these should be sufficient.⁵ It also recommends consideration of fascia iliaca block (FIB).⁵

FIB was initially used in the 1980s in pediatric burns cases, however more recently there has been increasing use in NOF fracture patients.⁶ FIB targets the femoral nerve, lateral femoral cutaneous nerve, and may include the obturator nerve.⁷ Fascia iliaca block has been shown to provide better analgesia especially in hip flexion and at rest which can allow better positioning of patients reducing post-operative morbidity from respiratory infections.^{6,8} It also aids nursing staff with patient bed transfer from the emergency department to ward and allows bedside care to be better tolerated.⁸

Many studies have investigated the use of FIB for NOF fracture patients, however it is still a relatively new component of analgesia management for NOF fracture patients in the pre-operative period.^{5,10} These studies have evaluated the effect of FIB on pre-operative pain scores^{5,10} and showed that pre-operative pain scores were improved after use of FIB.^{5,10} However, despite this knowledge, FIB uptake remains variable between different centers.

The aim of this study was to investigate pre-operative analgesia management of NOF fracture patients and to improve uptake of fascia iliaca blocks in NOF fracture patients using an educational training session.

Materials and Methods

Study Population and Eligibility

A prospective review of all patients with NOF fractures admitted via the emergency department at our local district general hospital was performed. The study population included all patients admitted with NOF fractures aged over 65, NOF fracture proven clinically and on radiograph, FIB received in the pre-operative period only (some patients received post-operative FIB in addition), pain scores assessed in the pre-operative period only. Exclusion criteria included post-operative FIB and patients with cognitive impairment, therefore not being able to give reliable pain scores.

The first cycle was conducted over a one month period September – October 2018 and the second cycle was conducted over a one month period December 2018 – January 2019. Review of patient notes using a standardized NOF fracture pathway proforma allowed documentation of

patient demographics, time and date of admission, grade of physician performing block. Pain scores (pre and post block) were recorded by the data collector prospectively using the visual analog pain scale (VAS) at the time of FIB delivery. Fascia iliaca block was performed by an admitting doctor either in the Emergency Department or Orthopedic Department.

Following cycle 1, a multidisciplinary-led short interventional training program of FIB administration was developed. The first intervention was an educational teaching session on how to perform a fascia iliaca block. In order to make the simulation as real as possible, a dummy model specifically designed for FIB teaching was used. The teaching was delivered by a Consultant Anesthetist and NOF lead for the trust. The consultant delivered a lecture explaining the basic anatomy, physiology and complications of FIB. He then delivered a practical session and all participants had an opportunity to practice. This simulation could have been performed on a real patient with observing doctors, however we chose not to do this as it did not allow for discussion or opportunity to practice individually. The current orthopedic junior doctors and the incoming orthopedic junior doctors were given this training and the emergency department junior doctors had a separate training session delivered by the same Consultant Anesthetist.

This was delivered to all relevant staff, and pain management and pain scores were recorded in a second prospective cycle. A video in the form of an educational e-learning tool was designed. This first intervention was successful at improving FIB uptake, however like all training – the level of confidence of an individual decreases if the skill is not practiced immediately and often after the training. Therefore, a video combining the teaching session and how to perform the FIB. This video was designed as an e-learning tool and it meant that any orthopedic or emergency department team could access it via YouTube. A second prospective review of all patients with NOF fractures was carried out over 1 month period December 2018 to January 2019 to assess pain management, pain scores after educational interventions.

Data were recorded on a database created in MS Excel and an unpaired *t*-test statistical analysis was performed to assess for significance.

Ethical Approval

Caldicott ethical approval was granted for the study by Dartford and Gravesham NHS Foundation Trust, United Kingdom. Informed consent was obtained from all

participants and documented. Patient confidentiality of all information collected was maintained.

Results

A total of 45 patients were reviewed in this study. All NOF patients (n=45) were managed according to the NICE guidelines for analgesia in hip fracture. A total of 25 patients were reviewed in cycle 1 and 20 patients in cycle 2.

Demographics

Mean age of patients was 82 with a range 65 to 97. There were 84% female patients (n=38) and 16% male patients (n=7).

There were 38% extracapsular fractures (n=17) and 62% intracapsular fractures (n=28).

Cycle 1

44% (n=11) of total patients received FIB and 56% (n=14) did not receive FIB pre-operatively. The time of FIB administration was plotted against patients who did and did not receive the FIB. 9/11 of FIB that was administered occurred during 'daytime hours' between 6 am and midnight. Out of the 14 patients who did not receive a block there was no correlation between time of arrival to ED and administration of FIB, indicating a poor correlation to staffing or workload.

Out of the 11 FIB administered, three (27%) were administered by orthopedic doctors and eight (73%) were administered by the emergency department.

Patients who did not receive FIB (14/25) had a mean initial pain score of 9.3. After oral analgesia mean pain score reduced to 7.3. Of the patients who received FIB, initial pain score was 9.7 and pain score after FIB was 4.5. There was a 53.2% reduction in pain score in the group that received FIB compared to 26.7% in patients who received oral analgesia only. This was a statistically significant percentage reduction (p value = 0.0046). No cases of local anesthetic toxicity occurred.

Cycle 2

After the educational session was delivered, a second cycle was carried out which showed that 45% (n=9) received FIB and 55% (n=11) did not receive FIB. The mean initial pain score in patients who received FIB was 8.0 which decreased to 4.3 after FIB administration, percentage reduction of 51.2%. From the total FIB administered, 100% (n=9) was administered by orthopedic doctors. There was no

statistically significant increase in overall number of FIB administered and there was a similar percentage reduction in pain scores after FIB, however there was a statistically significant 2.66x increase in FIB administration by orthopedic doctors (27.3% in cycle 1 to 100% in cycle 2) after the educational session intervention. No cases of local anesthetic toxicity occurred.

Discussion

Poorly managed pain causes significant mortality in NOF patients.² FIB is a safe, cheap, and effective form of pain relief for patients with NOF fractures.⁵ A single shot of local anesthetic in the form of FIB, in the emergency department, can significantly decrease pain from 30 minutes to eight hours post-block compared to opioids.⁵ Other forms of regional anesthesia discussed in the literature include lumbar erector spinae plane block, suprainguinal fascia iliaca block and quadratus lumborum blocks¹¹⁻¹³ however, the primary quoted regional block for NOF in the literature is fascia iliaca block.¹⁴

Our study confirms that FIB is significantly better than oral-based analgesia alone, which is supported by the literature.⁵ Currently there is not a 100% rate of FIB administration for fracture NOF patients; reasons include poor pain assessment due to cognitive impairment, lack of confidence and training in FIB administration, patient refusal and increased staff workload. Our interventions improved the confidence of block administration in our cohort.

Regular opioids were also given to some patients even after FIB that combined the pain score reduction from opioids and FIB. However, this was a constant factor in both groups, therefore allowing comparison of data. Pain score was assessed pre-operatively, however at varying times after FIB was administered. Ideally pain scores should have been measured within one hour after administration of FIB, however this was difficult to accomplish due to work shift pattern and practical reasons. There was difficulty assessing pain in patients with cognitive impairment and an Abbey pain scale was suggested,⁹ however this was poorly received by the nursing staff. The quality of blocks administered by doctors without US guidance, and only using a landmark approach is still being debated and many anesthetists would agree that the landmark approach is just as accurate as US-guided FIB.¹⁵⁻¹⁷

The introduction of FIB into our trust required an MDT approach with involvement of several teams, namely;

anesthetics, emergency medicine, orthopedics, orthogeriatrics and nursing.

Although the emergency department had welcomed the use of FIB, it was essential for orthopedic team members to learn and be able to administer the block, and as with other studies,⁵ it was noted that this was lacking prior to our intervention. It should also be noted that at times, emergency departments are extremely busy as well as short staffed. This should not compromise the initiation of appropriate pain management for the NOF patients and so orthopedic trainees must be well versed in delivering this block. Furthermore, with the development of our e-learning tool, we can roll out and deliver teaching sessions to various other members of the MDT, including advanced nurse practitioners and physician assistants, and increase uptake of FIB. Furthermore, in the current digital era, patients and healthcare providers frequently use social media such as YouTube and Instagram to enhance professional and patient education, patient care and health programs.^{18,19} Our video tool is freely accessible on YouTube²⁰ and this easy access to educational skills training could significantly reduce the burden on the current low numbers of “FIB trained” staff and effectively reduce the morbidity and mortality associated with these injuries.^{21,22}

Conclusion

Our study confirms that FIB is significantly better than oral-based analgesia alone. This study shows that with the use of an educational training tool, FIB can be safely administered by junior doctors, emergency department doctors, emergency nurse practitioners as well as specialty pain nurses successfully without complications. Our educational tool has enabled a significant increase in delivery of FIB. Using other health professionals maintains uptake of blocks, allows continual provision of education to new and rolling staff.

Acknowledgments

The authors thank all anesthetic, orthopedic, orthogeriatric, emergency medicine and nursing colleagues at Dartford and Gravesham NHS Trust. In particular, Dr. Dhiraj Ali and Mr Shibby Robati. The authors would also like to thank the medical education department for technical support in creation of the e-learning tool.

Disclosure

The authors report no conflicts of interest in this work.

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