Improving analgesia in fractured neck of femur with a standardised fascia iliaca block protocol

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Abstract

Fractured neck of femur (NOF) causes significant morbidity and pain for patients; adequate analgesia is an essential component of patient centred care. Patients experiencing greater pain during treatment for fractured NOF are slower to mobilise and have poorer health-related quality of life. NICE guidance suggests considering adding nerve blocks if paracetamol and opioids do not provide sufficient preoperative pain relief. We set out to audit pain levels in this group of patients in a small District General Hospital and to develop a protocol to improve analgesia provision if required. We identified that patients waiting a long time for fixation of fractured NOF could benefit from safe, effective analgesia by way of fascia iliaca compartment block (FICB). We drew up a protocol and held training sessions bringing about a culture change to provide an excellent standard of analgesia for these patients. Most patients reported much better levels of analgesia post-block and junior doctors felt more empowered. Further developments considered are training of senior ED nurses to administer FICB (in keeping with the AAGBI position statement) and a fascia iliaca catheter placement service.

Problem

Fractured neck of femur (#NOF) is a common cause of admission among the elderly population to Weston General Hospital (a district general hospital in the UK). Many patients wait up to 36 hours before surgical intervention. During this time their pain is treated with systemic analgesia on the wards. For many frail patients it can be difficult for the team to balance adequate analgesia with side effects of opioids. As a result, pain can be difficult to manage pre-operatively. In addition, many of the patients admitted with #NOF have either long-standing cognitive impairment or delirium and may not be able to adequately communicate their pain levels. It is likely that analgesia in this group is often sub-optimal.

Background

Patients who experience greater pain during inpatient treatment for fractured NOF are at higher risk of delirium,[1] slower to mobilise,[2] have poorer health-related quality of life [3] and are more likely to report persistent pain three to six months after fracture.[4]

A Cochrane systematic review states that “following a hip fracture the use of nerve blocks inserted either before or at the time of surgery, reduces the degree of pain and the need for parenteral analgesia.”[5] NICE guidance on hip fracture suggests considering nerve blocks if paracetamol and opioids do not provide sufficient preoperative pain relief, or to limit opioid dosage.[6]

The femoral nerve block is an effective method of providing analgesia to patients with fractured neck of femur in the emergency department (ED) that can reduce average pain scores and reduce average opiate requirements.[7] Fascia iliaca compartment block (FICB) is a modified technique of providing a femoral nerve block without use of ultrasound guidance. FICB can provide pain relief after fractured neck of femur in more than 70% of patients and can be successfully performed by other trained health care providers without anaesthetic background.[8]

Baseline measurement

For this project, four measures were considered. The first two were process measurements: regular documented pain observations, and whether a femoral nerve block or fascia iliaca block had been performed. The second two were outcome measurements: pain scores and morphine requirements.

An initial retrospective audit of 25 patients with fractured neck of femur was conducted from patient notes. Data collected included: Hourly pain scores for first 10 hours from admission, opioid analgesia given (standardised to “oramorph equivalent”), nerve blocks administered and time to theatre. An “opioid index” was derived from the oramorph equivalent (mg) divided by time (hours).

Baseline results showed: 25 patients (20F, 5M. Mean age 82.9y, range 62-100y). Pain score average: 3.1/10 (range 2.8-4.8). Baseline opioid index 0.84mg/h (range 0-2.4mg/h). Number of nerve blocks considered: 5 (20%), number of blocks performed 5 (20%). Techniques included femoral nerve block and fascia iliaca block. Of these, none would have conformed to the “best practice” protocol later devised, having various non-standard doses of local anaesthetic infiltrated. In addition, the procedure was not clearly documented for any of the blocks performed. Average time to theatre was 29 hours.

Design

In many emergency departments across the country there are sufficient middle grade doctors to routinely perform femoral nerve or
fascia iliaca blocks on diagnosis of a #NOF. In Weston General Hospital, staff levels are low due to the small size of the department, and there is a high turnover of junior doctors.

Teaching emergency department doctors ultrasound guided femoral nerve blocks was initially considered. However it was felt that it would be a challenge to expect junior physicians to become proficient in the technique during a four month rotation. The fascia iliaca compartment block differs from the standard femoral nerve block in that it is a high volume block that does not require ultrasound guidance. It can easily be learned by junior medical staff. In addition, studies have shown that the technique can be effectively administered by adequately trained nursing staff.

We decided to formulate a protocol for administering fascia iliaca blocks, and then to roll out a teaching programme among ED doctors and nurses, anaesthetic SHOs and the acute pain nurse.

The protocol included a synopsis of the teaching regarding landmarks, dose, volume of infiltrate and time to repeat the block if necessary.

**Strategy**

Three PDSA cycles were conducted. Notes were audited as part of each cycle.

PDSA 1: A protocol for the fascia iliaca block was developed. This intervention aimed to significantly reduce morbidity and suffering in patients with fractured NOF. A proforma was designed and included in the fractured NOF folder for each patient, including a checklist to ensure correct dose for weight and best practice technique.

PDSA 2: Several training sessions were held for emergency department junior doctors and nurses. The initial audit results and the new protocol were presented to the Trauma and Orthopaedic team with agreement to become departmental policy.

PDSA 3: Presentation of the new policy to the Anaesthetic Department and subsequent discussion led to establishment of a "block support service". This enabled anaesthetic doctors to provide ongoing support to Emergency Department doctors as needed. Reminder posters were put up in the Emergency Department. Once all departments (Trauma & Orthopaedics, Emergency Medicine and Anaesthetics) were in agreement on the protocol, it was included in the new Trust fractured NOF pathway booklet.

**Post-measurement**

PDSA 1: New Emergency Department SHO intake, proforma in fractured NOF folder. 10 patients (7F, 3M. Mean age 89y, range 62-102y). Blocks considered 2 (20%), blocks performed: 0 (0%).

PDSA 2 which comprised of training sessions. 6 Patients (4F, 2M. Mean age 77.2y, range 67-96y). Blocks considered: 1 (17%), blocks performed: 1 (17%).

PDSA 3: Presentation to Anaesthetic Department, ongoing staff training sessions, posters put up in Emergency Department. 25 Patients (21F, 4M. Mean age 82.9y, range 59-98y). Block considered 22 (88%), blocks performed 19 (76%). Average opioid index: 0.72mg/h (range 0-2.05mg/h). Average pain score in those without block was 5.0 (range 3.1-8.3). Average pain score in those with block performed was 3.8 (range 0-10). It was noted that this group of patients fell into two sub-groups. In one group, pain scores dropped significantly (to zero in the majority) in the hour after block administration. In the other group, pain scores remained statically high throughout. This could be explained by blocks either working or not working. Out of 21 blocks administered, 13 worked, constituting 62% success rate. Eight did not work - a 38% failure rate. On further analysis, those in the failed block group had average pain scores of 7.2/10 (range 1.4-10). Patients in the successful block group had average pain scores of 0.3/10 (range 0.2-3).

Although statistical analysis using Fisher's exact test has shown that the improvement in number of blocks administered was not statistically significant, we hope that further auditing and analysis of a larger data set would show such statistical significance.

**Lessons and limitations**

Initially we assumed that once the FICB protocol was available to ED staff, it would be immediately utilised. What became evident was that there was a training issue - the SHOs did not feel confident to use the technique. In tandem with this lack of confidence from junior doctors, there was no real push from either ED or orthopaedic consultants to implement the protocol. These difficulties were overcome by liaising with consultants of both departments, presenting the case for the FICB at orthopaedic departmental meetings and setting up and delivering extra training for junior & middle grade ED staff. In this way support for implementation was developed, and junior staff gained the skills and confidence they needed to play their part.

One important group that helped immensely with implementation was the ED nursing staff. From the outset they expressed great interest in the idea, and after training sessions, they felt empowered to remind junior doctors to complete the block and relevant paperwork, leading to greatly increased compliance. In addition several of the more experienced nurses expressed interest in learning how to perform the block themselves. This seems the key overcoming problems associated with a high turnover of junior staff in emergency medicine, and is supported by the Association of Anaesthetists of Great Britain and Ireland (AAGBI) statement regarding FICB. It is planned that a small number of ED nurse practitioners will be taught the block, and will serve as a permanent quorum able to perform it. They may also be in a position to teach each cohort of junior doctors rotating through the department.

**Conclusion**

The problem that I initially noticed was that many elderly patients in our hospital with fractured neck of femur had high levels of pain...
between admission and surgery. NICE guidance suggested that regional anaesthesia be considered for all of these patients, but my initial audit revealed little evidence of such consideration. In our small DGH I found that most junior and middle grade doctors in the ED had no experience in performing any type of femoral nerve block and lacked confidence in doing so. My research revealed that even in those inexperienced in use of ultrasound, the FICB can be an effective mode of regional anaesthesia for fractured NOF. By communicating with doctors of all levels in emergency, orthopaedic and anaesthetic departments as well as ED nursing staff a culture change came about where FICB was considered for all patients with fractured NOF. Key to supporting this change was a proforma that was developed to act as both aide-memoir and documentation of the block. Education of junior doctors was vital to this culture change.

Plans for the future go further still - to train ED nurse practitioners to perform the block and act as a permanent quorum of staff able to administer FICB where needed and in turn train incoming staff.

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Declaration of interests

Nothing to declare.

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Ethical approval

According to the policy activities that constitute research at Weston Area Health NHS Trust this work met criteria for operational improvement activities exempt from ethics review. We used the following criteria for determining if improvement activities require ethics review. Policy criterion: The work is primarily intended to improve local care, not provide generalisable knowledge in a field of inquiry. Explanation: The work reported here meets this criterion because adequate analgesia is a universally recommended practice. We sought only to evaluate the improvements in providing adequate analgesia for patients with fractured neck of femur as a result of staff training in tandem with provision of a proforma-based protocol.
Erratum: Improving analgesia in fractured neck of femur with a standardised fascia iliaca block protocol

Watson P, Keehan R, Rugonfalvi-Kiss S. Improving analgesia in fractured neck of femur with a standardised fascia iliaca block protocol BMJ Quality Improvement Reports 2016;5:u202788.w1370. doi:10.1136/bmjquality.u202788.w1370. The author Robert Keehan has been added to this report since it was first published online.

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