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Feature Article

Can we reduce morphine use in elderly, proximal femoral fracture patients using a fascia iliac block?

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ABSTRACT

Proximal femoral fractures are becoming increasingly common with an ageing population. Many patients have multiple comorbidities increasing their risk of opiate complications. 40 consecutive patients presenting with a proximal femoral fracture to a trauma centre in the UK were given either a Fascia Iliaca Block (FIB) with oral analgesia or just oral analgesia to control their pre-operative pain. Numeric pain scores and morphine consumption were used as outcome measures. Patients receiving a FIB had significant reduction in their pain scores compared to patients only receiving oral pain relief. There was also a significant reduction in both the actual oral morphine taken and the renal calculated level of morphine products in the group receiving the FIB. Patients undergoing a FIB required almost 50 mg less oral morphine pre-operatively. Nerve blocks should be used routinely to help pre-operative pain in proximal femoral fracture patients and to reduce the amount of morphine products prescribed. This prevents potential opiate complications in a highly susceptible cohort of patients often suffering with impaired renal function as a co-morbidity.

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Introduction

Proximal femoral fractures are an increasing problem worldwide. Over 64,000 proximal femoral fractures occurred in the United Kingdom in 2014[1] with an annual cost for medical and social management estimated at approximately £2 billion.[2] The incidence and cost is increasing as the population's age rises. Currently 10% of patients with a proximal femoral fracture die in the first 30 days after their injury with mortality levels at 33% after 12 months.[2–5]

Pain management of patients with proximal femoral fractures is often difficult. This is due to patients advancing age, combined with multiple co-morbidities and the associated poly-pharmacy. Increasingly morphine is administered initially by the ambulance staff and then again in the Emergency Department. This increased use and dependence on morphine as the main analgesic for proximal femoral fractures leads to many complications. Delirium, increased confusion, constipation and respiratory depression are all side effects regularly encountered following opiate administration in the elderly population. The elderly population are more susceptible to side effects and complications from opiates due to their co-morbidities and the incidence of polypharmacy. It can be difficult to calculate the appropriate dose, especially by paramedics and in the emergency department before a patients' full medication history is known. This is particularly the case in proximal femoral fracture patients increasing the risk of side effects and complications and so making nerve blocks an attractive option in the management of these patients.[6–9]

The National Institute of Clinical Excellence (NICE) has introduced guidelines in the United Kingdom (UK) to help optimize and standardize management of proximal femoral fractures. NICE guidelines have recommend the use of nerve blocks "if paracetamol and opioids do not provide sufficient preoperative pain relief, or to limit opioid dosage".[10]

Two nerve blocks tend to be used to target hip pain: either a femoral nerve block or a fascia iliaca nerve block (FIB). The FIB is a safe and efficacious nerve block that can be inserted using an anatomical, landmark based technique. Ultrasound guidance is not required for its use and as a compartmental block it aims to isolate more than one nerve. These are two reasons it is felt to be a more appropriate block than a femoral nerve block. It has been

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demonstrated to be as efficacious as a femoral nerve block in control of pain after proximal femoral fracture and is safe to administer by junior doctors in the Emergency Department.[11–15]

Nerve blocks are recommended for use in proximal femoral fracture patients who are in severe pain as per NICE guidelines. The aims of our study were to see if FIB's improved the pain in patients presenting with a proximal femoral fracture and to assess if when patients receiving an FIB required less oral morphine to control their pre-operative pain. This was part of a project in our institution to investigate whether the FIB should be used routinely in all hip fractures rather, as NICE guidelines recommend, in patients with severe pain.[10]

Method

All patients admitted to a single trauma centre fitting the inclusion criteria were enrolled in the study, which was approved after institutional board review at the author's institution. To be included in the study patients required capacity to provide informed consent, had to be over the age of 50 and presenting with a proximal femoral fracture (intracapsular, intertrochanteric or subtrochanteric). Age formed part of the inclusion criteria due to the higher energy mechanism of injury under the age of 50 and potentially expedited emergency surgery requirement. Patients on warfarin therapy were also excluded due to risks of haematoma post nerve block causing nerve damage either temporarily or permanent.[16–18] Contraindications to performing a FIB are limited but important. An INR above 1.5, previous vascular surgery in the limb (relative contraindication) and an allergy to local anaesthetic excluded patients from enrolling in the study. Capacity was decided after performing an Abbreviated Mental Test Score (AMTS) which includes an assessment of short term memory lost.[19] Sample size was calculated with a power of 0.80, an effect size of 0.5 and a two tailed confidence interval of 5%.

40 consecutive patients with proximal femoral fractures and capacity to consent to the study were recruited prospectively at the time of their admission to the Emergency Department. The first 40 patients approached consented to be part of the trial with a consent rate of 100%. The first 20 patients (Group A) were treated with traditional analgesia regime (regular paracetamol, mild opiates and oral morphine given as required). In our institution, and in most institutions within the UK, oral morphine is used in most ward based care. Intravenous morphine tends to be used by paramedics for emergency cases and so only oral morphine was used in our study.

Group B, the second consecutive 20 patients, all underwent a landmark based FIB performed by one of the authors (AK) who is a Specialist Registrar/Resident in the Trauma and Orthopaedic surgery department. Group B were also given regular paracetamol, mild opiates and oral morphine as required. Oral morphine was administered based on the patient's perception of their pain (requesting further pain relief) and based on the assessment of pain by clinical and nursing staff. The prescription of medications between the two groups was identical, the only difference between the two groups being the FIB received by group B.

Numerical Rating Scores (NRS) to assess pain (0 = no pain and 10 = worst pain imaginable) were prospectively collected in both groups.[20,21] These were performed at the time of recruitment to the trial prior to any treatment, 1 h following the treatment, 6 h and 12 h post intervention. The administration of oral morphine in the first 12 h was then recorded retrospectively from patient prescription charts. Surgery was performed in all patients within 36 h.

The FIB was administered using a landmark-based technique. This involved injection of a patient's weight-based dose of 0.25% Levobupivicaine using an aseptic technique. A lower percentage Levobupivicaine was utilised (instead of 0.5% Levobupivicaine) to allow an increased volume to help the local anaesthetic infiltrate throughout the fascial plane. The dose was calculated depending on the weight of the patient (maximum dose 2 mg/kg body weight) and in practice, either 30 or 40 ml of 0.25% Levobupivicaine was administered in all cases.

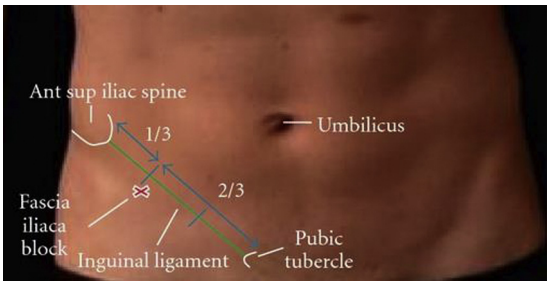

Fig. 1. Surface markings for fascia iliaca block.[22]

A line was drawn between the Anterior Superior Iliac Spine (ASIS) and the Pubic Tubercle. This line is divided into thirds and the point between the lateral and middle third is marked. The injection site is 1 cm caudal to this point (Fig. 1). A spinal 12G needle is inserted at 60° pointing cephalad after palpation of the femoral artery and confirmation that the injection site is lateral to the femoral neurovascular bundle. A "double pop" sensation is felt to identify the needle passing through the fascia lata followed by the fascia iliaca. Once the second "pop" is felt the local anaesthetic is infiltrated after aspiration to confirm no venous or arterial penetration. A high volume of local anaesthetic is injected which infiltrates throughout the anatomical space underneath the fascia iliaca surrounding the compartments nerves (Fig. 2).[22]

All results were collected on a Microsoft Excel spread sheet where graphs and tables were generated. A statistician assessed our cohort as nonparametric and calculated statistical significance using a Man-Whitney *U* test, the significance level being 5%. To allow comparison of pain scores between the two groups, an area under the curve (AUC) graph was used. Results were assessed using a 2-way repeated measure analysis. No missing data was encountered and an assumption was made that the observations between and within the groups had equal variance/correlation.

Results

There was no significant difference between the groups in age, time to definitive surgery or in the type of fracture sustained (Table 1). No complications were encountered in either group from either the analgesic treatment or the nerve block administered. There was no significant difference in initial pain scores between

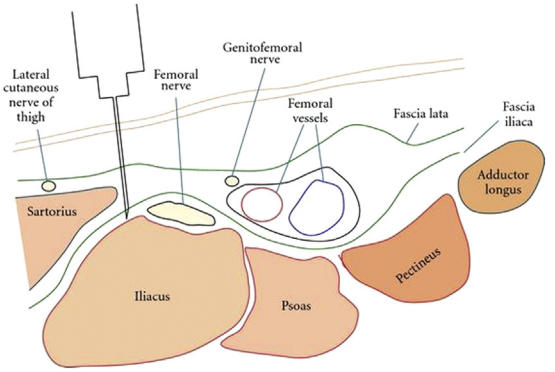

Fig. 2. Cross sectional view of the fascia iliaca block showing the anatomical planes for insertion of the local anaesthetic.[22]

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