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Improving Pain Control in Elderly Hip Fractures with Fascia Iliaca Compartment Block

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Abstract

Successful pain control in elderly hip fracture is associated with decreased morbidity, anxiety, delirium, and length of stay, but standard treatment with intravenous opioids also comes with its own harmful side effects. Peripheral nerve blocks, such as fascia iliaca compartment blocks have been shown in other countries to successfully reduce pain levels but are not common in the preoperative period. This project was undertaken to evaluate the efficacy of fascia iliaca compartment blocks in elderly hip fractures. This was a single institution retrospective analysis of a quality improvement project for blocks in ten sequential elderly hip fractures that were analyzed using a two-tailed paired t-test. Post block VAS scores significantly improved when compared to their pre-block counterparts with a median morphine equivalent requirement of 13.5 prior to operative intervention. Therefore, this project for elderly hip fractures shows successful improvement in pain control pre-operatively and demonstrates promising results for a future prospective, randomized control study.

Keywords: Floating knee. Femur Fracture, Tibia fracture, Ipsilateral trauma, Stiffness.

INTRODUCTION

Hip fractures are a significant problem in the elderly with over 300,000 admissions within the United States alone that carries an incidence of 20-35% morbidity and mortality in this population[1,2]. Not only do they have a high rate of mortality, but hip fractures are also indicative of declining physiological function and associated with loss of independence[3,4]. It is well established that prompt surgical intervention decreases the postoperative mortality, complications, and length of stay[3]. Aside from quick surgical intervention, adequate pain control in elderly hip fractures is also associated with decreasing morbidity, anxiety, confusion, length of stay, cardiovascular events, and depression[1,4-7]. Pain control with this older population proposes a conundrum as attempts to decrease pain levels with opioids also cause increased confusion, respiratory depression, nausea, and vomiting[3].

Due to the potential for adverse effects with current treatment guidelines for pain control in the elderly, research studies have begun focusing on alternatives to opioids and NSAIDs for pain control. Regional analgesia is one option for pain control over systemic pain relievers due to being site specific, reducing opioid requirements, length of stay, respiratory infections, and delirium, as well as improve pain scores, ambulation, and increased likelihood to discharge home versus a rehabilitation facility[1-3,5,7-17]. If ultrasound is used for these peripheral nerve blocks, there is a further advantage with the use of smaller amounts of local anesthetic and increased success rate[11]. Several options for peripheral nerve blocks exist that control hip pain and one that has grown in particular favor is the fascia iliaca compartment blocks (FICBs) because they are effective, low-risk, easily learned, and possibly superior to other blocks[8,15].

Despite these promising results on block efficacy for pain control, these are often not performed in most emergency rooms in the United States. This is unfortunate because emergency rooms are the first contact for care and where most individuals would benefit the most from adequate pain control. In fact, there is a trend towards not only under-medication of elderly patients with hip fractures as well as prolonged waiting time for analgesia[13,16]. Based on these data and the growing need for better pain control in the elderly, this project was undertaken to determine if FICBs done in the emergency room for hip fractures were effective and feasible for pain control within the emergency room.

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METHODOLOGY

This is a retrospective review of a quality improvement project carried out at a single institution with a combined effort between the departments of emergency medicine and orthopedics that occurred from January 1, 2018 to May 5, 2018. A group of 10 patients over 50 were included based on a diagnosis of a hip fracture (including intertrochanteric, subtrochanteric, and femoral neck). Patients were excluded if the fracture occurred during a high energy mechanism (such as motor vehicle collision or fall from substantial height) or anticipated time to the operating room was within 12 hours, have a known allergy to anesthetic or hardware at or near the planned injection sit, have known peripheral neuropathy or preexisting nerve injury, and/or currently on anticoagulation. Once the patient met criteria, the patient was consented, visual analogue scores (VAS) for pain prior to block administration was documented, and underwent fascia iliaca compartment block.

Fascia Iliaca Compartment Block

The patient was prepped and draped in a sterile fashion. Using ultrasound, the femoral nerve was located just under the fascia iliaca. Once identified, 20mL ropivicaine (5mg/mL) with 0.1 mL of dexamethasone (10 mg/mL) was administered into the compartment and a dressing was applied. Patients were monitored by emergency department staff for 30 minutes after the procedure. VAS pain scores were obtained again 30 minutes after the block and 60 minutes after the block. Patient data collected included time to rescue analgesia in minutes, required opioids in oral morphine equivalents prior to surgical intervention, duration of the block procedure in minutes, and complications. VAS pain scores before and after the block were compared for statistical significance via a paired t-test. Descriptive statistics were used to evaluate the opioid requirements, time to rescue analgesia, time to anesthesia evaluation, and duration of the block.

RESULTS

The mean VAS score for the 10 patients was 9.4 (8-10) prior to block administration. Both post-block VAS scores were significantly different from the pre-block VAS scores with an average VAS score of 6.3 (0-10) at thirty minutes after block administration (p-value=0.032) and 3.8 (0-8) at sixty minutes after block administration (p-value=0.001) (Figure 1). The mean duration of the FICB in the emergency room was 8.1 minutes (4-12 minutes). The mean time to anesthesia evaluation was 884 minutes (525-1397 minutes).

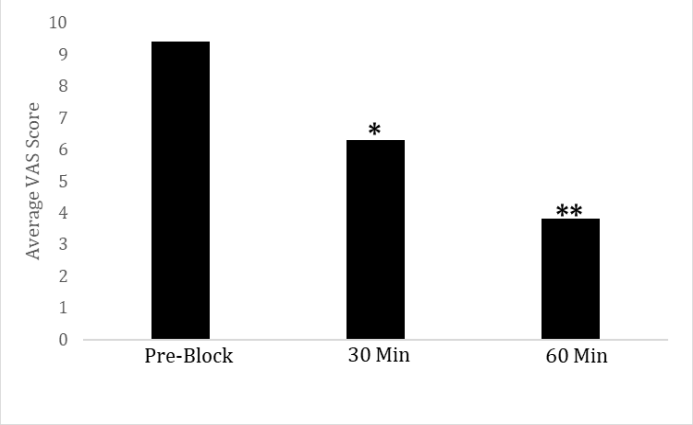

Figure 1: VAS Scores Following Fascia Iliaca Compartment Block

The mean opioid requirement was 33 morphine equivalents (0-211 morphine equivalents) with two patients whom did not require any additional rescue analgesia prior to anesthesia evaluation (Table 1). There was one outlier within this data with 211 morphine equivalents with the next largest amount of rescue analgesia being 51 morphine equivalents. If this outlier is removed, the mean amount of morphine equivalents of rescue analgesia was 13 morphine equivalents. The mean time to rescue analgesia prior to operative intervention was 254.75 minutes (116-467 minutes) (Table 1). There were no recorded complications following the block.

Table 1: Time to rescue analgesia and pain medication

Patient	Time to rescue analgesia (min)	Pain Meds (OMEs)
1	307	51
2	467	7.5
3	128	211
4	116	7.5
5	410	18.75
6	0	0
7	185	22
8	237	8.2
9	188	7.5
10	0	0
Mean	203.8	33.345

DISCUSSION

Hip fractures cause excessive mortality with less than 50% of all patients returning to prior level of function[17]. In addition to the fractures themselves, poor pain control can also contribute to delirium, slower mobilization, longer hospital stays, and poorer health-related quality of life[7]. Pain control is particularly difficult in the emergency room based on a variety of factors that cause both delay and under-treatment of pain[1,11,16]. Some of these factors include the presence of hypotension or altered mental status, which could be made worse if given opioid pain medications. Since pain control is often limited in the elderly, particularly if they present to the emergency room with factors that would prohibit opioid medications, peripheral nerve blocks present an alternative for successful pain management. Peripheral nerve blocks are advantageous over opioids for pain control in the elderly due to site specific treatment without any of the systemic side effects and quick onset[,15-16]. Beside initial pain control, these blocks can also help decrease the need for opioids, length of stay in the emergency room, and increase the likelihood of discharging home[9,14]. Ultrasound guided blocks show promise for even more success as they can further decrease the amount of local anesthetic needed to achieve sensory blockade and increase success rate[11]. This study was able to show the improvement peripheral nerve blocks have on pain control within the emergency room without any complications by significantly decreasing VAS pain scores.

Ideally pain control with these peripheral nerve blocks would begin within the emergency room, but there appears to be barriers to performing these. In the United Kingdom, about 55% of emergency rooms are performing fascia iliaca compartment blocks on a routine basis versus only 33% in the United States for hip fractures in the elderly[8]. This quality improvement project was used to discover evaluate the feasibility and effectiveness of fascia iliaca compartment blocks in elderly hip fractures at a single institution in the United States. In a survey of Canadian emergency room physicians, 89% were in favor of nerve blocks, but only one third of physicians are providing nerve blocks and of these only 13% of people are performing more than 10 blocks per month in Canada[18-19]. Limitations to more widespread nerve blocks include lack of familiarity with nerve block techniques, extended length of time to perform, lack of confidence, in need for more training[19]. This project, however, helped to show FICBs are of short

duration to perform with the average time for the block taking only 8.1 minutes and significantly reduced pain.

The United States emergency departments have not universally adapted the use of peripheral nerve blocks for elderly fracture control to date, but research continues to show the promise in these as early as when they first present. There are theoretical risks of these peripheral nerve blocks, including local anesthetic toxicity, hematoma or seroma formation around the injected site, infection or erythema around the injection site, or prolonged neurovascular compromise[6,8,9]. However, both the published literature and this study did not show any complications, making these blocks a safe alternative for pain control. This study is in agreement with prior research showing that FICBs in particular are less technically demanding, well tolerated, safe, effective, easily learned, and low cost[11,13-14,16,19-21]. With this promising case series, it is the goal to perform a prospective randomized control study to compare this block within the emergency department against standard opioid pain medication to further the importance of early pain control.

CONCLUSION

Fascia iliaca compartment blocks are a promising alternative to opioids for elderly hip fractures because they are quick, effective, and safe. This case series helped show success in sequential selection of elderly hip fractures for better pain control and low need for rescue analgesia. This proves the feasibility of ultrasound-guided fascia iliaca compartment blocks in the emergency department in decreasing pain control. This project is a pilot evaluation to perform a prospective, randomized controlled study comparing fascia iliaca compartment blocks with standard intravenous opioids.

Conflict of interest- Nill.

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