UAMS Journal Club Summary
February 2020
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Femoral nerve block in elderly adults with hip fracture as compared to conventional IV analgesia for pain control.

Clinical Bottom Line
Ultrasound guided regional anesthesia shows potential for decreasing IV analgesia requirements and reducing pain scores among patients with single trauma proximal pelvic fractures. It has also been shown to be effectively performed in the emergency department by emergency physicians.

PICO Question
P- Elderly adults with acute hip fracture
I- Regional anesthesia
C- Without regional anesthesia (and/or IV narcotics)
O- Acute pain

Background
Traditional IV analgesia for pain control of proximal femoral fractures is the conventional standard of care, but the populations prone to these injuries are also vulnerable to known complications of IV opioids, including pneumonia, respiratory distress, incomplete pain control and subsequent delirium, and even addiction. Regional anesthesia presents an alternative or adjuvant to IV analgesia, and when performed early in the emergency department setting, may also potentially reduce overall conventional analgesia requirements. As more emergency medicine physicians are trained in and perform these procedures, there is a growing, though still limited, body of literature exploring this alternative mode of pain control within the context of the emergency department.

Trial 1
Ketelaars R, Stollman JT, van Eeten E, Eikendal T, Bruhn J, van Geffen GJ. Emergency physician-performed ultrasound-guided nerve blocks in proximal femoral fractures provide safe and effective pain relief: a prospective observational study in The Netherlands. Int J Emerg Med. 2018;11(1):12. Published 2018 Mar 2. doi:10.1186/s12245-018-0173-z

Link: https://pubmed.ncbi.nlm.nih.gov/29500558/

Validity Rating : Moderate risk of bias

The Basics
This article was a prospective cohort study of elderly adults with single injury proximal femur fractures that compared NRS pain scales before and after ultrasound-guided fascia iliaca or femoral nerve blocks performed by ED physicians who had received standardized, single day training for the procedure. It was designed to identify if ED physicians could successfully perform this procedure within the context of the emergency department. Pain levels were taken at baseline, 30, 60, and 120 minutes. The author's cutoff for a "significant" pain reduction was a > 33% reduction of their score.

Inclusion Criteria
Adult patients admitted to a single-center ED in Rabdoud university medical center with proximal femoral fractures.

Exclusion Criteria
Patients with local anesthetic allergy, signs of infection at injection site, coagulopathies (congenital or secondary to medication), or multiple traumata were excluded.

Primary Outcomes
NRS pain scale scores.

Secondary Outcomes
Secondary outcomes were patient and ED physician scores on various perceptions on the procedure scored along a 1-10 scale as follows)

- Patient centered scores:
    - Discomfort experienced during the procedure (very uncomfortable v not uncomfortable at all)
    - Would like to undergo a similar procedure in the future (would like it never again v would like it again)
- ED physician scores:
    - Ease of procedure (very difficult v very easy)
    - Success of procedure itself (did not succeed at all v very successful procedure)
    - Visibility of anatomical structures on ultrasound (hard to recognize v easy to recognize)
    - Spread of local aesthetic on ultrasound (bad spread v good spread)
    - Subjective added value of procedure to patient care (no added value v absolute added value to patient care)

Overall, a low score (1) conveyed a negative experience or perceived quality, v a high score conveying a positive experience or quality (10).

Results:
Pain scores were significantly reduced at 30, 60 and 120 minutes in 70.7%, 80.0%, and 85.7% of participants respectively among patients that were not lost to follow up in this study. Amount of pain score reduction was 50.9% (CI 42.6-59.2), 64.4% (52.1-76.8), and 79.5% (46.3-100) respectively. Patient-reported discomfort during the procedure had a median score of 8 (IQR 8-9, n = 61), and when asked if they would undergo a similar procedure again their median score was a 9 (IQR 8-10), n = 60).

Limitations/Bias:
This study had a small cohort. Many of the patients were lost from this study. Baseline pain scores included 64 patients, but by 30, 60, and 120 minutes the number of participants dwindled to 58, 30, and 7 patients respectively. Surveys were also documented by the physicians and nurses involved in the blocks, a potential observer bias. There were also limited participants in this study, and confidence intervals could stand to be improved by a higher power study.

Critical Appraisal Skills checklist for prospective cohort study:

1. Focused issue? Yes
2. Cohort recruited in an acceptable way? Yes
3. Was the exposure accurately measured to minimise bias? Yes, though pain is subjective, NRS is a well-validated pain scale.
4. Was the outcome accurately measured to minimise bias? No, EP's and nurses who performed the blocks filled out the case reports themselves. Several patients were also lost to 30, 60, 120 minute intervals due to transfer out of the department and high workload. Additionally, patients served as their own controls. There was no control group comparing traditional pain management to FNB.
5. Have the authors identified all important confounding factors? Yes.
6. Was the follow up of subjects complete/long enough? Yes for acute pain control, but not long enough to identify peak effect.
7. What are the results of this study? Ultrasound guided regional fascia iliaca blocks provided statistically significant pain reduction among elderly patients with proximal femur fractures in the emergency department, when comparing their pain scores before and after the block.
8. How precise are the results? Not very. CI are wide.
9. Do you believe the results? Yes, N was small and effect relatively large.
10. Can the results be applied to the local population? Yes.
11. Do the results of this study fit with other available evidence? Yes, though high-quality studies regarding ultrasound guided regional anesthesia as performed by ED physicians is still limited.
12. What are the implications of this study for practice? It shows that ultrasound guided fascia iliaca blocks may be performed with significant effect on acute pain by ED physicians provided they receive this short and standardized training.

Trial 2

Unneby A., Svensson O., Gustafson Y., et al. Femoral Nerve Block In a Representative Sample Of Elderly People With Hip Fracture: A Randomized Control Trial. Injury. Vol48(7) p1542-1549.

Link: https://doi.org/10.1016/j.injury.2017.04.043

The Basics: This randomized control trial was performed in a single institution setting comparing self reported and nurse-assessed pain scores and surrogate markers of pain from patients who suffered an isolated proximal femur fracture, comparing pain between control patients receiving opioid/traditional pain control and those who received femoral nerve blocks.

Inclusion Criteria: Patients age >70 with an isolated hip fracture.

Exclusion Criteria: Previous vascular surgery of the inguinal area, infection of the inguinal area.

Primary Outcomes: Preoperative pain measured at five different time points (self reported and proxy-reported) using a visual aid and numeric 1-10 scale.

Secondary Outcomes: Opioid consumption, procedural complications of intervention.

Results: Self-reported pain was significantly reduced in the intervention group compared to the control group at 2 (-3.297), 6 (-3.038), and 12 (-3.250) hours as rated using the 10 point pain scale, and the intervention group had a statistically significant reduction in the amount of opioid pain medications administered as well (2.3mg intervention, 5.7mg control, $p<0.001$)

Limitations/Bias: The primary limitation/bias in this study is that the nurses who collected pain scores via self report from the patients, and also determined proxy pain scores in those who were demented or unable to provide a numeric scale were not blinded to patient allocation, potentially leaving room for significant bias.

Validity Rating:

1a. Were the patients randomized? Yes, patients were randomized to receive either FNB + opioids or traditional opioid therapy for pain relief.

1b. Was randomization concealed? Partially. Randomization was concealed until the time of intervention, but not concealed to nursing staff collecting pain data due to the nature of the intervention. Nurses were aware of their patient having received a femoral nerve block. Randomization was maintained and participants blinded to those processing the data.

1c. Were patients similar at baseline with respect to known prognostic facts? Yes, patients were similar in presentation and exclusion criteria was adequate.

2. Were patients, caregivers, collectors of outcome data, adjudicators of outcome, and data analysts aware of group allocation? Patients, caregivers, collectors of data were aware of allocation due to the nature of the intervention. Analysts were not aware of allocation.

3a. Was follow-up complete? Mostly, the period of observation and assessment was only 18 hours, so patient responses were collected in entirety.
3b. Was the trial stopped early due to benefit? No, the trial was completed in entirety without alteration. In a somewhat related perspective, the hospital in which this was performed adopted FNBs as standard of care for isolated femur fractures.
3c. Were patients analyzed in the groups to which they were randomized? Yes, analysis was performed with intention-to-treat analysis.
4a. How large was the treatment effect? What was the relative risk reduction? What was the absolute risk reduction? Treatment effect demonstrated a significant difference between the two groups, but baseline scores were low. ARR and RRR not calculated given numeric reporting of pain scale.
4b. How precise was the estimate of the treatment effect? What were the confidence intervals? Fairly precise, confidence intervals were wider in the control group, reduced and more narrow in the intervention group.
5a. Were the study patients similar to my patients? Yes, elderly patients with isolated femur fractures are relatively common.
5b. Were all patient-important outcomes considered? Were surrogate endpoints used? Pain was the primary outcome assessed using a visual aid. Surrogate outcomes included secondary outcomes such as delirium and nurse-assessed agitation etc.