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LETTER

Efficacy and duration of ultrasound guided fascia iliaca block for hip fracture performed in the emergency departments

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To the Editor,

Delirium is one of the most frequent complications during hospitalization in elderly patients with a hip fracture. The correlation between this complication and the efficacy of pain relief is demonstrated also in cognitively intact patients [1]. The pain level is frequently underestimated and the likelihood of an ineffective pain management is more pronounced in regional hospitals with overcrowded emergency departments [2]. This situation is similar to what is happening in our hospital. In settings where a long waiting time for hip fracture surgery may occur, the introduction of an effective and long lasting alternative for analgesia is imperative.

The fascia iliaca compartment block is a better alternative to 3-in-1 block in hip fracture patients and can be easily performed in the emergency department (ED) [3].The idea of introducing the ultrasound guided fascia iliaca compartment block (US-FICB) as a standard pain management approach for hip fracture patients in the ED followed the acquisition of a new ultrasound device by our department, which eased the learning curve of US-guided FICB for emergency physicians.

The efficacy of ultrasound-guided fascia iliaca block (US-FICB) as an adjunct to opioid analgesia was demonstrated by Beaudoin et al., emphasizing the significant reduction of pain and the decreased requirement for rescue analgesia without any significant side effects [4]. Reduction of the risk of developing delirium by providing effective analgesia is more evident in intermediate risk patients than in high risk ones [5].

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The aim of this study was to evaluate the success rate and the duration of analgesia with US-FICB performed in the ED for hip fracture patients. The length of the preoperative period and complication rates were also recorded.

We developed a prospective, observational study, approved by the Ethics Committee of Bihor County Emergency Clinical Hospital Oradea, Romania. Forty-eight patients with radiologically confirmed upper femur fractures admitted to the ED were included in the study from October 2016 until February 2017.

We included patients aged more than 18 years, conscious and with a pain score higher than 3 on the Visual Analogue Scale (VAS). All patients provided written informed consent. We excluded patients with an international normalized ratio (INR) > 3.0, prior femoral artery vascular surgery on the same side as the fracture, other significant trauma, hypoxemia (SpO_2 – oxyhemoglobin saturation < 92%), hypotension (systolic blood pressure < 100 mmHg), or known hypersensitivity to local anaesthetics.

The preparation for the procedure consisted of pain assessment using the VAS scale (0 – no pain, 10 – worst imaginable pain), monitoring of vital signs (ECG, blood pressure, SpO_2), testing the baseline coagulation profile and shaving the inguinal space on the fracture site. The injection site was prepared with an antiseptic solution (povidone iodine).

Using a high frequency linear ultrasonography probe (Logiq V2, General Electric, USA), the inguinal space was scanned localizing the fascia iliaca proximal to the bifurcation of the common femoral artery. The needle was inserted in-plane, after providing the local anaesthesia of the skin. A maximum of 40 mL of 0.5% ropivacaine was injected under direct visualization between the fascia iliaca and the ilio-psoas muscle. If

the patient weight was less than 70 kg, the local anaesthetic volume was calculated for the maximum dose of 3 mg/kg). All the procedures were performed by emergency physicians with competence in FAST (Focused Assessment Sonography in Trauma).

Pain scores were evaluated 40 minutes after the block administration and hourly afterwards. Reduction of the pain score to less than 4 meant an effective block. The duration of adequate analgesia was calculated from the beginning of its effect, until the moment the pain score rose back to 4 or more. The preoperative period was defined as the time between admitting the patient in the hospital and the time of the surgery.

Statistical analysis was performed using MedCalc® version 12.5.0.0 (MedCalc® Software, Mariakerke, Belgium). The Kolmogorov-Smirnov test was used to test the distribution of continuous variables. Means and medians were calculated. Standard deviation or interquartile range (IR) are stated in brackets. To compare the duration of analgesia with the waiting period for the surgery we used the Wilcoxon test for paired samples. The graphical representation was developed using Microsoft® Excel® 2010 (Microsoft® Corporation, USA).

A total of 54 patients were evaluated, two were excluded for altered coagulation profile, two because of low intensity of pain, and two who refused to sign the informed consent. Thus, 48 patients entered the study and were followed up until discharge from the Orthopedic Clinic. Only four patients (8.3%) benefited from pre-hospital administration of any analgesics (paracetamol or NSAID). In all these cases, analgesia was ineffective, the patients entering the study with pain scores higher than 3.

The mean (SD) patients' age was 77.4 ± 9.8 years, with a 1:1.5 sex ratio of 19 males *versus* 29 females.

We reached a 93.8% success rate (45 successful analgesia blocks from the total number of 48 patients), without any complication. A number of 18 patients (40% from 45) were operated before the end of the analgesia period. In four patients, an additional fascia iliaca block was performed and in another 2 cases appeared a confounding effect of the spinal anaesthesia (no more analgesia after the disappearance of the effects of spinal anaesthesia). Thus, these 6 cases were excluded from the analysis of the analgesia duration.

The median duration of the analgesia was 48 (IR: 44.5-48) hours which almost covered the need for analgesia for a surprisingly long waiting period for the surgical intervention: on average 50.7 ± 42.5 hours. Non-significant difference was found between duration of analgesia and the lengths of preoperative period of time (p = 0. 6397) (Figure 1).

There are still few publications regarding the use of US-FICB in the ED. Most studies refer to postoperative analgesia with different doses of various local anaesthetics (0.2%, 0.3% or 0.5% of bupivacaine or ropivacaine). In a study conducted by Ganesanet al., 0.5% ropivacaine was used, but a smaller volume (30 mL) was administered to provide postoperative analgesia for femoral surgery [6]. They followed up the patients for 24 hours only for the assessment of analgesia and reported a considerable pain relief for 4-6 hours.

Other studies report a comparable success rate of FICB when performed by emergency medical service nurses in the prehospital settings [7].

When comparing our results with those of other studies conducted in emergency departments, we found that few trials had as a study objective the duration of effective analgesia. They reported a maxi-

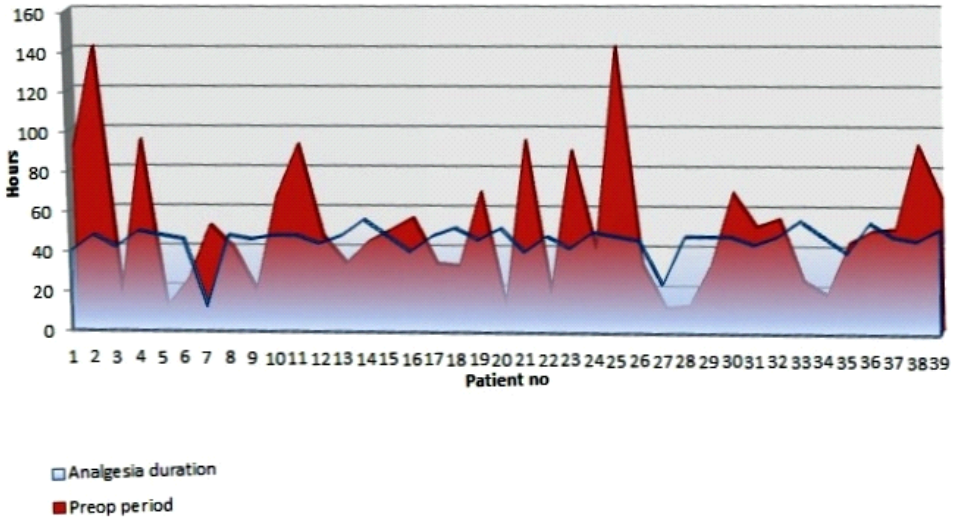

Fig. 1. Correlation between analgesia duration and preoperative period

mum analgesia time of approximately 500 minutes (8 hours) [8]. Our study revealed a more prolonged analgesia. The differences could be explained by a different pain assessment protocol or different concentration of local anaesthetics (mainly bupivacaine or ropivacaine in 0.25-0.3%) used in other studies [8]. Demographic data, success rate of analgesia and complications rate were comparable with other studies..

Our study was an observational nonrandomized one, with no control group. Being a single-center study with a reduced number of cases, the power of the statistical analysis is low owing to the low number of patients.

Our study confirms the high success rate of US-FICB performed in the ED. The results demonstrated prolonged analgesia using the high-volume, high-concentration technique which fits our hospital's specific long waiting period for surgery. US-FICB proved to be an effective and low risk procedure that should be considered for all hip fracture patients in the ED.

Conflict of interest

Nothing to declare

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