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Interest of Continuous Ultrasound-Guided Iliofascial Block in Analgesia After Total Hip Replacement

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ABSTRACT

Objective: *The objective of our study was to evaluate the quality of postoperative analgesia of ultrasound-guided ilio-fascial block (IFB) with continuous catheter after total Hip Prothesis (THP).*

Methods: *We conducted a prospective non-randomized cross-sectional study over a period of 7 months at the Order of MALTA Hospital Center (CHOM) after informed consent from patients. Forty patients were included in this study divided into two groups of 20.*

Results: *The average preoperative VAS in the IFB group was 4.2 and 3.85 in the group without IFB. Morphine consumption was higher in the group without IFB with a significant difference (P = 0.038). Static VAS during the first 48 hours was significantly higher in the group without IFB except for VAS in the 40th hour (p=0.065). Dynamic VAS during the first 48 hours were also significantly higher in the group without IFB.*

Conclusion: *Ultrasound-guided IFB by continuous catheter via the suprainguinal route associated with multimodal analgesia after THP is a safe and effective analgesic technique.*

Keywords

Ultrasound-guided iliofacial block, Postoperative analgesia, Early rehabilitation.

Introduction

Prosthetic surgery is often marked by intense pain that can last up to 72 hours. Quality analgesia is essential to optimize rehabilitation and accelerate the return to walking [1]. The use of nerve blocks for postoperative pain management after THP poses difficulties due to the complexity of hip joint innervation [2]. However, ultrasound improves the effectiveness and safety of the procedure [3]. The main objective of this study was to evaluate the quality of postoperative analgesia after ultrasound-guided ilio-fascial block (IFB) with a continuous catheter during total hip arthroplasty (THA). The secondary objectives were to improve the comfort and satisfaction of patients by relieving them at rest and during rehabilitation, to provide opioid sparing and early postoperative rehabilitation.

Methods

This was a non-randomized prospective study with descriptive and analytical aims over a period of 7 months (December 2022 to June 2023). All patients requiring total hip replacement who consented to the study were included. Excluded from the study were patients with a history of peripheral neuropathy, patients unable to understand the pain rating scale, those with a contraindication to the local anesthetics used, and those with a local skin infection. and inguinal lymphadenopathy. The patients were divided into two

groups at the end of the intervention, a group with placement of an ultrasound-guided ilio-fascial catheter with continuous injection of LA associated with systemic analgesia and a group receiving systemic analgesia alone. The initial approach was the modified MOORE approach. All patients had received spinal anesthesia (RA) with hyperbaric bupivacaine 0.5% 12.5 mg and sufentanil 5gamma, antibiotic prophylaxis with cefuroxin (1.5g), tranexamic acid 1g and towards the end After the intervention, systemic analgesia was started with 15 mg/kg/6 hours of paracetamol, 75 mg/12 hours of diclofenac iv, combined with nefopam 0.4 mg/kg/6 hours.

The patients in the IFB group had benefited from the placement of an ilio-fascial catheter with ultrasound tracking via the supra-inguinal route using a mindray ultrasound device and a high frequency 10 MHz linear probe with injection of ropivacaine 0.125% 20 ml as a bolus then maintenance with an electric syringe pump (ESP) at a speed of 5 ml/h for 48 hours. The patient was placed in a supine position, the ultrasound probe placed in a para-sagittal plane at the level of the anterior superior iliac spine. The catheter was placed directly into the iliac fossa by advancing a needle into the fascia iliaca, under the inguinal ligament, so that the tip of the needle was above the ligament. This is then rotated a few degrees, on its initial axis, in order to find itself parallel to an imaginary line coming from the umbilicus and intersecting the probe in its center.

The effectiveness of the ilio-fascial catheter was evaluated in SSPI when the RA block was lifted before transfer to the hospital room then every 4 hours for 48 hours. Sensory and motor blocks were assessed as follows:

- For the sensory block, a sensory test using an ice cube was carried out at different levels depending on the nervous territories concerned: Lateral cutaneous nerve (application of an ice cube to the outer surface of the thighs), femoral nerve, (application of an ice cube to the anterior surface of the thighs), obturator nerve (application of an ice cube to the level of the lateral-internal surface of the knees).
- For the motor block, a motor test was carried out depending on the nerves concerned: Femoral nerve (the patient was asked to extend the leg), obturator nerve (the patient was asked to adduct the thighs).

The sensory block was considered effective when the patient did not feel the cold when an ice cube was applied to the corresponding nerve territory. Concerning the motor block, it was considered effective when no muscular contraction corresponding to the nervous territory was felt. Postoperatively, pain assessment was performed using the visual analog scale. Titration with intravenous morphine was carried out at a dosage of 3 mg/5 min if the visual analogue scale was greater than 30 mm in SSPI. Results were expressed as mean ± standard deviation and median. The data were recorded on the Epi info 7.2.2 software from which the statistical analyzes with the Fischer test were carried out.

Data were expressed as mean and standard deviation if they had a normal distribution (Shapiro Wilk test). Otherwise, they were expressed as medians and 5–95th percentiles and a Kruskall-Wallis test was used for their comparison. The qualitative variables were expressed as a percentage and a $\chi 2$ test was used for their comparison or a Fischer exact test when the conditions were not met. For comparison of data measured at varying times, repeated measures analysis of variance was applied to compare VAS scores between groups. Secondary outcomes also included a patient satisfaction score at 48 hours (a=very satisfied, b=satisfied, c=not very satisfied, d=dissatisfied). A difference between the populations studied was considered significant for a value of $p < 0.05$.

Results

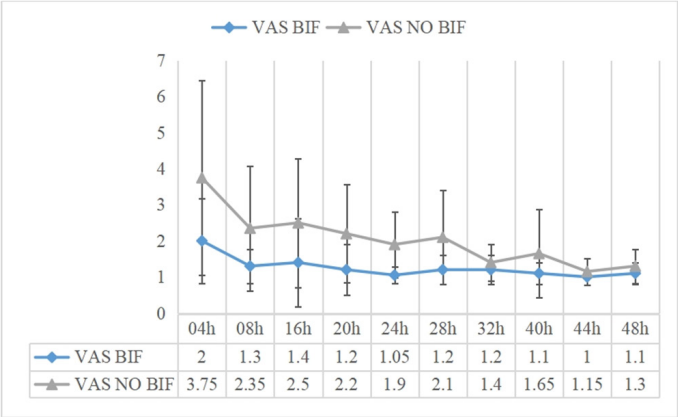
The patients were divided into two uniform groups of 20 patients. The demographics between the two groups were well matched, and there were no statistically significant differences in age, gender and American Society of Anesthesiologists (ASA) class (Table 1).

Table 1: Comparative sociodemographic and clinical characteristics of patients.

		IFB Group		Group without IFB	
		Effectif	%	Effectif	%
Gender	Women	12	60	10	50
	Men	8	40	10	50
Middle age		45.5		42.2	
Classification ASA	I	15	75	14	70
	II	4	20	5	25
	III	1	5	1	5
Indications	Femoral coxarthosis	9	45	12	60
	Femoral neck bill	7	35	6	30
	Head necrosis	4	20	1	5
	Old Hip trauma	0	0	1	5
Average duration of surgery		76.3		72.8	
Average preoperative VAS		4.20		3.85	
Patients who received morphine		3	15	8	40
Average consumption of morphine		1.2		6.7	
static post-op VAS		1.25		2.03	
Dynamic post-op VAS		1.26		2.19	
Satisfaction score	Very satisfied	16	80	7	35
	satisfied	2	10	6	30
	Not satisfied	2	10	5	25
	unsatisfied	0	0	2	10

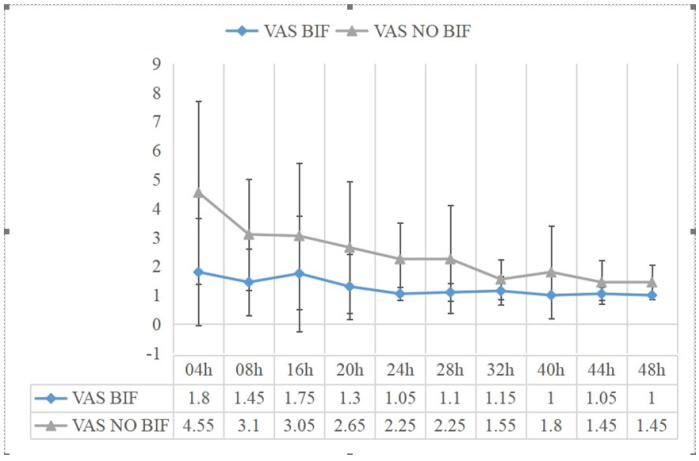
The preoperative VAS was higher in the IFB group with an average of 4.2 (2 and 4 extremes) than in the group without IFB with an average of 3.85 (2 and 7 extremes) without significant difference. Three patients in the IFB group required morphine postoperatively compared to 8 in the group without IFB. Total morphine consumption was different in the two groups ($p = 0.038$). It was 1.2 mg on average in the IFB group compared to 6.7 mg in the group without IFB. The hourly static VAS of patients in the IFB group was lower than patients in the group without IFB during the first 48 postoperative hours. The difference in hourly static VAS in the two groups during the first 48 hours was significant

in both groups except for the VAS of the 40th hour (p=0.065). (Figure 1). The evaluation of dynamic VAS shows lower values in the IFB group compared to the group without IFB during the first 48 postoperative hours. (Figure 2).



	04h	08h	16h	20h	24h	28h	32h	40h	44h	48h
VAS BIF	2	1.3	1.4	1.2	1.05	1.2	1.2	1.1	1	1.1
VAS NO BIF	3.75	2.35	2.5	2.2	1.9	2.1	1.4	1.65	1.15	1.3

Figure 1: Assessment of patients' static VAS during the first 48 hours postoperative.



	04h	08h	16h	20h	24h	28h	32h	40h	44h	48h
VAS BIF	1.8	1.45	1.75	1.3	1.05	1.1	1.15	1	1.05	1
VAS NO BIF	4.55	3.1	3.05	2.65	2.25	2.25	1.55	1.8	1.45	1.45

Figure 2: Evaluation of dynamic VAS of patients during the first 48 hours postoperative.

Discussion

Continuous nerve block combined with regional anesthesia has many advantages. Continuous nerve block, using local anesthetics, helps avoid the adverse effects of opioid analgesics, such as nausea, vomiting, drowsiness, constipation and respiratory depression [4]. It is possible by selectively blocking sensory nerve fibers to preserve motor function, promote early functional rehabilitation and reduce the risk of deep vein thrombosis [5]. Short-term postoperative pain control appears essential to optimize rehabilitation and accelerate the return to walking [6,7]. Nerve block after THA poses difficulties due to the complexity of the joint innervation of the hip [4]. The incision for THA using the MOORE approach is located on the lateral part of the hip, innervated by the lateral cutaneous nerve of the thigh. Lateral cutaneous nerve block can produce effective analgesia in this area. Prior studies have shown that continuous IFB is more effective than femoral nerve block in blocking the lateral femoral cutaneous nerve [8].

The innervation of the anterior surface of the capsule is provided by the femoral nerve (supero-lateral, supero-medial and infero-lateral quadrant) by these high and low articular branches, by the obturator nerve (infero-lateral and infero-lateral quadrant). medial) and accessory obturator nerve (medial half of the anterior surface of the capsule) [9]. The posterior surface is innervated by the sciatic, femoral and inferior gluteal muscles [9]. Bone innervation is provided by the femoral, sciatic and obturator [9]. This rich innervation of the hip shows that a femoral nerve block would be insufficient to ensure good analgesia after total hip replacement [10]. In the immediate post-operative period, no complications linked to our analgesic protocol (no vascular-nervous breach, no nerve damage, no sign of intoxication, no obvious signs of catheter infection), anesthesia or No surgery was noted in either group. Authors B Yu et al. [11] found the same results in their study. Indeed, the use of ultrasound allows the reduction of doses of local anesthetics but also reduces complications.

Pain is subjective and remains difficult to assess. VAS is the most commonly used measurement tool in the literature but remains subjective. The consumption of opioids within 48 hours seems to be more objective. The preoperative VAS in the two groups was comparable with an average of 4.2 in the IFB group and 3.85 in the group without IFB. Postoperative static and dynamic VAS were lower in the BIF group than the no-IFB group. Static and dynamic VAS were significantly different in the two groups except at the 40th hour (p = 0.065) for static VAS. Previous studies show similar results. Goitia et al. showed that IFB reduced morphine consumption and provided good overall patient satisfaction after total hip replacement [12]. A reduction in morphine consumption allows a reduction in opioid-related complications [13]. It is also important to emphasize that the consumption of morphine depends indirectly on the VAS because morphine is administered if the VAS is greater than 3. The average postoperative morphine consumption was 1.2 mg in the IFB group and 6. 7 mg in the group without IFB. It was 5.6 times higher in the group without IFB than in the IFB group with a significant difference (p = 0.038).

Overall satisfaction was 90% in the BIF group, however it was 65% in the group without IFB. These results show a reduction in morphine consumption of 11.94% and high patient satisfaction in the IFB group compared to the group without IFB. Similar results are noted in the literature with opioid savings of up to 40% [12]. Continuous IFB effectively prolongs the duration of postoperative analgesia after THA and provides longer analgesia and is suitable for postoperative management [11]. Hsu YP et al. [13] indicated by comparing with intravenous analgesic that IFB could provide better quality during patient mobilization [13]. Our study has some limits, namely the absence of randomization and the small number of people. Nevertheless, it shows for comparable populations that ultrasound-guided IFB with the use of a continuous catheter allowed better control of DPO at rest and during mobilization, a reduction in morphine consumption and better patient satisfaction. patients in relation to systemic analgesia after total hip replacement.

Conclusion

Continuous ultrasound-guided IFB via the suprainguinal route associated with multimodal analgesia after THA is a safe and effective analgesic technique. It provides quality postoperative analgesia with opioid sparing allowing early postoperative rehabilitation.

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