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Continuous Lumbosacral Plexus Blocks for Hip and Femur Surgery Analgesia in Elderly Patients Using a Neurostimulator. A Retrospective Study Comparing Psoas and Inguinal Compartment Access

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ABSTRACT

Background: Lumbar plexus block has been used effectively as an anesthetic technique for anesthesia and analgesia in elderly patients with femur and hip fractures. Access to the lumbar plexus can be achieved via a posterior approach (within the psoas compartment) or an anterior approach (in the inguinal compartment), with single short administration or continuous infusion of local anesthetic. The aim of this retrospective study was to compare the analgesic efficacy of an elastomeric pump in two access points, identified by neurostimulation, and its complications.

Method: This study was recorded in an Excel spreadsheet from July 2010 to February 2019, including 100 patients over the age of 60 years old who underwent corrective surgery for femur or hip fractures underwent continuous lumbar plexus block for postoperative analgesia. An elastomeric pump was used with 400 ml of 0.1% levobupivacaine excess of enantiomeric solution, at a flow rate of 10 ml/hour. A pain scale (grades 0 to 3) was used, assessed in the anterior thigh region at 4, 8, 12, 16, 20, 24, 30, and 40 hours.

Results: There was a predominance of females (77%) compared to males (23%). Access to both compartments was achieved with neurostimulation and catheter placement, successfully in all 100 patients. No complications occurred. The best analgesic outcome was obtained with the psoas compartment. There was no bacterial growth upon catheter removal.

Conclusion: The retrospective study showed that there was significant difference, the quality of analgesia is better with the catheter installed in the psoas compartment compared to inguinal access. In both approaches, there were no postoperative complications.

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Introduction

On July 4, 2010, I left private patient anesthesia in Rio de Janeiro and went to work with patients in the Brazilian Unified Health System (SUS) in the state of Paraíba, where we transferred the Regional Anesthesia Institute, where we taught the technique to

400 anesthesiologists, in São José do Rio Preto. The Brazilian Institute of Geography and Statistics (IBGE), responsible for counting the Brazilian population, showed that in 2025 16% of the population will be over 60 years old, which represents 35 million people [1]. Because the study was carried out only in the state of Paraíba, according to the IBGE, the number of elderly people over 60 years old already exceeds 17% of the population, which highlights the need for public policies aimed at health and quality of life in old age [1].

In a retrospective epidemiological study between November 2022 and November 2023, using data from the hospitals SUS on hospitalizations due to femur fractures in people over 60 years of age, it was revealed that the incidence was more pronounced in brown women, over 70 years of age, living in the southeast region [2]. This study was conducted in a state in northeastern Brazil.

The Fast Track Surgery (FTS) refers to all phases of perioperative care: preoperative, intraoperative, and postoperative strategies. After evaluating 105 patients undergoing the hospital's usual protocol analgesia with morphine and Intensive Care Unit (ICU), it was compared with 1793 patients undergoing FTS, with patients underwent spinal anesthesia with postoperative analgesia by lumbar plexus block and no ICU [3]. For analgesia, lumbar plexus blockade was used before the procedure in 998 patients and after surgery in 795 patients, with an average duration of 22 hours. All parameters studied in 1793 patients compared with the data before the project showed a reduction from 62% to 83% [3].

Since its first description in 1946, continuous peripheral nerve block has evolved from the simple case report of a needle inserted through a cork taped close to a patient's brachial plexus [4]. In the first report of a continuous lower limb block, Continuous Lumbar Plexus Blocks (CLPB) lasting 72 to 96 hours were performed for patients suffering from femoral neck fractures [5].

The number of bilateral Total Hip Arthroplasties (THA) has been increasing every year, and the use of elastomeric pumps has increased patient satisfaction when compared to electronic models. Recently, CLPB was performed via the bilateral psoas compartment with infusion of 0.1% bupivacaine through elastomeric pumps, showing that it was a safe and effective procedure in adults with analgesia lasting 40 hours [6].

The primary objective of this study was to evaluate the results of CLPB analgesia for femur and hip fractures in three hospitals of the SUS in state of Paraíba, with the implementation of FTS in patients over 60 years of age. The approach was compared with the psoas compartment approach and the inguinal approach, using an elastomeric pump and an enantiomeric mixture of levobupivacaine (S75:R25) with a fixed flow rate of 10 ml per hour. A secondary objective was to evaluate the complications of both continuous techniques (psoas x inguinal), using the Stimuplex HNS 12 neurostimulator as an access point.

Methods

This retrospective study was recorded in an Excel spreadsheet (Figure 1) from July 2010 to February 2019, including all patients over the age of 60 years old who underwent corrective surgery for femur or hip fractures. The protocol was approved by the Research Ethics Committee (No. 171,924) and registered with Plataforma Brasil (CAAE: 09061312.1.0000.5179). All patients and family members were informed and signed the Informed Consent Form. They agreed to undergo spinal anesthesia for the surgical procedure and CLPB for postoperative analgesia. The study included 100 patients physical status ASA I, II and III, divided into two groups of 50 patients who underwent CLPB via the psoas compartment approach (posterior block) or via the inguinal approach (anterior block).

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
	Sx	Age	Weight	Height	LA	Dose	Duration	4 h	8 h	12 h	16 h	20 h	24 h	30 h	40 h
1	M	74	80	170	Nova Is	15	04:20	0	0	0	0	1	1	1	1
2	F	87	75	160	Nova Is	15	02:05	0	0	0	1	1	2	2	2
3	F	86	78	162	Nova Is	15	02:10	0	0	0	0	0	0	0	0
4	M	69	63	170	Nova Is	15	02:20	0	0	0	0	0	0	0	1
5	F	73	52	157	Nova Is	15	02:00	0	0	0	0	0	0	0	0
Psoas Group = 50 Patients															
46	F	68	62	173	Nova Is	15	01:25	0	0	1	2	2	2	2	2
47	F	84	78	159	Nova Is	15	01:40	0	0	0	0	1	1	1	1
48	F	66	58	159	Nova Is	15	01:55	0	0	0	1	2	2	2	2
49	M	80	82	175	Nova Is	15	01:25	0	0	0	0	1	2	2	2
50	M	73	79	170	Nova Is	15	01:35	0	0	0	0	2	2	2	2
1	F	62	78	174	Nova Is	15	01:55	0	1	1	2	2	2	2	2
2	M	71	84	180	Nova Is	15	02:45	0	0	0	2	1	2	2	2
3	F	64	85	143	Nova Is	15	01:25	0	0	0	0	0	2	2	2
4	M	69	64	156	Nova Is	15	01:35	0	0	0	0	0	1	1	1
5	M	69	60	162	Nova Is	15	03:30	0	0	0	1	0	2	2	2
Inguinal Group = 50 Patients															
46	F	85	47	150	Nova Is	15	01:55	0	0	1	0	2	3	3	3
47	F	63	47	153	Nova Is	15	01:25	0	0	1	0	2	2	2	2
48	F	81	58	157	Nova Is	15	01:35	0	0	0	0	2	2	2	2
49	F	67	60	155	Nova Is	15	02:10	0	0	0	1	0	1	2	3
50	M	83	78	171	Nova Is	15	01:35	0	0	0	0	2	1	1	1

Figure 1: Excel Spreadsheet with all 100 Patients

During the pre-anesthetic visit the project was detailed explained to the patient and family. All elderly patients with femoral or hip fracture who were admitted in one of the three hospitals SUS where the anesthesiologist responsible for implementing the FTS project. All patients normovolemic, without neurological disease, without coagulation disorders, without infection at the lumbar puncture site L3-L4, L4-L5, who did not present agitation and/or delirium, did not use an indwelling urinary catheter, with a hemoglobin level > 10g %, who were anesthetized under spinal anesthesia without opioids and CLPB for analgesia and who were not admitted to the ICU, were included in this study. All orthopedists were trained and at the beginning of the project there were no residents in orthopedics in the first year of the project and later participated in the surgery.

Abbreviation of fasting was performed in all patients included in the study who received oral feeding the day before the operation, and 200 mL of maltodextrin 2 to 4 hours before being transferred to the Operating Room (OR). The surgeries would be performed until 3 pm and they would remain in the Post-Anesthetic Recovery Room (PACU) until the end of the block, when they were again given 200 mL of maltodextrin. After 30 to 60 minutes, if the patients accepted oral feeding without nausea or vomiting, they were referred to the ward, without intravenous hydration and with free diet released in the ward. remained with a venous catheter saline for injection of antibiotics, analgesics and other intravenous medications. Surgeries after 3pm were not included in the study.

After a visit by the anesthetist, no patients received preanesthetic medication, being sent to OR. After venoclysis with 18G or 20G catheter, infusion was initiated with Ringer lactate solution, in parallel with 6% hydroethyl starch. Monitoring at operating theater was provided by continuous ECG at CM5, blood pressure by non-invasive method, as well as pulse oximetry and capnography through the nose. After sedation with intravenous dextroketaamine (0.1 mg/kg) and midazolam (0.5 to 1 mg) and skin cleansing with alcoholic chlorhexidine or 70% alcohol, spinal puncture was performed with the patient in the sitting position or lateral position, through the median route or paramedian between the spaces from L3 to L5, using 26G or 27G needle type Quincke without introducer. After the appearance of cerebrospinal fluid (CSF) confirming the correct position of the needle, 15 mg of isobaric 0.5% levobupivacaine in enantiomeric mixture (S75:R25) were administered at a rate of 1 mL/15s. In no patient bladder catheterization was used.

At the end of the surgery, all patients operated on in lateral decubitus were selected to receive a lumbar plexus block in the psoas compartment (posterior). The lumbar plexus was accessed using a stimulator (HNS 12) connected to a 150-mm 18G Tuohy type needle (Figure 2). The needle was advanced to stimulate the quadriceps, with a current of 0.5 mA, until a response was obtained. After negative aspiration for blood, 20 mL of 0.2% S75:R25 was injected through the needle extension connector. With the needle maintained in the same position, a 20G catheter was introduced 4-7 cm into the psoas compartment and secured with adhesive and an occlusive dressing. An elastomeric pump was installed with 400 mL of the same substance at 0.1% and a volume of 10 mL/hour.

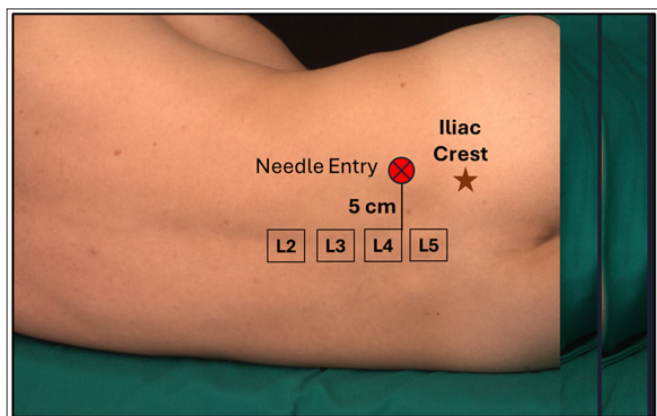


Figure 2: Position and Marking for Locking the Psoas Compartment

In patients operated in the horizontal dorsal decubitus position received an inguinal (anterior) block (Figure 3). The lumbar plexus was accessed using a stimulator HNS12 connected to a 50-mm 18G Tuohy type needle. The needle was advanced to stimulate the quadriceps, with a current of 0.5 mA, until a response was obtained. After negative aspiration for blood, 20 mL of 0.2% S75:R25 was injected through the needle extension connector, to facilitate catheter insertion. With the needle maintained in the same position, a 20G catheter was introduced 4-7 cm into the inguinal compartment and secured with adhesive and an occlusive dressing. An elastomeric pump was installed with 400 mL of the same substance at 0.1% with a fixed volume of 10 ml/hour.

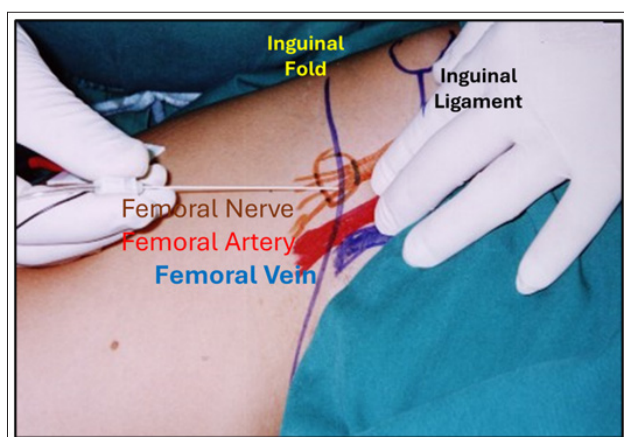


Figure 3: Position and Marking for Locking Inguinal Block

In both groups (posterior and anterior), analgesia was assessed by the anesthesiology resident using the pinprick and cold tests to determine the extent of sensory blockade in the femoral nerve area at 4, 8, 12, 16, 20 hours. The first 20 hours of assessment were

conducted in the hospital; after discharge, the 30-hour assessment was conducted by telephone; and the 40-hour assessment was conducted at the patients' homes by the principal investigator, at which point the catheter was removed immediately, and sent to culture. Pain was assessed on a scale from 0 (no pain) to 3 (severe pain). At the end of surgery, both groups received 2 g of dipyron in 50 ml of saline solution. After being released to their room or ward, 1 g of dipyron was administered orally every 6 hours until the catheter was removed in all patients, which was sent to culture.

The three hospitals did not have an ultrasound device for performing peripheral nerve blocks. Due to the study, access to the various regional blocks was performed using the HNS 12 plexus stimulator. Therefore, a summary of several aspects of the comparison between the two main techniques for approaching the lumbar plexus (psoas compartment and inguinal compartment) using the neurostimulator was presented [Table II].

Statistical Analysis

Continuous variables were expressed as mean and standard deviation or median and interquartile range, as appropriate. The area under the pain intensity curve was estimated using the trapezoidal rule, and comparisons between groups were performed using the Kruskal-Wallis test. Differences in the proportion of patients reporting "no pain" were assessed using Fisher's exact test. Demographic variables and surgery duration were compared between groups using the Kruskal-Wallis test. A two-tailed p value < 0.05 was considered statistically significant. Analyses were performed using R (R Foundation for Statistical Computing, Vienna, Austria).

Results

There is no significant difference between the demographic data of the two patient groups (Table I, Figure 4). There was a predominance of females (77%) compared to males (23%). The average duration of surgeries performed under spinal anesthesia in both groups was 02:05±00:29 hours for those who received the posterior block and 02:14±00:35 hours for the anterior block, with no significant difference. In all patients, the first evaluation (four hours after the block) was performed without residual spinal anesthesia.

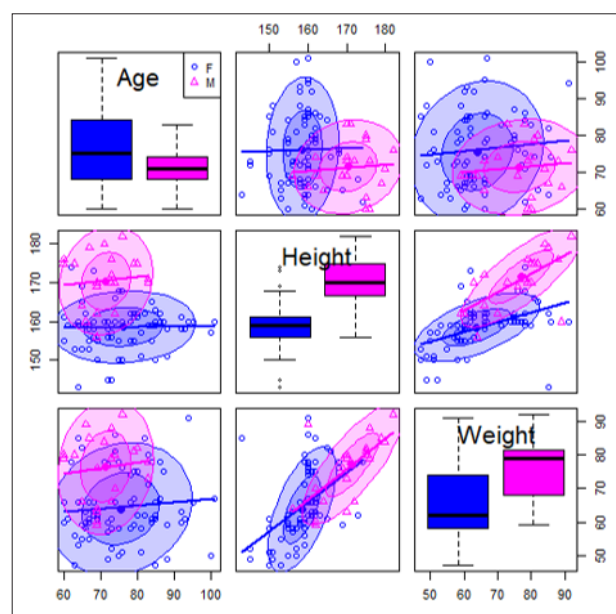


Figure 4: Demographic Data in the Two Study Groups

Table I: Demographic Data in the Two Study Groups			
Variables	Psoas = 50	Inguinal = 50	p-Value
Age (y)	77.26±9.0	72.76±9.25	0.009383 *
Weigh (kg)	68.04±10.3	66.48±11.93	0.8356 *
Height (cm)	161.44±7.5	161.06±7.90	0.4253 *
Gender: F / M	39 / 11	38 / 12	1**

* Kruskal-Wallis Test ** Fisher’s Exact Test

Table II: Summary of the Comparison Between the Two Techniques for Accessing Lumbar Plexus

Variables	Compartment Psoas	Compartment Inguinal
Injection site	Within psoas muscle major (L2–L4 nerve)	Just lateral femoral artery, femoral nerve is superficial.
Blocked nerves	Complete lumbar plexus	Incomplete block.
Patient position	Lateral or prone position	Supine position
Needle depth	6 – 10 cm	2 – 4 cm
Response stimulator	Quadriceps contraction	Quadriceps contraction
Potential risk	Higher: perforation kidney, epidural, subarachnoid space, hematoma	Lower: superficial, well-defined structure)
Extent of the block	Wider analgesia entire L2–L4 region	Analgesia limited anterior aspect
Analgesia postoperative	Excellent; also covers the obturator	Good for knee surgery
Technical ease	More difficult technique	Simpler technique rapid and safe
Risk of complications	Higher risk	Low risk
Post-operative mobility	More intense motor blockade	Less motor blockade
Use neurostimulator	Easy within the psoas (quadriceps)	Easy location (quadriceps)
Hip or proximal femur	Psoas compartment block	That's not good technique
Knee surgeries	That's not good technique	Inguinal block
Analgesia with catheter	Lumbar catheter	Inguinal catheter
High-risk patients	That's not good technique	Inguinal region (safer)

The CLPB was used to provide postoperative analgesia in 100 elderly patients with femur and hip fractures and was satisfactory in all patients. The localization of the lumbar plexus in both the psoas compartment and inguinal compartments was successfully obtained in all patients using neurostimulation. During access to the posterior lumbar plexus using a neurostimulator, no complications such as intravascular injection, epidural block, renal complications, or subarachnoid injection were observed. No complications were observed during access to the anterior lumbar plexus. Similarly, catheter insertion after plexus expansion with 20 ml of 0.2% levobupivacaine was successful in both groups. None of the patients complained of paresthesia at the time of

catheter removal, which occurred after the elastomeric pump had been completely deflated, at the patients' residences. No catheter contamination was observed after removal.

The number of patients who showed different pain scale scores (0 - 3) for up to 40 hours post-operatively showed that at 24, 30, and 40 hours, maximum pain (score 3) occurred only in the inguinal group, with significant difference (Figure 5). The total analgesic effect over time (0 - 40 hours) was assessed using the area under the curve estimated via the trapezoidal method. The Kruskal-Wallis test revealed a statistically significant difference between the groups ($p = 0.0017$), indicating that patients who received a block in the psoas compartment showed a significantly greater overall analgesic effect compared to the group that received it in the inguinal region (Figure 5).

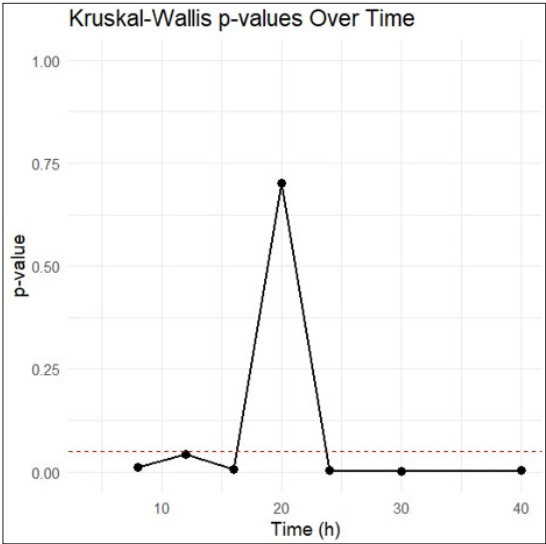


Figure 5: The Total Analgesic Effect Over Time (0 - 40 hours)

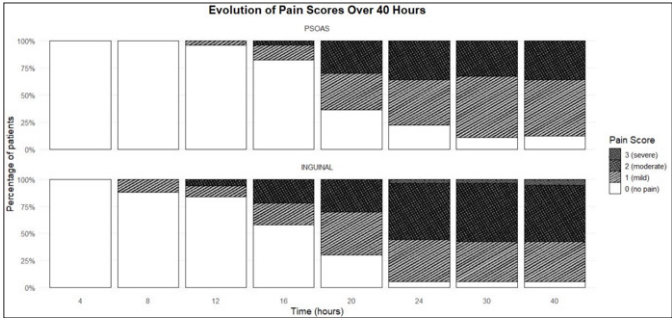


Figure 6: Evolution of Pain Scores Over 40 Hours

No hypotension or bradycardia was observed during the 40 hours of continuous injection of 0.1% levobupivacaine. No patient in the psoas compartment catheter group reported analgesia in the feet, showing that there was no passage to the sacral plexus. No neurological complications were observed. No patient required bladder catheterization. The need for additional doses of analgesics was not assessed, due to the use of 1 g of dipyrrone orally every 6 hours post-operatively, both in the hospital and at home.

Discussion
CLPB both in the psoas compartment (posterior) and inguinal access (anterior) with the aid of a peripheral nerve stimulator, is an easy-to-perform technique with a long duration of action and free of adverse effects. CLPB resulted in a significant difference,

with better results for accessing the psoas compartment, and only one patient in the inguinal group presented the maximum pain score (grade 3) at the end of bag emptying. The evolution of pain scores with 0.1% S75:R25 at a flow rate of 10 ml/hour over 40 hours with CLPB in both groups showed 56% without pain after psoas block versus 47.25% after inguinal block, with statistical significance. No complications occurred during access to either site of the lumbar plexus, and no complications were observed during the 40 hours of continuous injection of the local anesthetic. There was no bacterial growth in the 100 catheters.

The upper segment of the leg is primarily innervated by the lumbar in the lateral, anterior, medial, and posterior region by the sciatic nerve. The main branches of the lumbar plexus are: iliohypogastric formed by T12 and L1, ilioinguinal formed by L1, genitofemoral formed mainly by L1-L2, lateral femoral cutaneous formed by the posterior division of L2 and L3, femoral formed by the posterior division of L2, L3, L4, and obturator formed by the anterior division of L2, L3, L4 [7]. At the level of the 4th lumbar vertebra, all the nerves of the lumbar plexus are regrouped [8]. Therefore, because the lumbar nerve passes practically within the psoas compartment, blocking it via this pathway yields better analgesic results. The femoral nerve gives motor innervation to the quadriceps muscle and sensory innervation to the knee through, the reason we used quadriceps contraction with neurostimulation to confirm access to the lumbar plexus in both approaches.

In a previous study comparing single shots of 40 ml of 0.25% bupivacaine with neurostimulation access, blockade of the five nerves occurred in 92% of patients in the psoas compartment versus 68% in the inguinal region, resulting in analgesia, without the need for supplemental analgesics, in 42% of patients in the psoas compartment and 36% in the inguinal region during the first 24 hours post-operatively [9]. This present study did not evaluate five-nerve blocks in either group.

A study with 200 patients, comparing lumbar plexus access versus perivascular inguinal access with a neurostimulator and a single injection of 40 ml of 0.25% bupivacaine, showed that injection into the psoas compartment was easier and more effective in blocking the five nerves of the lumbar plexus, with an average duration of 21 hours compared to 16 hours for the inguinal plexus [9]. Using the same technique in 80 patients with a neurostimulator and a single shot of 30 ml of 0.25% bupivacaine, showed that there was no significant difference in the time to first analgesia request, postoperative pain, both at rest and movement, and total analgesic consumption, between the lumbar access and 3x1 block [10].

Magnetic resonance imaging studies in four volunteers have demonstrated that the spread of local anesthetic in a psoas block is usually within the psoas muscle, most of the time along the internal fascial plane with a cephalad spread to lumbar nerve roots and around the lumbar branches [11]. The iohexol contrast study showed a different distribution when studied in the psoas compartment compared to the study of the inguinal region [9]. In this study, no contrast agent was used to evaluate the catheter.

In a hospital within the SUS system, a total of 226 medical records of elderly people over 60 years of age who suffered a femoral fracture were analyzed. The analysis showed that waiting for surgery for more than seven days increased the length of hospital stay and the mortality rate, and that the lack of available ICU beds and waiting for surgical risk assessment contributed to delays in surgery and its outcome [12]. In a recently published study

following the application of FTS for 12 years in hip and femur orthopedic procedures in 1793 elderly patients over 60 years of age, the recovery time was reduced from 15.51 days (6-52 days) to 5.47 days (1-13 days), corresponding to a 65% decrease in the time before orthopedic surgery [3]. This approach facilitated discharge to the hospital the day after surgery and eliminated the need for ICU, this occurred in all 100 patients who underwent analgesia via CLPB with a flow rate of 10 ml/hour.

In a recent systematic review and meta-analysis on the efficacy of CLPB in managing post-operative pain after hip or femur orthopedic surgeries, it was shown that the technique is effective, with lower pain scores and less opioid consumption [13]. Additionally, patient satisfaction was relatively higher in CLPB-treated patients compared to other approaches like general anesthesia. In a previous prospective study, the posterior approach proved effective without blocking the sacral plexus [9]. The anterior approach, in turn, was less effective in blocking the five nerves and, similarly, did not block the sacral plexus [9]. However, in this CLPB study over 40 hours, it was confirmed that the posterior approach provided better quality analgesia in hip and femur surgical procedures when compared to the anterior approach.

In a previous study after single-shot injection in the psoas compartment and inguinal compartment, in five patients from each group, a contrast study was performed with 1 mL for needle localization and, subsequently, 20 mL of iohexol contrast with 300 mg/mL to study the dispersion of the local anesthetic 30 minutes later, producing blockade of the five nerves (ilioinguinal, genitofemoral, lateral femoral cutaneous, obturator, and femoral nerves) of the lower extremity derived from the lumbar plexus without blocking the nerves of the sacral plexus (common fibular and tibial nerves), showing that the dispersion of the anesthetic with contrast showed cephalic and caudal dispersion [9]. The same study of contrast-enhanced dispersion after inguinal access showed cephalic and caudal dispersion, but without showing blockade of the five nerves of the lumbar plexus [9]. In this study of CLPB in both access points, no contrast study of the catheter was performed to avoid increasing the volume within the plexus.

In a total of 162 patients comparing continuous epidural with CLPB via the psoas compartment with dual guidance (electrostimulation and ultrasound) with 0.2% ropivacaine, showed that CLPB is a safer technique and has analgesic efficacy equivalent to epidural block in hip surgery [14]. Because the hospitals where the CLPB study was conducted did not have ultrasound at the time, all accesses were performed with stimulation (HNS 12), and continuous plexus assemblies were offered for the study, as they were not part of the hospitals' therapeutic arsenal.

Complications related to the lumbar plexus block are infrequent. Although there are report a high incidence of local anesthetic spread to the epidural space, intrathecal injection, spinal anesthesia or renal injury, using the technique through the psoas compartment [7]. In a retrospective study with 9649 patients who underwent a total of 11,395 total hip arthroplasty with posterior lumbar plexus blockade, complication incidences of 0% for infection, 0.01% for bleeding, and 0.53% for perioperative nerve injury were found [15]. In the 100 patients studied at CLPB, no complications were reported.

Continuous infusion of local anesthetic through a perineural catheter can provide analgesia of longer duration than a single

shot through a needle. Elastomeric infusion pumps are disposable pumps; unlike electronic infusion pumps, they work mechanically and independently of electricity or other energy sources. In 2011, the use of an elastomeric pump in a patient with rheumatoid arthritis was published. She underwent bilateral total hip arthroplasty and CLPB was performed in both compartments of the psoas (right and left) under spinal anesthesia associated with general anesthesia [6]. First, the right side was operated on, and at the end of the surgical procedure, the same method described above in methods was used, and 20 mL of 0.2% bupivacaine was injected, and a catheter was passed. At the end of the surgery, a disposable elastomeric pump containing 400 mL of 0.1% bupivacaine was installed and connected to the catheters of both compartments of the psoas muscle, with an infusion rate of 14 mL/h, aiming to infuse 7 mL into each catheter [6]. After 24 hours, a new elastomeric pump with the same solution (volume, concentration, and infusion rate) was installed, remaining in place for another 25 hours. No bolus was required during the 50 hours of the postoperative period.

The neurostimulator technique for locating the nerve by motor response is still acceptable in contexts where ultrasound is difficult or unavailable. In resource-limited countries, nerve stimulation continues to be used with good results. Furthermore, there are situations where the neurostimulator is used in combination with ultrasound as an "additional safety measure" or to confirm needle placement/avoid direct nerve contact. It is important to state that in a continental country (Brazil), ultrasound is not available in all public hospitals (SUS), so neurostimulation is still a useful tool for accessing the nerve plexuses and providing postoperative analgesia.

Conclusion

The lumbar plexus block has been available for several years as an analgesic technique for surgeries involving the hip, the thigh, and the knee. A recent article explained the neurostimulation technique and ultrasound-guided technique for accessing the lumbar plexus [7]. The combination of a catheter in the lumbar plexus and the use of a portable elastomeric pump, without the need for electricity, can be used in elderly patients undergoing femur and hip surgery for pain control, as all 100 patients were transferred to their homes on the first postoperative day, with the catheter being removed after the pump had completely emptied at their residence, showing that perineural anesthesia with a portable infusion pump can be used in outpatient settings for pain control, avoiding unnecessary hospital stays. Continuous lumbar peripheral blockade with infusion of 0.1% levobupivacaine with elastomeric pumps is a safe and effective procedure in elderly patients, with a fracture of the femur or hip, with improved quality of analgesia in the psoas compartment.

Study carried out in three Hospitals (SUS) João Pessoa, PB, Brazil.

Financial Support

No.

Conflict of Interest

No.

Contribution

No.

IRB

No (This paper has not been presented).

Note: The 50 Contiplex units in each group, as well as the 100 elastomeric pumps, were supplied by B. Braun, Melsungen, because the material is not standardized in the SUS hospitals in

João Pessoa, PB, Brazil.

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