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ORIGINAL RESEARCH

Clinical Value of Continuous Fascia Iliaca Compartment Block in Perioperative Management of Elderly Patients with Intertrochanteric Fracture: A Propensity Score-Matched Retrospective Study

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Background: Hip fractures in elderly patients represent a significant healthcare challenge, with substantial morbidity and mortality rates. This study investigated the efficacy of continuous fascia iliaca compartment block (CFICB) in perioperative management.

Methods: A retrospective analysis was conducted on elderly patients (≥65 years) with intertrochanteric fractures treated between January 2020 and December 2023. Eligible patients were initially divided into CFICB (n=46) and routine analgesia (RA, n=64) groups. Propensity score matching with a caliper width of 0.21 was performed, yielding 40 patients in each group for final analysis. Matching variables included age, gender, BMI, and ASA score. Primary outcomes were Visual Analog Scale pain scores, cognitive function assessed through a two-tier protocol (Montreal Cognitive Assessment [MoCA©] screening followed by confirmatory Mini-Mental State Examination-2 [MMSE-2®] for positive screens), and functional recovery evaluated using the Harris Hip Score.

Results: The CFICB group showed significantly lower VAS scores during the early postoperative period (≤ 72h). This was most notable at 24 hours postoperatively (2.43 ± 0.72 vs 3.45 ± 0.87, $P < 0.001$). Postoperative cognitive dysfunction rates were significantly lower in the CFICB group. The differences were evident at 6h (10% vs 30%, $P = 0.025$), 24h (15% vs 35%, P = 0.039), and 72h (5% vs 20%, P = 0.043). Multivariable analysis identified CFICB as an independent protective factor against postoperative cognitive dysfunction (adjusted OR = 0.41, 95% CI: 0.26–0.65, P < 0.001). Harris Hip Scores at one month post-operatively were significantly higher in the CFICB group (78.56 ± 8.12 vs 72.39 ± 7.65, P = 0.008). Complication rates were comparable between groups (22.5% vs 17.5%, $P = 0.576$).

Conclusion: CFICB effectively improves postoperative pain management, reduces cognitive dysfunction incidence, and enhances early functional recovery in elderly patients with intertrochanteric fractures, while maintaining a favorable safety profile.

Keywords: continuous fascia iliaca compartment block, intertrochanteric fracture, cognitive function, postoperative pain, hip joint function, elderly patients, regional anesthesia

Introduction

Hip fractures represent one of the most challenging orthopedic traumas in the elderly population. With accelerating global aging, their incidence shows a significant upward trend. The annual incidence of hip fractures in China is estimated to exceed 1.6 million cases, with this number expected to continue rising.[1] Such injuries not only result in significant disability rates but also carry a 30-day mortality rate of 10% and a one-year mortality rate of 36%.[2]

Current clinical practice guidelines recommend early surgical intervention. Specifically, surgery is advised within 24–48 hours post-injury to optimize clinical outcomes.[3,4] However, approximately 70% of patients present with multiple comorbidities,[5] which not only limit the use of traditional opioid analgesics but also increase perioperative risks. Furthermore,

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factors such as anticoagulation therapy and preoperative assessment often delay surgery.[6] Severe postoperative pain not only affects functional rehabilitation but may also increase the risk of postoperative complications, particularly cognitive dysfunction.[7]

Delirium represents one of the most common perioperative complications in patients with intertrochanteric fractures.[8] Literature reports indicate that the incidence of perioperative delirium in hip fracture patients ranges from 38% to 62%,[9] increasing with age, comorbidities, and declining preoperative cognitive function.[10] Patients experiencing delirium often present with hallucinations and impaired event recall. Those with cognitive impairment demonstrate poorer short-term and long-term outcomes following intertrochanteric fractures compared to cognitively intact patients. Neglecting pain management may increase the risk of delirium, making effective perioperative pain control essential. Severe acute pain not only elevates delirium risk but may also increase the incidence of postoperative complications such as pneumonia and circulatory system dysfunction, affecting early functional recovery, prolonging rehabilitation time, and increasing the likelihood of chronic postoperative pain.

Perioperative pain management is crucial for improving patient outcomes. While traditional epidural analgesia proves effective, its application is limited by postoperative anticoagulation requirements and early mobilization needs.[9] In recent years, regional block techniques have demonstrated unique advantages in perioperative pain management. Continuous fascia iliaca compartment block (CFICB), through selective blockade of nerve distributions within the iliac fascia compartment,[11,12] may provide sustained effective analgesia without compromising limb motor function.

Although previous studies indicate that single-shot FICB can provide 8–24 hours of analgesia,[13,14] perioperative pain management often requires more prolonged intervention. CFICB extends the duration of analgesia through continuous drug delivery technology,[15] potentially addressing this clinical need. However, systematic research on CFICB's effects on postoperative cognitive function, hip joint functional recovery, and complication rates in elderly patients with intertrochanteric fractures remains limited.

Based on this background, this study retrospectively evaluates the clinical value of CFICB in perioperative management of elderly patients with intertrochanteric fractures. We focus on its effects on pain control, cognitive function, and hip joint functional recovery. Our aim is to provide clinical evidence for optimizing perioperative management strategies in this patient population.

Materials and Methods

Study Design and Setting

This retrospective cohort study was conducted with approval from the Ethics Committee of Beijing Friendship Hospital, Capital Medical University (approval number: 2024-P2-169-02). The study adhered to the STROBE guidelines for observational research. We analyzed medical records of elderly patients who underwent surgical treatment for intertrochanteric fractures between January 2020 and December 2023.

The study included patients aged ≥ 65 years with confirmed intertrochanteric fractures, who were admitted within 48 hours of injury occurrence and ASA physical status I–III. We excluded patients with contraindications to local anesthetic agents, severe cardiopulmonary disease, coagulation disorders, local infection, pathological fractures, preoperative cognitive dysfunction (identified through initial screening with Montreal Cognitive Assessment [MoCA©, cutoff <26]), or psychiatric disorders.

Sample size calculation referenced a previous study on CFICB in elderly patients undergoing total hip arthroplasty.[16] Based on their reported outcomes and considering a more conservative effect size (0.4) for the specific population with intertrochanteric fractures, we calculated a minimum requirement of 38 patients per group (α=0.05, power 0.8). From an initial cohort of 156 patients, 46 were excluded due to incomplete data (n = 18), severe cardiopulmonary disease (n = 12), preoperative cognitive dysfunction (n = 9), and pathological fractures (n = 7). Among 110 eligible patients, 46 received continuous fascia iliaca block with routine analgesia (CFICB group) and 64 received routine analgesia alone (RA group).

We first applied propensity score matching using a logistic regression model with a standard caliper width of 0.2, which yielded 37 matched pairs. To achieve our target sample size while maintaining methodological rigor, we made a minor adjustment to the caliper width (0.21), which resulted in 40 matched pairs. This adjustment preserved the balance of baseline characteristics between groups as shown in Table 1. The matching variables included age, gender, BMI, and ASA score. A post-

Table 1 Comparison of General Characteristics Between Groups

Characteristic	CFICB (n = 40)	RA (n = 40)	*P* value
Age (years), mean ± SD	79.65 ± 7.13	81.00 ± 7.31	0.103
Gender, n (%)			0.485
Male	13 (32.5)	16 (40.0)	
Female	27 (67.5)	24 (60.0)	
BMI (kg/m²), mean ± SD	23.5 ± 2.8	23.8 ± 2.6	0.527
ASA score, mean ± SD	1.00 ± 0.69	0.99 ± 0.68	0.967
Admission BI value, mean ± SD	49.95 ± 4.97	49.77 ± 3.86	0.713
Pre-fracture CCI value, mean ± SD	5.04 ± 1.24	5.00 ± 1.20	0.805
Fracture type, n (%)			0.363
Intertrochanteric fracture	32 (80.0)	35 (87.5)	
Subtrochanteric fracture	8 (20.0)	5 (12.5)	

Notes: Data are presented as mean ± SD or n (%). *P*-values were calculated using *t*-test (continuous variables) or chi-square test (categorical variables).
Abbreviations: CFICB, Continuous Fascia Iliaca Compartment Block; RA, Regular Analgesia; BMI, Body Mass Index; ASA, American Society of Anesthesiologists; BI, Barthel Index; CCI, Charlson Comorbidity Index.

hoc power analysis confirmed that our final sample size (40 patients per group) provided >85% power to detect the observed differences in our primary outcome measures at an alpha level of 0.05. The patient selection process is illustrated in Figure 1.

The CFICB group received ultrasound-guided continuous fascia iliaca block in addition to routine analgesia (Figure 2). The protocol consisted of an initial bolus of 40mL 0.25% ropivacaine followed by continuous infusion at 5mL/h for 72 hours via catheter. The RA group received standard analgesic protocol comprising immediate oral celecoxib 200mg, followed by postoperative IV flurbiprofen axetil 40mg for three days, then maintenance with oral celecoxib 200mg every 12 hours.

Continuous Fascia Iliaca Compartment Block Procedure

Patients were positioned supine, and skin asepsis was performed according to standardized protocols. A board-certified anesthesiologist with extensive experience in regional anesthesia techniques utilized ultrasound guidance (SonoSite M-Turbo system with 6–13 MHz linear transducer) to identify the relevant anatomical structures of the fascia iliaca compartment. The puncture site was selected approximately 1–2 cm distal to the anterior superior iliac spine, with precise identification of the fascia iliaca between the anterior superior iliac spine and pubic symphysis. Following infiltration of the skin and subcutaneous tissues with 2% lidocaine, an appropriately sized needle was advanced under continuous ultrasound visualization until its tip was confirmed to be beneath the fascia iliaca.

After negative aspiration, 40 mL of 0.25% ropivacaine was injected incrementally while observing for appropriate hydrodissection of the fascia iliaca compartment. Subsequently, a catheter was inserted and secured to the skin using sterile adhesive dressing. The catheter was connected to an electronic infusion pump programmed to deliver 0.25% ropivacaine at a basal rate of 5 mL/h, with provision for patient-controlled boluses (5 mL maximum dose, 30-minute lockout interval) for 72 hours postoperatively. Catheter placement and drug distribution were confirmed by ultrasound visualization and documentation of sensory changes in the appropriate dermatomes.

Data Collection and Outcome Measurements

Two trained orthopedic residents independently collected data using standardized forms. All data points were part of standard care documentation and were extracted from medical records. These included VAS pain scores, cognitive

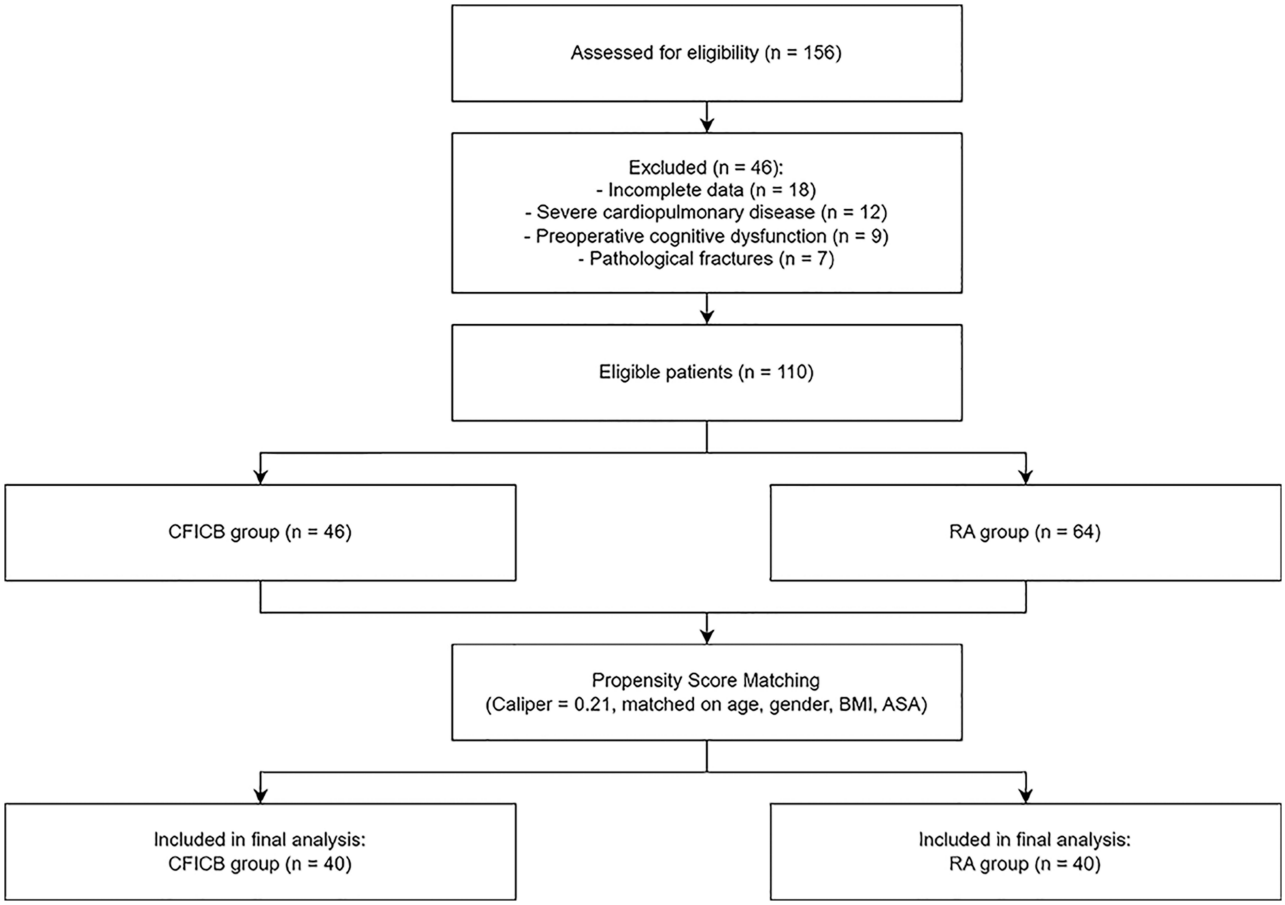

Figure 1 Flow diagram showing the process of patient selection and group assignment.From an initial cohort of 156 patients, 46 were excluded based on predefined criteria. The remaining 110 eligible patients were divided into CFICB (n = 46) and RA (n = 64) groups. After propensity score matching (1:1 ratio), 40 patients were included in each group for final analysis. Matching variables included age, gender, BMI, and ASA score.

function assessment (using MoCA© for initial screening [cutoff <26] with MMSE-2® [score below education-adjusted cutoff] for confirmatory assessment in patients with positive screens), and Harris Hip scores. Measurements were recorded at admission, pre-operation, and multiple postoperative time points (6 h, 24 h, 72 h, 1 week, 2 weeks, and 1 month). Data extraction was cross-verified between the two residents.

Statistics

Statistical analysis was performed using SPSS 28.0 (IBM Corporation, Armonk, NY, USA). Continuous variables were analyzed using *t* - tests or Mann–Whitney *U*-tests based on distribution normality. Categorical variables were compared using χ^2 or Fisher's exact tests. Score trends were evaluated using repeated measures ANOVA, and risk factors were assessed through multivariable logistic regression analysis. Bonferroni correction was applied for multiple comparisons to control for Type I error. Statistical significance was set at $\alpha = 0.05$.

Results

Baseline Characteristics

After propensity score matching, 80 patients were included in the final analysis (CFICB group, n = 40; RA group, n = 40). Baseline demographic and clinical characteristics were well-balanced between groups (Table 1). The mean age was 79.65 ± 7.13 years in the CFICB group and 81.00 ± 7.31 years in the RA group ($P = 0.103$). No significant differences were observed in gender distribution, BMI, ASA physical status, admission Barthel Index, pre-fracture Charlson Comorbidity Index, or fracture patterns between groups (all $P > 0.05$).

Figure 2 Ultrasound-guided continuous fascia iliaca compartment block implementation.Clinical photograph demonstrating the practical application of continuous fascia iliaca compartment block (CFICB) in a patient with left intertrochanteric fracture. The image shows the electronic infusion pump (Fornia F15, FORNIA, China) delivering local anesthetic solution through a catheter positioned in the fascia iliaca compartment. The catheter insertion site and securing dressing are visible on the lateral aspect of the thigh, corresponding to the anatomical location of the fascia iliaca compartment. The infusion device is programmed to deliver a continuous infusion of 0.25% ropivacaine at 5mL/h. This standardized approach ensures consistent analgesic delivery throughout the perioperative period.

Pain Management Outcomes

Repeated measures analysis revealed superior early postoperative pain control in the CFICB group. Compared to the RA group, CFICB patients demonstrated significantly lower VAS scores at 6 hours (4.02 ± 1.09 vs 4.93 ± 1.24), 24 hours (2.43 ± 0.72 vs 3.45 ± 0.87), and 72 hours (2.26 ± 0.81 vs 2.98 ± 1.10) postoperatively (all $P < 0.001$). This difference gradually diminished, with scores becoming comparable between groups by two weeks postoperatively (1.89 ± 0.76 vs 1.91 ± 0.85, $P = 0.912$) (Table 2). In summary, CFICB provided superior pain control during the crucial early postoperative period, with the effect diminishing over time as healing progressed.

Table 2 Pain Improvement (VAS Scores)

Time Point	CFICB Group (mean ± SD)	RA Group (mean ± SD)	*P* value
Admission	5.03 ±1.37	4.98 ± 1.56	0.879
6h post-block	4.02 ± 1.09	4.93 ± 1.24	<0.001
Morning of surgery	3.48 ± 1.12	4.49 ± 1.45	<0.001
6h post-surgery	2.77 ± 0.94	3.96 ± 1.38	<0.001

(*Continued*)

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Table 2 (Continued).

Time Point	CFICB Group (mean ± SD)	RA Group (mean ± SD)	*P* value
POD 1	2.43 ± 0.72	3.45 ± 0.87	<0.001
POD 3	2.26 ± 0.81	2.98 ± 1.10	0.001
POW 1	2.04 ± 0.61	2.37 ± 0.90	0.059
POW 2	1.89 ± 0.76	1.91 ± 0.85	0.912
POM 1	1.51 ± 0.83	1.56 ± 0.44	0.737

Notes: Data are presented as mean ± SD. *P*-values were calculated using *t*-test with Bonferroni correction for multiple comparisons.
Abbreviations: VAS, Visual Analog Scale (0–10, with higher scores indicating more severe pain); POD, Post-operative Day; POW, Post-operative Week; POM, Post-operative Month.

Cognitive Function Assessment

The incidence of postoperative cognitive dysfunction was significantly lower in the CFICB group compared to the RA group at 6 hours (10% vs 30%, $P = 0.025$), 24 hours (15% vs 35%, $P = 0.039$), and 72 hours (5% vs 20%, $P = 0.043$) postoperatively (Table 3). Multivariable logistic regression analysis identified CFICB as an independent protective factor against post-operative cognitive dysfunction (OR = 0.41, 95% CI: 0.26–0.65, $P < 0.001$), while advanced age (OR = 1.89), ASA III status (OR = 1.75) and Charlson Comorbidity Index (OR = 1.63) emerged as risk factors (Table 4). These results suggest that CFICB may play an important role in preserving cognitive function during the perioperative period in elderly patients.

Functional Recovery

Harris Hip Scores demonstrated superior functional recovery in the CFICB group across all time points (Table 5). Significant differences were observed at one week (56.34 ± 5.67 vs 52.16 ± 6.23, $P = 0.012$), two weeks (68.42 ± 7.01 vs 63.25 ± 6.89, $P = 0.025$), and one month (78.56 ± 8.12 vs 72.39 ± 7.65, $P = 0.008$) postoperatively. The consistently better functional outcomes in the CFICB group suggest that effective early pain control may facilitate more active participation in rehabilitation and translate to improved functional recovery.

Table 3 Comparison of Cognitive Status Changes

Time Point	CFICB Group Cognitive Dysfunction [n(%)]	RA Group Cognitive Dysfunction [n(%)]	*P* value
Admission	2 (5.0)	1 (2.5)	0.556
6h post-block	2 (5.0)	7 (17.5)	0.077
Morning of surgery	4 (10.0)	7 (17.5)	0.330
6h post-surgery	4 (10.0)	12 (30.0)	0.025
POD 1	6 (15.0)	14 (35.0)	0.039
POD 3	2 (5.0)	8 (20.0)	0.043
POW 1	2 (5.0)	3 (7.5)	0.305
POW 2	0 (0.0)	0 (0.0)	-
POM 1	0 (0.0)	0 (0.0)	-

Notes: Data are presented as n (%). *P*-values were calculated using chi-square test or Fisher's exact test as appropriate. Dash (-) indicates statistical analysis not applicable.
Abbreviations: POD, Post-operative Day; POW, Post-operative Week; POM, Post-operative Month.

Table 4 Multivariate Logistic Regression Analysis of Post-Operative Functional Impairment in Intertrochanteric Fracture Patients

Factor	OR	95% CI	*P* value	Standardized *β*
CFICB	0.41	0.26–0.65	<0.001	−0.672
Age	1.89	1.26–2.84	0.002	0.538
ASA Grade	1.75	1.08–2.84	0.022	0.421
Charlson Comorbidity Index	1.63	1.05–2.53	0.031	0.379
BMI	1.08	0.85–1.36	0.532	0.103
Gender	1.22	0.76–1.94	0.412	0.186
Fracture type	1.15	0.71–1.86	0.573	0.141

Notes: Multivariable logistic regression analysis with postoperative cognitive dysfunction as the dependent variable and listed factors as independent variables. $P < 0.05$ was considered statistically significant.
Abbreviations: CFICB, Continuous Fascia Iliaca Compartment Block; BMI, Body Mass Index; ASA, American Society of Anesthesiologists; OR, Odds Ratio; CI, Confidence Interval.

Table 5 Hip Function Recovery (Harris Hip Score)

Assessment Time	CFICB Group (mean ± SD)	RA Group (mean ± SD)	*P* value
POW 1	56.34 ± 5.67	52.16 ± 6.23	0.012
POW 2	68.42 ± 7.01	63.25 ± 6.89	0.025
POM 1	78.56 ± 8.12	72.39 ± 7.65	0.008

Notes: Harris Hip Score ranges from 0 to 100, with higher scores indicating better function. Data are presented as mean ± SD. *P*-values were calculated using *t*-test with Bonferroni correction for multiple comparisons.
Abbreviations: POW, Post-operative Week; POM, Post-operative Month; CFICB, Continuous Fascia Iliaca Compartment Block; RA, Regular Analgesia.

Safety Analysis

Overall complication rates (22.5% vs 17.5%, $P = 0.576$) and adverse event rates (12.5% vs 20%, $P = 0.363$) were comparable between groups (Table 6). The CFICB group experienced complications including pneumonia (n = 3), urinary tract infection (n = 2), heart failure (n = 2), myocardial infarction (n = 1), and deep vein thrombosis (n = 1). The RA group reported pneumonia (n = 2), urinary tract infection (n = 2), heart failure (n = 1), myocardial infarction (n = 1), and cerebral infarction (n = 1). No mortalities were recorded in either group.

Table 6 Post-Operative Complications and Adverse Events

Complication Type	CFICB Group (n = 40)	RA Group (n = 40)	*P* value
Complication rate [n(%)] (pneumonia, UTI, heart failure, MI, DVT, stroke)	9/40 (22.5%)	7/40 (17.5%)	0.576
Adverse events [n(%)] (nausea/vomiting, dizziness, liver dysfunction, catheter dislodgement, local hematoma)	5/40 (12.5%)	8/40 (20%)	0.363
Mortality	0 (0.0)	0 (0.0)	–

Notes: Data are presented as n (%). *P*-values were calculated using chi-square test. Dash (-) indicates statistical analysis not applicable.
Abbreviations: CFICB, Continuous Fascia Iliaca Compartment Block; RA, Regular Analgesia.

Discussion

Pain management is a crucial therapeutic measure following intertrochanteric fractures in elderly patients. The key findings of our study demonstrate that continuous fascia iliaca compartment block significantly improves pain control, reduces the incidence of postoperative cognitive dysfunction, and enhances functional recovery in elderly patients with intertrochanteric fractures, without increasing complication rates. These benefits were most pronounced during the early postoperative period (≤72 hours), which represents a critical window for initiating rehabilitation and preventing complications.

Current standard analgesic approaches for elderly patients with intertrochanteric fractures primarily involve oral NSAIDs or opioids such as morphine and pethidine. However, research has demonstrated that NSAIDs often provide suboptimal analgesia while inducing adverse effects including nausea, vomiting, and peptic ulcers. While opioids offer superior analgesic efficacy, elderly patients frequently experience complications such as hypotension and respiratory depression, along with increased risk of dependence. In patients with multiple comorbidities, particularly those with myocardial infarction, cerebral infarction, or chronic obstructive pulmonary disease, opioid administration may exacerbate existing conditions.[17] Consequently, monotherapy with either NSAIDs or opioids is suboptimal for pain management in elderly patients with intertrochanteric fractures.

Epidural anesthesia, while effective for pain control, presents significant limitations due to sympathetic blockade-induced hypotension and post-anesthetic muscle weakness, particularly quadriceps weakness, which adversely affects postoperative rehabilitation in elderly patients with intertrochanteric fractures.

The fascia iliaca comprises musculofascial layers formed by the psoas major, iliacus, and pectineus muscles. A potential space exists between the anterior fascia iliaca and the posterior iliopsoas muscle and fascia, through which branches of the lumbar plexus - including the femoral nerve, lateral femoral cutaneous nerve, and obturator nerve - traverse.[18,19] Fascia iliaca nerve block effectively interrupts conduction in these nerves, providing efficient hip analgesia. This approach reduces NSAID and opioid requirements, thereby minimizing complications such as gastrointestinal ulceration and cardiorespiratory dysfunction, facilitating perioperative stability and postoperative recovery in elderly patients.[20,21]

Studies have shown that FICB provides effective analgesia for 24 hours following total hip arthroplasty (THA), improving early recovery quality and reducing cardiovascular complications and acute respiratory infections in elderly patients.[22] FICB has consequently been adopted as a preoperative analgesic technique for intertrochanteric fractures.

However, since FICB allows for only single administration with limited duration, some researchers have suggested repeated dosing. To address this limitation, continuous fascia iliaca compartment block (CFICB) with catheter-based pulsatile delivery has been proposed. Our study confirms that CFICB effectively improves postoperative pain control in elderly patients with intertrochanteric fractures. We observed significantly lower VAS scores in the CFICB group from 6 hours to 3 days postoperatively, with particularly notable differences at 24 hours postoperatively (2.43 ± 0.72 vs 3.45 ± 0.87, $P < 0.001$). These findings align with Feng et al,[23] who reported significantly lower resting VAS scores at 24 hours postoperatively in their CFICB group compared to controls. The sustained analgesic effect is achieved through effective blockade of the obturator, femoral, and lateral femoral cutaneous nerves.[19]

Regarding functional recovery, the CFICB group demonstrated significantly higher Harris Hip Scores at all postoperative time points, particularly at one week (56.34 ± 5.67 vs 52.16 ± 6.23, $P = 0.012$) and one month (78.56 ± 8.12 vs 72.39 ± 7.65, $P = 0.008$). This improved functional outcome likely reflects superior early pain control enabling more active participation in rehabilitation exercises. Gao et al[16] similarly demonstrated that CFICB significantly enhances early rehabilitation quality following hip arthroplasty.

Postoperative delirium represents a common complication in elderly orthopedic patients, adversely affecting recovery quality, rehabilitation progress, length of hospital stay, and healthcare costs. Current evidence suggests multiple contributing factors, including advanced age, postoperative electrolyte disturbances, anesthesia, and underlying neurological conditions. The pathophysiology likely involves systemic inflammatory responses triggered by fracture trauma, surgical stress, and pain, leading to elevated inflammatory mediators such as IL-6 and IL-β.[24] This inflammatory cascade may induce central nervous system inflammation and neurotoxicity, resulting in cognitive dysfunction.[23] Effective perioperative pain management may reduce the incidence of postoperative cognitive disorders including delirium in elderly patients with intertrochanteric fractures.

Our implementation of a two-tier cognitive screening protocol combining MoCA© with MMSE-2® represents a methodologically sound and resource-efficient approach.[25,26] MoCA© offers superior sensitivity for detecting mild cognitive impairment, particularly in domains relevant to postoperative recovery such as executive function and attention. This approach aligns with current recommendations for cognitive assessment in geriatric populations while optimizing resource utilization.

In our study, the CFICB group demonstrated significantly lower rates of postoperative cognitive dysfunction, particularly at 6 hours (10% vs 30%, $P = 0.025$) and 24 hours (15% vs 35%, $P = 0.039$) postoperatively. These findings corroborate Wennberg et al,[19] who suggested that FICB may reduce postoperative cognitive dysfunction risk through reduced opioid requirements and improved pain control.

Multivariatble logistic regression analysis identified CFICB as an independent protective factor against postoperative cognitive dysfunction (OR = 0.41, 95% CI: 0.26–0.65, $P < 0.001$). Liu et al[24] proposed that this protective effect may be mediated through reduced inflammatory marker levels. Additionally, we identified advanced age (OR = 1.89), ASA III status (OR = 1.75) and Charlson Comorbidity Index (OR = 1.63) as independent risk factors for postoperative cognitive dysfunction, consistent with previous research.[23]

Regarding safety, complication rates (22.5% vs 17.5%, $P = 0.576$) and adverse event rates (12.5% vs 20%, $P = 0.363$) were comparable between CFICB and RA groups, aligning with Azizoğlu et al.[27] Notably, only one case of catheter-site hematoma occurred in the CFICB group, which resolved with local compression. This supports O'Reilly et al's[19] assertion regarding the high safety profile of ultrasound-guided FICB.

Several inherent limitations should be acknowledged in interpreting our findings. Despite employing propensity score matching to minimize selection bias, the retrospective single-center design may affect result generalizability. The one-month follow-up period precludes evaluation of long-term functional outcomes and quality-of-life metrics critical for elderly populations. Additionally, variability in rescue analgesia protocols and unmeasured confounding factors inherent to observational studies warrant consideration. The two-tier cognitive assessment protocol implemented in this study, while methodologically sound and resource-efficient, introduces the potential for verification bias in cognitive dysfunction prevalence estimates. Future prospective studies should validate this approach against comprehensive neuropsychological assessment batteries.

These methodological constraints underscore the necessity for future research. Specifically, prospective, multicenter randomized controlled trials with extended follow-up periods (6–12 months) are needed to validate our findings. Such studies should include standardized protocols for rescue analgesia, comprehensive assessment of cognitive function using multiple validated tools, and evaluation of long-term functional outcomes and quality of life. Furthermore, comparative studies examining CFICB against other regional anesthetic techniques would help establish optimal perioperative management protocols for elderly patients with intertrochanteric fractures.

Conclusion

This study demonstrates that continuous fascia iliaca compartment block provides significant clinical benefits in the perioperative management of elderly patients with intertrochanteric fractures. The technique effectively improves postoperative pain control, reduces cognitive dysfunction incidence, and enhances early functional recovery while maintaining a favorable safety profile. These findings provide strong evidence supporting the integration of CFICB into standard perioperative care protocols for this vulnerable patient population. However, the retrospective single-center nature of this study and the relatively short follow-up period limit generalizability across diverse clinical settings. Future prospective, multicenter studies with longer follow-up periods and comparison with other regional anesthetic techniques are warranted to validate these results and optimize implementation strategies.

Abbreviations

ASA, American Society of Anesthesiologists; BI, Barthel Index; BMI, Body Mass Index; CCI, Charlson Comorbidity Index; CFICB, Continuous Fascia Iliaca Compartment Block; CI, Confidence Interval; CT, Computed Tomography; DVT, Deep Vein Thrombosis; FICB, Fascia Iliaca Compartment Block; MI, Myocardial Infarction; MMSE, Mini-Mental State Examination; NSAIDs, Non-Steroidal Anti-Inflammatory Drugs; OR, Odds Ratio; ORIF, Open Reduction Internal Fixation; POD, Post-operative Day; POM, Post-operative Month; POW, Post-operative Week; RA, Regular Analgesia; THA, Total Hip Arthroplasty; UTI, Urinary Tract Infection; VAS, Visual Analog Scale.

Data Sharing Statement

The datasets generated and/or analyzed during the current study are available from the corresponding author on reasonable request.

Ethics Statement

This study was approved by the Ethics Committee of Beijing Friendship Hospital, Capital Medical University, approval number 2024-P2-169-02. All procedures performed were in accordance with the 1964 helsinki Declaration and its later amendments. Informed consent was obtained from all participants involved in the study.

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An unauthorized version of the Chinese MMSE was used by the study team without permission, however this has now been rectified with PAR. The MMSE is a copyrighted instrument and may not be used or reproduced in whole or in part, in any form or language, or by any means without written permission of PAR (www.parinc.com).

Consent for Publication

Written informed consent was obtained from all patients for publication of clinical details and images.

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Disclosure

The authors declare that they have no competing interests in this work.

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