

Original Article

The effect of the fascia iliaca compartment block combined with laryngeal mask general anesthesia on the internal fixation of senile femoral neck fracture

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Abstract: Objective: To explore the effect of fascia iliaca compartment block (FICB) combined with a laryngeal mask on the internal fixation of senile femoral neck fracture (FNF) and its improvement on cognitive and immune functions. Methods: 72 patients with FNF in our hospital were enrolled in the study. All the patients underwent internal fixation and were randomly divided into a study group (SG) and a control group (CG), with 36 cases in each group. The SG underwent the FICB combined with laryngeal mask general anesthesia (LMA), and the CG underwent LMA. The perioperative extubation time, the total dose of anesthesia, the postoperative language statement time, and the recovery time index were recorded. The incidence of adverse reactions of the two groups was recorded. The pain scores at 6 h, 24 h, and 48 h after surgery were evaluated using the visual analog scale pain score (VAS). The cognitive functions of the two groups before surgery, 1 day after surgery, and 3 days after surgery were evaluated using a simple intelligence table (MMSE). Peripheral blood T lymphocyte subsets were determined using flow cytometry at 30 min before the anesthesia induction, 1 day after surgery, and 3 days after surgery. Results: The extubation time, the total dose of anesthesia, the time of speech presentation, the time of recovery, and the incidence of complications were lower in the SG than in the CG ($P < 0.05$). The VAS scores of the SG and CG at 24 h and 48 h after the operation were lower than those at 6 h after the operation ($P < 0.05$). The VAS scores of the SG were lower than the CG VAS scores at 6 h, 24 h, and 48 h after the operation ($P < 0.05$). The MMSE scores of the SG and CG 1 day after surgery were lower than the preoperative MMSE scores and the MMSE scores 3 days after the operation ($P < 0.05$). The MMSE scores of the SG were higher than the MMSE scores of the CG ($P < 0.05$). The ratio of CD3⁺, CD4⁺, CD8⁺ and CD4⁺/CD8⁺ in the peripheral blood of the SG and CG were lower than they were before the induction of anesthesia and at 3 days after the operation ($P < 0.05$). Conclusion: FICB combined with LMA is a viable anesthesia program in elderly FNF. It can reduce the amount of anesthetic used, make the recovery and postoperative statement times faster, achieve a better postoperative analgesic effect, and reduce postoperative complications, which can improve the cognitive and immunologic functions of patients to a certain extent.

Keywords: Femoral neck fracture (FNF), fascia iliaca compartment block, laryngeal mask general anesthesia, cognitive function, immunologic function

Introduction

As the world's population ages, the incidence of osteoporosis increases yearly, which increases the incidence of FNF in the elderly. FNF has a high disability and mortality, which seriously threatens the life safety of the elderly patients [1]. Internal fixation is a common surgical treatment for FNF. It can effectively improve the recovery of joint function in patients and has a significant benefit on the patients' long-term quality of life [2]. However, elderly patients are

often associated with basic chronic diseases. The organs of the body function poorly and have a poor tolerance to surgery and anesthesia. Therefore, there are certain difficulties in the anesthesia treatment of elderly patients [3, 4]. Elderly patients with FNF are in poor condition and often require a conservative treatment. Long-term bed rest can easily cause a series of complications, which is not conducive to patient prognosis [5]. Therefore, it is clinically important to develop a suitable anesthesia program for elderly patients.

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General anesthesia or spinal anesthesia is used clinically for elderly patients. Due to the influence of surgical stress and trauma, the autonomic sympathetic response of elderly patients is weakened, the metabolic rate of anesthetic drugs is reduced, and hemodynamic fluctuations are easily generated, affecting the body's immunologic function [6, 7].

In the process of anesthesia induction and extubation, a patient's stress response is strong. In addition, postoperative recovery delay and cognitive function disorder are likely to occur in patients, which will also affect their cardiovascular systems [8]. Among them, postoperative cognitive function disorder is a common early complication after gynecologic surgery. With the increase in the number of elderly fracture patients, the number of patients with cognitive function disorder has increased [9]. With the development of anesthesia technology, FICB has obvious benefits for elderly patients with surgery, so it has been widely used in clinical practice [10]. The operation of laryngeal mask ventilation for general anesthesia is relatively simple. It can effectively maintain the stability of the blood rheology indicators, and the effect of the anesthesia is ideal [11].

Previously, FICB and LMA were used more frequently in elderly patients [12, 13]. For example, Yang et al. [14] showed that FICB is a safe and effective method for lower extremity surgery, which can relieve postoperative pain. However, the application effect of FICB combined with LMA in the elderly FNF internal fixation is still unclear. In this study, FICB combined with LMA was used for the internal fixation of elderly patients with FNF to observe the effect of this anesthesia program and its influence on cognitive and immunologic functions.

Materials and methods

General information

72 elderly patients with FNF admitted to the First Affiliated Hospital of Nan Chang University from January 2018 to October 2018 were enrolled in the study. All patients underwent internal fixation and were randomly divided into the SG or the CG, with 36 in each group. According to the American Society of Anesthesiologists (ASA) standard [15], we judged the severity of the patients. Inclusion criteria: FNF; Grade II-III in accordance with ASA classifica-

tion; with an age ≥ 60 years; No major organ dysfunction; patients who can understand the nature of this study and sign an informed consent; this study did not violate any norms of ethics or morality. This plan was submitted to the hospital ethics committee for review and approval before implementation. Exclusion criteria: local anesthesia; long-term use of analgesics; combined injury or infection at the puncture site, combined with severe liver and kidney dysfunction, severe respiratory disease, peripheral neuropathy, connective tissue disease, malignant tumor, endocrine and metabolic diseases, hematopoietic dysfunction, infectious diseases; patients who used immunosuppressive drugs in the past 1 month; and conscious or psychiatric diseases.

Anesthesia method

LMA was performed in both groups. Each patient was injected with 0.5 mg atropine (Tianjin Jinyao Pharmaceutical Co., Ltd., China, batch number: H12020382) 30 minutes before surgery. The intravenous channels were routinely opened. Non-invasive arterial blood pressure, blood oxygen saturation, end-expiratory partial pressure of carbon dioxide, EEG dual-frequency index, and ECG were closely monitored. The following was used to carry out general anesthesia induction: 0.05 to 0.10 mg/kg of midazolam (Sujiuxu Pharmaceutical Co., Ltd., China, batch number: H20153019), 0.1 to 0.3 mg/kg of etomidate (Jiangsu Enhua Pharmaceutical Co., Ltd, China, the batch number: H32022992), 0.15 mg/kg of atracurium (Jiangsu Hengrui Pharmaceutical Co., Ltd., China, batch number: H20060869), 0.2 to 0.5 mg/kg of sufentanil (Yichang Renfu Pharmaceutical Co., Ltd., China, batch number: H20054256). After the patient's muscles relaxed and the consciousness disappeared, the appropriate laryngeal mask was placed, and the anesthesia machine was connected. During surgery, 5-6 $\mu\text{g}/(\text{mg}\cdot\text{h})$ of remifentanil (Yichang Renfu Pharmaceutical Co., Ltd., China, batch number: H20030197) was continuously injected by micropump, 3-6 mg/kg of propofol (Sichuan Guorui Pharmaceutical Co., Ltd., China, batch number: H20030115) was intravenously pumped, and 0.25-0.5 mg/kg of atracurium was added to maintain anesthesia.

The SG underwent a nerve block after the general anesthesia induction, and the FICB was

performed by the same anesthesiologist [16]. Under ultrasound guidance, the ultrasound probe was placed 2 cm down the middle part of the inguinal ligament. After seeing the fascia and fascia structure, the 45° lancet was inserted into the fascia, and 2 mL of saline was injected after pumping without blood. Using ultrasound, it was determined whether the liquid was diffused or not. In the case of diffusion, 30 mL of 0.4% ropivacaine (Hebei Yipin Pharmaceutical Co., Ltd., China, H20113463) was injected after accurate positioning. When the drug solution was completed along the intercondylar space of the fascia, the patient's vital signs were closely observed after the injection of the local anesthetic. Remifentanyl was continuously injected with a micropump, propofol was injected intravenously, and atracurium was added to maintain anesthesia. During the operation, the patient was given blood transfusions and fluid replacement according to the actual situation.

Detection methods

Peripheral blood T lymphocyte subsets were determined using FACSCalibur flow cytometry (B D, Franklin Lakes, NJ, USA) 30 min before the induction of anesthesia, 1 d after surgery, and 3 d after surgery. 100 µL of anticoagulated whole blood was placed in a TruCOUNT tube, and 20 µL of each of CD3-FITC, CD4-PE, CD8-PE (B D, Franklin Lakes, NJ, USA) antibody was added, and the mixture was allowed to stand at room temperature for 15 minutes. 370 µL of hemolysin (B D, Franklin Lakes, NJ, USA) was added, and the mixture was allowed to stand at room temperature for 15 minutes. The samples were tested on a flow cytometer and the peripheral blood CD3⁺, CD4⁺, CD8⁺ and CD4⁺/CD8⁺ values were recorded.

Observation indexes

A visual analogue scale (VAS) [6] was used to evaluate the patients' pain degrees at 6 h, 24 h, and 48 h after surgery. The score included 0 for painless, 1 to 3 for tolerable mild pain, 4 to 6 for pain that affected rest, and 7 to 10 for unbearable pain that affected sleep and appetite. The simple intelligence table (MMSE) [17] was used to assess the patients' cognitive functions before and at 1 d and 3 d after surgery. There were 30 questions in the MMSE, for a total of 30 points, 1 point for each question. It included 7 aspects: immediate memo-

ry, time orientation, language, place orientation, visual space, attention and calculation, place orientation, delayed memory and visual space. A score of >26 was considered normal. The higher the score, the better the cognitive function. The perioperative period of extubation time, total dose of the anesthetic, postoperative language statement time, and recovery time were observed. The incidence of adverse reactions in the two groups was recorded.

Statistical methods

The statistical analysis was performed using SPSS 18.0 (Guangzhou Bomai Information Technology Co., Ltd., China). Cases/percentage (n/%) was used to represent the count data usage/percentage (n/%), and a chi-squared test was used to compare the count data between the groups. When the theoretical frequency in the chi-squared test was less than 5, a continuity correction chi-square test was used. Measurement data were expressed as the mean ± standard deviations ($\bar{X} \pm sd$). The comparisons of the measurement data between the groups was performed using an independent sample *t* test. Multiple time point data comparisons were analyzed using repeated measures of variance. The Bonferroni method was used to compare the two points at different time points in the group. $P < 0.05$ indicated a significant difference.

Results

General information of two groups

There were no significant differences between the SG and CG in the following general clinical data ($P > 0.05$): gender, age, body mass index (BMI), ASA classification, marital status, smoking history, drinking history, hypertension, diabetes, place of residence, time from injury to surgery, preoperative traction, reduction mode, aspartate aminotransferase (AST), alanine aminotransferase (ALT), urea (Urea), creatinine (Scr), uric acid (UA), β₂-microglobulin (β₂-MG), and so on (**Table 1**).

Comparison of the results of the two groups of perioperative indicators

The expansion time, total anesthetic dose, postoperative language statement time, and wake-up time in the SG were lower than they were in the CG ($P < 0.05$) (**Table 2**).

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Table 1. General information about the study and control groups [n (%)]/($\bar{X} \pm sd$)

Category	Study group (n=36)	Control group (n=36)	t/ χ^2 value	P value
Gender			0.229	0.633
Male	20 (55.56)	22 (61.11)		
Female	16 (44.44)	14 (38.8)		
age	67.9 \pm 5.2	67.2 \pm 6.1	0.524	0.602
BMI (kg/m ²)	22.57 \pm 2.67	22.38 \pm 2.86	0.291	0.772
ASA rating			1.443	0.230
II	19 (52.78)	24 (66.67)		
III	17 (47.22)	12 (33.33)		
Marital status				
Unmarried	1 (2.78)	2 (5.56)		
Married	32 (88.89)	30 (83.33)		
Other	3 (8.33)	4 (11.11)		
History of smoking			0.223	0.637
Yes	18 (50.00)	16 (44.44)		
No	18 (50.00)	20 (55.56)		
Drinking history			0.234	0.629
Yes	15 (41.67)	13 (36.11)		
No	21 (58.33)	23 (63.89)		
Hypertension			0.321	0.571
Yes	9 (25.00)	7 (19.44)		
No	27 (75.00)	29 (80.56)		
Diabetes			0.464	0.496
Yes	4 (11.11)	6 (16.67)		
No	32 (88.89)	30 (83.33)		
Place of residence			0.575	0.448
City	23 (63.89)	26 (72.22)		
Rural	13 (36.11)	10 (27.78)		
Injury to surgery time			0.500	0.479
<24 h	17 (47.22)	20 (55.56)		
\geq 24 h	19 (52.78)	16 (44.44)		
Preoperative traction			0.900	0.343
Yes	22 (61.11)	18 (50.00)		
No	14 (38.89)	18 (50.00)		
Reset mode			1.047	0.306
Cut open	9 (25.00)	13 (36.11)		
Closure	27 (75.00)	23 (63.89)		
AST (U/L)	21.08 \pm 12.07	19.43 \pm 11.36	0.597	0.552
ALT (U/L)	29.51 \pm 9.01	30.15 \pm 7.58	0.326	0.745
Urea (μ mol/L)	5.16 \pm 0.89	5.23 \pm 0.95	0.323	0.748
Scr (μ mol/L)	73.26 \pm 10.57	75.18 \pm 11.09	0.752	0.455
UA (μ mol/L)	177.59 \pm 20.18	175.23 \pm 24.83	0.443	0.660

ratory depression (2.78%) in the SG, and the complication rate was 5.56%. There were 4 cases of nausea and vomiting (11.11%), 2 cases of respiratory depression (5.56%), and 2 cases of itching (5.56%) in the CG, and the complication rate was 22.22%. The incidence of complications in the SG was lower than it was in the CG ($P < 0.05$; **Table 3**).

Changes in the postoperative VAS scores in the two groups

There were statistical differences in the VAS scores between the SG and CG at different time points. The VAS scores of the SG and CG at 24 h and 48 h were lower than they were at 6 h ($P < 0.05$). The VAS scores of the SG were lower than those of the CG at 6 h, 24 h, and 48 h after operation ($P < 0.05$) (**Table 4; Figure 1**).

Changes in the MMSE scores in the two groups

There were statistical differences in the MMSE scores between the SG and CG at different time points. The MMSE scores of the SG and CG at 1 d after surgery were lower than they were before and at 3 days after surgery ($P < 0.05$). The SG's MMSE scores were higher than the CG's MMSE scores 1 day after surgery ($P < 0.05$). There was no significant difference in the MMSE scores between the SG and the CG 1 day before surgery and 3 days after surgery ($P > 0.05$) (**Table 5 and Figure 2**).

Changes in T lymphocyte subsets in peripheral blood of

The incidence of adverse reactions in the two groups

After surgery, there was 1 case of nausea and vomiting (2.78%), and there was 1 case of respi-

two groups

There were statistical differences in the ratio of the CD3⁺, CD4⁺, CD8⁺ and CD4⁺/CD8⁺ cells between the SG and the CG at different time

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Table 2. Comparison of the results of the perioperative indicators in the two groups ($\bar{X} \pm sd$)

Group	n	Extubation time (min)	Total dose of anesthesia (mg)	Postoperative language statement time (min)	Wake time (min)
Study group	36	11.28±3.62	291.62±35.42	4.74±3.95	20.41±7.26
Control group	36	18.53±4.08	367.08±46.29	9.83±5.38	34.05±6.18
t value	-	7.975	7.768	4.576	8.584
P value	-	<0.001	<0.001	<0.001	<0.001

Table 3. Comparison of the incidence of adverse reactions in the two groups [n (%)]

Group	n	feel sick and vomit	Respiratory depression	Itching	Total incidence (%)
Study group	36	1 (2.78)	1 (2.78)	0 (0.00)	5.56
Control group	36	4 (11.11)	2 (5.56)	2 (5.56)	22.22
χ^2 value	-	1.059	0.348	2.057	4.181
P value	-	0.304	0.555	0.152	0.041

Table 4. Comparisons of the VAS scores at different time points after surgery in the study and control groups ($\bar{X} \pm sd$)

Time	Study group (n=36)	Control group (n=36)	t value	P value
6 h after surgery	3.41±1.17	3.97±1.15	2.048	0.044
24 h after surgery	1.95±0.84*	2.43±0.91*	2.326	0.023
48 h after surgery	1.15±0.73*#	1.54±0.87*#	2.060	0.043
F value	54.390	56.140	-	-
P value	<0.001	<0.001	-	-

Note: compared with 6 h after the operation, *P<0.05; compared with 24 h after the operation, #P<0.05.

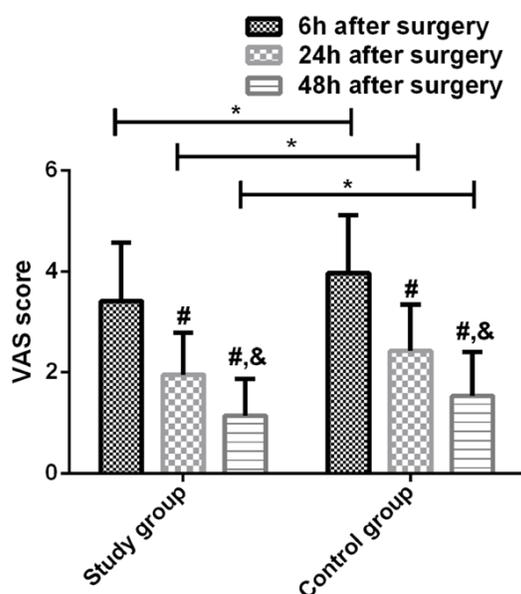


Figure 1. Comparisons of the VAS scores between the study and control groups at different time points after surgery. Note: *P<0.05; compared with the same group at 6 h after surgery, #P<0.05; compared with the same group at 24 h after surgery, &P<0.05.

points. The ratio of the CD3⁺, CD4⁺, CD8⁺ and CD4⁺/CD8⁺ cells in the peripheral blood of the SG and the CG were lower than they were before and 3 days after the anesthesia induction (P<0.05). The ratio of the CD3⁺, CD4⁺, CD8⁺ and CD4⁺/CD8⁺ cells in the peripheral blood of the SG was higher than that of the CG (P<0.05). There was no significant difference in the ratio of the CD3⁺, CD4⁺ and CD8⁺ cells between the SG and the CG before and after the anesthesia on the 3rd day (P>0.05) (Table 6 and Figure 3).

Discussion

Older patients can experience bone fractures due to factors such as decreased physical function, limited mobility, and osteoporosis

[18]. Older FNF is often treated with an internal fixation for clinical treatment. However, elderly patients have more complicated underlying diseases [19], so the use of reasonable anesthesia in the treatment of surgery is of great significance in improving the therapeutic effect of surgery and in promoting patient prognosis.

A laryngeal mask is a kind of anesthesia method for glottic ventilation, which can allow patients to maintain spontaneous breathing during surgery. It has the advantages of a short implantation time, less stimulation to patients, and no impact on lung function [20]. The iliofascial gap is a potential gap in the human body, located between the iliopsoas muscle and the iliofascial membrane, and includes the femoral nerve, reproductive femoral nerve, lateral cutaneous nerve, etc. [21]. Under the guidance of ultrasound, FICB can be far away from the femoral nerve and blood vessels. By applying local anesthetics, it can have a better nerve blocking effect and exert a better analgesic effect, which provides safety and convenience [10]. In this

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Table 5. Comparisons of the MMSE scores between the study and control groups at different time points after the operation ($\bar{x} \pm sd$)

Time	Study group (n=36)	Control group (n=36)	t value	P value
Preoperative	27.46±0.63	27.52±0.64	0.401	0.690
1 d after surgery	25.48±1.57*	23.21±1.31*	6.661	<0.001
3 d after surgery	26.91±0.72	26.92±1.02	0.048	0.962
F value	33.380	185.900	-	-
P value	<0.001	<0.001	-	-

Note: compared with 3 days before and after the surgery, *P<0.05.

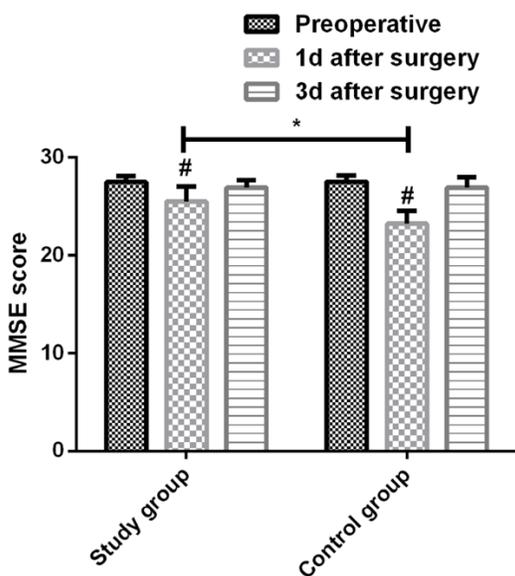


Figure 2. Comparisons of the MMSE scores between the study and control groups at different time points. Note: *P<0.05; compared with the same group before and 3 days after surgery, #P<0.05.

study, the SG's expansion time, the total dose of anesthetic, the postoperative language statement time, and the wake-up time were lower than they were in the CG. The study group's VAS scores were lower than the control group's at 6 h, 24 h, and 48 h after the operation. This indicated that the use of FICB combined with LMA for the treatment of elderly FNF required less sedative and analgesic drugs than LMA alone. Moreover, the postoperative analgesic effect was better because of the shorter waking time, faster verbal statement, and waking time. In the randomized controlled study of Lu et al. [22], it was shown that the ultrasound-guided lumbar plexus block combined with general anesthesia in a supine position can more effectively maintain the stable

hemodynamic indexes during hip replacement, and it had a better postoperative analgesic effect, which was similar to this study. However, the patients' hemodynamics was not observed in this study, which remain to be further studied in the future. By observing the patient's postoperative adverse reactions, the results showed that the incidence of complications in the study group was lower than that of the control group, indicating that FICB combined with LMA is safer. In Zhong et

al.'s [23] study, FICB combined with a general laryngeal mask airway in children who underwent femoral fracture surgery provided stable intraoperative and postoperative analgesic effects with fewer postoperative complications. This may be because FICB combined with LMA took a visual approach. This anesthesia can effectively block the afferent nerves in the surgical area and reduce the nociceptive stimulation to the central nervous system. This resulted in a significant reduction in the secretion of catecholamines in the adrenal medulla and pituitary gland [24], which reduced the stress response of the incision and dilated the medullary cavity, resulting in the reduction during surgery, so the postoperative analgesic effect was better and the adverse reactions were reduced.

Postoperative cognitive function decline is a common result of gynecologic surgery. Changes in cognitive function such as thinking, memory, and orientation often occur after anesthesia surgery [25]. The pain of FNF surgery is very severe, which often affects the cognitive function and seriously affects elderly patients' postoperative recovery and quality of life [26]. In community surveys and clinical surveys, the MMSE scale is often used in screening for cognitive impairment in the elderly, with features such as simplicity, high recognition, and good sensitivity [27]. In this study, the MMSE scale was used to evaluate the patients' cognitive function before, and 1 day and 3 days after surgery. The results showed that the MMSE scores of the SG and the CG 1 day after surgery were lower than they were before and 3 d after surgery. The study group's MMSE score was higher than the control group's score one day after surgery. This indicated that the anesthesia may have a certain effect on the elderly patients' cognitive function, and FICB combined with

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Table 6. Comparisons of the T lymphocyte subsets in the peripheral blood at different time points between the study and control groups ($\bar{X} \pm sd$)

Group	Time	CD3 ⁺ (%)	CD4 ⁺ (%)	CD8 ⁺ (%)	CD4 ⁺ /CD8 ⁺
Study group (n=36)	Before anesthesia induction	66.49±8.21	35.19±5.08	33.16±6.15	1.42±0.35
	1 d after surgery	57.16±6.49* [#]	29.93±5.95* [#]	29.07±5.92* [#]	1.19±0.27* [#]
	3 d after surgery	67.09±6.52	34.82±5.73	32.71±6.07	1.39±0.41
F value	-	22.020	9.899	4.951	4.645
P value	-	<0.001	<0.001	0.009	0.012
Control group (n=36)	Before anesthesia induction	68.12±7.95	34.85±6.37	32.21±6.73	1.44±0.41
	1 d after surgery	51.73±6.28*	23.41±5.91*	27.41±6.57*	0.87±0.33*
	3 d after surgery	67.53±6.34	34.69±6.07	32.61±5.92	1.38±0.36
F value	-	65.360	41.360	7.322	26.060
P value	-	<0.001	<0.001	<0.001	<0.001

Note: *P<0.05 compared with 3 d before and after anesthesia induction in the same group; compared with 1 d after the operation, [#]P<0.05.

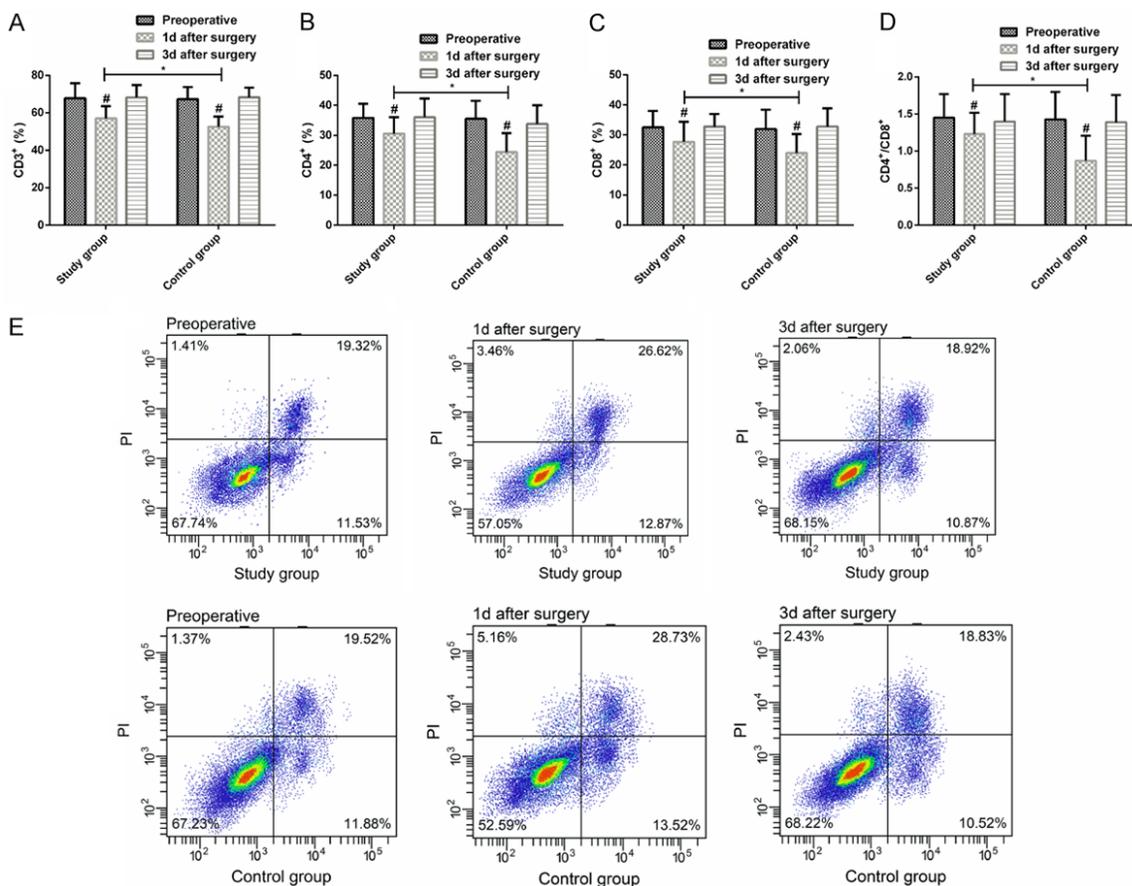


Figure 3. Comparisons of the T lymphocyte subsets in the peripheral blood at different time points between the SG and the CG. Comparisons of the CD3⁺ ratios in the peripheral blood of the study and control groups at different time points after the operation (A); Comparisons of the CD4⁺ results in the peripheral blood of the study and control groups at different time points after the operation (B); Comparisons of the CD8⁺ ratios in the peripheral blood in the study and control groups at different time points after the operation (C); Comparisons of the peripheral blood CD4⁺/CD8⁺ ratios between the study and control groups at different time points after the operation (D). Note: *P<0.05; [#]P<0.05 compared with 3 days after the induction of anesthesia between the same groups. CD3⁺ using flow cytometry before and after treatment (E).

LMA had a certain improvement effect on the elderly patients' cognitive function. In a study by Mouzopoulos et al. [28], pain affected patients' mental state and led to the appearance of sputum, and FICB in elderly patients with hip fracture can effectively prevent sputum. In a study by Monzon et al. [29], FICB anesthesia for hip fractures had a significant benefit in controlling pain for at least 8 hours. After 15 minutes of injection, the patient's pain was drastically reduced, and it may have a preventive effect on the patient's spasm. This may be because FICB combined with LMA can control the pain of elderly FNF patients, and can reduce the recovery time of cognitive function in elderly patients while relieving pain.

Changes in T lymphocyte subsets can assess the status of the body's immunologic function, which can be divided into CD3⁺, CD4⁺, and CD8⁺ T cells according to their functions and surface markers. The changes in the ratio of the three are important markers reflecting the disorder of the body's immunologic function [30]. In this study, the ratio of CD3⁺, CD4⁺, CD8⁺ to CD4⁺/CD8⁺ in the peripheral blood of the SG and CG was lower than it was before and 3 days after the anesthesia induction. The ratio of CD3⁺, CD4⁺, CD8⁺ and CD4⁺/CD8⁺ in the peripheral blood in the SG was higher than it was in the CG. This suggests that anesthesia may have an effect on the immunologic function of elderly patients with FNF who underwent internal fixation, while the FICB combined with a laryngeal mask had a smaller effect on the patient's immunologic functions. In the study by Yang et al. [31], ropivacaine FICB combined with dizocindolol model analgesia can alleviate the pain and stress response after hip replacement, and the fluorescence intensity of the CD3⁺, CD4⁺ and CD8⁺ cells in the peripheral blood 12 h after surgery is lower than it is in patients with simple intravenous analgesia. Therefore, FICB may also bring some improvement to the patient's immunologic function. Although our study confirmed that FICB combined with LMA in the elderly FNF internal fixation is a viable anesthesia program and also has a certain improvement effect on the patient's cognitive and immunologic functions, there are still deficiencies in the study. The patients' hemodynamics was not observed in the study, and it is unclear whether this anesthesia is suitable for other elderly fracture surgery patients. These

shortcomings need to be addressed in future research to further confirm this study's conclusions.

In summary, FICB combined with LMA is a viable anesthesia program in elderly FNF. It can reduce the amount of anesthetic used, make the recovery time and postoperative statement time faster, achieve a better postoperative analgesic effect, and reduce postoperative complications, which can improve patients' cognitive and immunologic functions to a certain extent.

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