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Effects of Continuous Iliofascial Space Analgesia on Sleep Quality and Cognitive Function in Elderly Patients After Hip Surgery

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Abstract

Objective: To investigate the effects of continuous iliac fascia space analgesia on sleep quality and cognitive function in elderly patients after hip surgery. **Methods:** A total of 60 elderly patients with hip operations admitted to our hospital from April 2021 to October 2023 were randomly divided into a study group and a control group with 30 cases in each group. The study group received continuous iliac fascia space analgesia, and the control group received routine analgesia. Perioperative pain status, sleep quality, and cognitive function were evaluated and compared between the two groups. **Results:** The VAS score of the study group at 6h, 24h, and 48h after surgery was lower than that of the control group; the PSQI score of the study group at 1d, 3d, and 5d after surgery was lower than that of the control group; MoCA score of the study group at 1d, 3d and 5d after surgery was higher than that of the control group, with statistical significance ($P < 0.05$). **Conclusion:** Continuous iliofascial space analgesia in elderly patients undergoing hip surgery can improve early postoperative pain, and improve postoperative sleep quality, and cognitive function.

Keywords

Hip surgery; Elderly patients; Continuous iliofascial space analgesia; Sleep quality; Cognitive function

Hip operation is a relatively common surgical site in the elderly population, which is mostly caused by accidental falls, car accidents, and other emergencies. With the aging of the elderly population, the problem of osteoporosis will become increasingly prominent, and the incidence of hip fracture shows a certain increasing trend. Clinical treatment of hip fractures in the elderly is mainly surgical. In clinical diagnosis and treatment, it has been found that elderly patients with hip fractures will be accompanied by relatively significant pain due to fracture trauma, coupled with physiological degradation of organ and tissue function, elderly patients are often accompanied by different types of underlying diseases. When receiving hip surgery, large surgical trauma will further increase the physical burden. It affects the early postoperative recovery effect [1, 2]. In recent years, our hospital has introduced iliofascial space analgesia into elderly patients with hip fractures. This analgesia has the advantages of accurate positioning, reliable effect, few complications, and small influence on hemodynamics [3, 4], and can obtain a longer postoperative analgesia time, which is suitable for elderly patients with multiple underlying diseases [5, 6]. This study analyzed the application value of continuous iliac fascia space analgesia with the data of some elderly patients undergoing hip operations.

1. Data and methods

1.1 General information

60 elderly patients with hip operations admitted to our hospital from April 2021 to October 2023 were selected and

divided into study group and control group by random number table method, with 30 cases in each group. In the study group, there were 16 males and 14 females, aged 60 to 84 (75.39±7.12) years old. The underlying diseases were diabetes mellitus (5 cases), hypertension (7 cases), hyperlipidemia (3 cases) and other diseases (2 cases).In the control group, there were 17 males and 13 females, aged 61-86 (76.12±7.74) years old. The underlying diseases were diabetes mellitus (6 cases), hypertension (8 cases), hyperlipidemia (3 cases) and other 3 cases. There was no significant difference in the general data between the two groups ($P > 0.05$). Inclusion criteria: (1) Elective surgery cases; (2) Patients diagnosed with a hip fracture through systematic examination; (3) No previous history of hip surgery; (4) The basic disease control effect is good; (5) Patients with normal cognitive function before surgery. Exclusion criteria: (1) complicated with serious physical diseases, such as myocardial infarction, stroke, etc.; (2) Patients with infectious diseases; (3) Patients with contraindications to nerve block; (4) Abnormal mental condition; (5) Patients with a history of surgery within the last 12 months; (6) Patients with poor coordination in perioperative diagnosis and treatment; (7) Contraindicated non-steroidal analgesic drugs.

1.2 Methods

After admission, routine examination was improved, ECG monitoring was strengthened, oxygen intervention was given according to the situation, and the intravenous channel was established for fluid rehydration. On this basis, analgesic intervention is carried out with the following specific methods:

1.2.1 Research Group

Continuous iliofascial space analgesia was given, the patient was assisted in maintaining a supine position, the inguinal ligament area was exposed, and the tissue was disinfected. Local exploration was performed by bedside ultrasound and high-frequency probe. The probe was perpendicular to the junction area of the middle and third of the inguinal ligament, and the probe was moved for local observation. The nerve block needle was inserted into the needle, and the needle was passed through the fascia lata and the iliac fascia under ultrasound guidance until the tip of the needle was in the iliac fascia space between the iliac fascia and the iliac muscle. After the needle was withdrawn, 2 ml of sterilized water was injected into the iliac fascia space without blood. After the injection liquid diffused, 20ml of mixed anesthetic liquid was injected, which was made of 0.2% ropivacaine hydrochloride mixed with 0.7% lidocaine. The observation was performed after the injection of anesthetic liquid. When the patient's body pain was effectively relieved and the limb movement function was not affected, a wire catheter was placed through the puncture needle, fixed the catheter after removal of the puncture needle, connected to the electronic analgesia pump, and continuous pumping was performed (background dose 5 mL/h, PCNA5 mL/h, locked for 20 min). The analgesic liquid connected to the analgesic pump was 0.2% ropivacaine hydrochloride. Explain to the patient how to use the analgesic pump, and ask the patient to perform self-controlled analgesia according to their own pain conditions. The analgesic pump for continuous iliac fascia space analgesia was closed after entering the operating room and opened after returning to the ward after surgery.

1.2.2 Control group

Routine analgesia was given. According to the pain status of the patient, flurbiprofen axetil injection was given slowly, 50mg each time, and the injection time was kept above 60s.

1.3 Observation indicators

1.3.1 Evaluation of perioperative pain status

At the time of admission, 3h, 6h, 24h, and 48h after surgery, a visual analogue scale (VAS) was used to evaluate patients' pain response in the resting state, with a total score of 10 points. The higher the score, the more severe the pain.

1.3.2 Sleep quality assessment

The Pittsburgh Sleep Quality Index (PSQI) was used to assess the sleep quality of patients on the 1st day after admission, the 1st day after surgery, the 3rd day after surgery, and the 5th day after surgery. The PSQI included 18 self-assessment items, ranging from 0 to 21 points. The higher the score, the worse the sleep quality.

1.3.3 Cognitive function assessment

The Montreal Cognitive Assessment Scale (MoCA) was used to assess the cognitive function of the patients at admission, 1d, 3d, and 5d after surgery. The scale involved 8 areas, including visuospatial and executive function, language, abstraction, naming, attention, delayed memory, and orientation. The total score was 30 points, and ≥26

points were normal.

1.4 Statistical methods

SPSS23.0 statistical software was used for processing, measurement data were represented by ($\bar{x} \pm s$), comparison by t-test, and $P < 0.05$ was considered statistically significant.

2. Results

2.1 Comparison of perioperative pain status between the two groups

VAS scores of the study group at 6h, 24h, and 48h after surgery were lower than those of the control group, with statistical significance ($P < 0.05$), as shown in Table 1.

Table 1. Comparison of perioperative pain status between the two groups ($\bar{x} \pm s$)

Group	At admission (points)	3h after surgery (points)	6h after surgery (points)	24h after surgery (points)	48h after surgery (points)
Research group/30	6.51±1.21	1.93±1.23	2.21±0.98	1.89±0.67	1.03±0.71
Control group/30	6.39±1.14	2.02±1.18	3.74±1.49	3.12±1.19	2.39±0.95
t	0.395	0.289	4.669	4.933	6.281
P	0.694	0.773	< 0.001	< 0.001	< 0.001

2.2 Comparison of perioperative sleep quality between the two groups

PSQI scores of the study group at 1d, 3d, and 5d after surgery were lower than those of the control group, with statistical significance ($P < 0.05$), as shown in Table 2.

Table 2. Comparison of perioperative sleep quality between the two groups ($\bar{x} \pm s$)

group	Admission day 1d (points)	1d postoperatively (points)	3d postoperatively (points)	5d postoperatively (points)
Research group/30	7.58±0.91	5.42±0.78	4.58±0.81	4.11±0.85
Control group/30	7.81±0.95	8.12±0.99	6.85±1.03	6.23±1.06
t	0.958	11.734	9.489	8.546
P	0.342	< 0.001	< 0.001	< 0.001

2.3 Comparison of perioperative cognitive function between the two groups

The MoCA score of the study group was higher than that of the control group at 1d, 3d, and 5d after surgery, with statistical significance ($P < 0.05$), as shown in Table 3.

Table 3. Comparison of perioperative cognitive function between the two groups ($\bar{x} \pm s$)

group	At admission (points)	1d postoperatively (points)	3d postoperatively (points)	5d postoperatively (points)
Research group/30	28.12±0.75	26.03±0.81	26.57±0.71	27.43±0.69
Control group/30	28.40±0.81	25.11±0.79	25.34±1.14	26.52±1.28
t	1.389	4.454	5.016	3.428
P	0.170	< 0.001	< 0.001	0.001

3. Discussion

The perioperative pain reaction in patients with hip joint operations is relatively severe, which can induce a strong sympathetic stress response, which has adverse effects on the operation and early postoperative rehabilitation. Iliofascial space block is an increasingly used analgesic method in recent years, mainly applied to patients undergoing hip, thigh, and knee surgery [7]. This analgesic method does not need to move the patient during operation, and can effectively reduce the pain and discomfort caused by postural adjustment. At the same time, it can effectively reduce the dosage of opioids, thereby reducing the side effects of related drugs [8, 9]. The risk of intraspinal hematoma in traditional intraspinal anesthesia is avoided [10].In the context of the continuous development of ultrasound technology, the accuracy and effectiveness of iliac fascia space block location have also been effectively improved. Relevant studies have found that the application of real-time ultrasound technology at the bedside significantly improves the success rate of puncture operations and improves safety compared to the classic "frustrated method". This study focused on the effect of continuous iliac fascia space analgesia in elderly patients undergoing hip surgery and showed that the VAS scores of patients in the study group at 6h, 24h, and 48h after surgery were lower than those in the control group, indicating that this analgesia mode can achieve a relatively ideal early postoperative analgesia effect.

In the evaluation of sleep quality and cognitive function, PSQI scores of patients in the study group at 1d, 3d, and 5d after surgery were lower than those in the control group, and MoCA scores of patients in the study group at 1d, 3d and 5d after surgery were higher than those in the control group. Sleep disorders are a common problem in perioperative patients, mainly divided into chronic and new sleep disorders. In the elderly population, the incidence of sleep disorders will gradually increase with age, which has become an important public health problem worldwide. The occurrence of postoperative sleep disorders will increase the risk of complications in patients, such as postoperative delirium and pain. In severe cases, it will also induce cardiovascular time, delay the healing of surgical incisions, and increase the physical burden. Improving the sleep quality of patients through effective means is conducive to improving the self-regulation ability of the body, enhancing resistance, and improving the early recovery effect after surgery [11]. The occurrence of perioperative sleep disorder is affected by many factors, and the obvious pain and increased psychological burden in the perioperative period are the common reasons that affect the quality of sleep. In this study, PSQI scores of patients in the study group were lower than those in the control group at different stages after surgery, indicating that continuous iliofascial space analgesia can relieve postoperative pain and reduce the impact of pain on sleep. There is a certain correlation between sleep quality and pain perception. Interference with sleep continuity, sleep disruption, deprivation of specific sleep stages, etc., may change pain perception and cause the body's pain response. Postoperative pain in patients undergoing hip surgery can induce sleep disorders, and continuous iliofascial space analgesia can alleviate the pain symptoms of patients, thereby reducing the impact on sleep quality and ensuring early postoperative sleep quality of patients, thus generating a virtuous cycle. Postoperative cognitive dysfunction is a common problem in the early postoperative period of elderly patients, which is manifested by different degrees of cognitive function decline, such as memory disorder and attention disorder. There is a certain correlation between the occurrence of postoperative cognitive dysfunction and age, and the incidence will gradually increase with the increase of age. The brain function of the elderly will gradually begin to decline with the increase of age, and the stress response caused by surgery may further aggravate the brain injury, such as cerebral hypoxia during the operation, perioperative inflammatory reaction, and neuronal death. At the same time, narcotic drugs can also have a certain negative effect on the brain, but the specific mechanism is not fully understood. The brain function of elderly patients can also be affected by postoperative pain and sleep disorders. Continuous iliofascial space analgesia can reduce the negative impact on the cognitive function of patients by improving sleep disturbance and pain response in the early postoperative period.

4. Conclusions

In summary, continuous iliofascial space analgesia can play a good role in postoperative analgesia, improve sleep quality and cognitive function in elderly patients after hip surgery, and has high application value.

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