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Effects of fascia iliaca compartment block as an adjunctive management to parecoxib for pain control after total hip arthroplasty

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Abstract

Background: This retrospective study investigated the effects of fascia iliaca compartment block (FICB) as an adjunctive management to parecoxib for pain control after total hip arthroplasty (THA).

Methods: A total of 72 patient records of THA were included in this retrospective study. All patients received parecoxib and were allocated to either the treatment group (n = 36) or the control group (n = 36). In addition, patients in the treatment group underwent FICB. The primary outcome was pain intensity measured using a resting and moving visual analog scales (VASs). The secondary outcomes were inflammatory factors (interleukin 6 and C-reactive protein) and occurrence rate of adverse events.

Results: Patients in the treatment group had better outcomes in the resting VAS (12 hours, $P < .01$; 24 hours, $P < .01$; 36 hours, $P = .01$; 72 hours, $P = .03$), moving VAS (12 hours, $P < .01$; 24 hours, $P < .01$; 36 hours, $P = .02$; 72 hours, $P = .02$), serum interleukin 6 ($P < .01$), and C-reactive protein ($P < .01$) than those in the control group at different time points. In addition, there were no significant differences in the occurrence rate of adverse events.

Conclusion: The findings of this study demonstrated that the effects of FICB as an adjunctive management to parecoxib are superior to those of parecoxib alone for pain control after THA.

Abbreviations: ASA = American Society of Anesthesiologists; CRP = C-reactive protein; FICB = fascia iliaca compartment block; IL-6 = interleukin 6; THA = total hip arthroplasty; VAS = visual analog scale.

Keywords: fascia iliaca compartment block, parecoxib, total hip arthroplasty

1. Introduction

There is an increasing number of elderly patients troubled by joint degeneration, osteoarthritis, and fracture,[1–4] which leads to a high rate of morbidity and poor quality of life.[1,5,6] Total hip arthroplasty (THA) is a common and widely adopted surgical treatment for managing end-stage hip conditions.[7,8] Despite its wide application in severe hip disorders, pain control after THA remains a clinical challenge.[9–11]

Analgesic management in THA often includes a combination of anesthetics and nerve block methods.[12,13] Parecoxib is indicated for the management of short-term pain control in general adult population.[14–18] However, there are unsatisfactory effects during the perioperative administration of THA. Fortunately, regional anesthesia has been reported to control pain after THA. As a type of local anesthetic, fascia iliac compartment block (FICB) is used to block the femoral and lateral femoral cutaneous nerves, as well as the obturator nerve, which can help decrease acute pain and the need for opioids with fewer adverse events.[18–22] Unfortunately, data regarding the effects and safety of parecoxib and FICB for pain relief after THA are limited. Therefore, this retrospective study aimed to investigate the effects and safety of FICB as an adjunctive therapy to parecoxib for pain control after THA.

2. Patients and Methods

2.1. Ethical consideration

The ethical approval of this study was approved by the Ethics Medical Committee of The Second Affiliated Hospital of Inner Mongolia Medical University. Written informed consent was obtained from all the patients.

2.2. Study design

This retrospective study analyzed the records of 72 patients who underwent THA. All samples were collected at The Second Affiliated Hospital of Inner Mongolia Medical University, between March 2017 and December 2018. We allocated 72 patients to the

X.-y.L. and L.Z. contributed equally to this work.

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The datasets generated during and/or analyzed during the current study are not publicly available, but are available from the corresponding author on reasonable request.

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treatment (n = 36) and control (n = 36) groups in accordance with the different treatments they received. All the patients in the treatment group received FICB plus parecoxib, whereas all the patients in the control group received parecoxib alone. The ethics of the study were waived because we only collected and analyzed the data of patient records. All patients, researchers, and data analysts were not blinded because it was a retrospective study.

2.3. Patients

We collected data from eligible patient records if they met the following criteria: diagnosis of osteoarthritis; underwent primary unilateral THA; aged 65 to 85 years old; and American Society of Anesthesiologists score of I-III. However, patients were excluded if they fulfilled the following criteria: allergy to local anesthetics; history of coagulopathy or chronic opioid dependency; severe or critical organ diseases, such as cancers; administration of study medication at 1 month before this study; any contraindication to the administration of the study treatments during the study period; insufficient patient information; and written informed consent was not provided.

2.4. Treatment approach

All 72 patients in both groups received parecoxib (40 mg) dissolved in 100 mL normal saline intravenously 30 minutes before and after skin incision. Thereafter, every 12 hours for 72 hours after surgery.

Patients in the treatment group also received FICB. It was conducted under ultrasound guidance by an anesthesiologist as a single injection within 30 minutes of THA. With the help of ultrasound guidance, the iliopsoas, iliac fascia, and fascia lata were detected, and 40 mg of 0.2% ropivacaine was injected into the iliac fascia using a Stimuplex A 4-inch long, 21G insulated needle.

2.5. Outcome measurements

The primary outcome was pain intensity measured using a resting and moving visual analog scales (VASs).[23] It ranges from 0 (no pain) to 10 (worst pain), with a higher score indicating worse pain intensity.[23] The resting and moving VAS scales were collected and analyzed at 12, 24, 36, and 72 hours after surgery.

Secondary outcomes included inflammatory factors and occurrence rate of adverse events. Inflammatory factors consist of interleukin 6 (IL-6) and C-reactive protein (CRP). Venous blood samples (5 mL) were collected from each patient before surgery and 72-hour postoperatively. The data were analyzed using commercial enzyme-linked immunosorbent assay kits for serum IL-6 and CRP levels. In addition, we analyzed the data on the occurrence rate of adverse events (such as nausea, vomiting, pruritus, and dyspepsia).

2.6. Statistical analysis

All data were analyzed using SAS package (version 9.1; SAS Institute Inc., Cary, NC). Continuous data were analyzed the 2-sided *t* test or Mann–Whitney *U* test. Categorical data were analyzed using the Chi-square test or Fisher's exact test. A 2-side value of $P < .05$ was set as having a statistical significance.

3. Results

The general characteristics and demographics of the patients are summarized in Table 1. There were no significant differences in age, sex, race, body mass index, or American Society of Anesthesiologists between the 2 groups (Table 1).

There were significant differences between the 2 groups at different time points in resting VAS scores (12 hours, $P < .01$; 24 hours, $P < .01$; 36 hours, $P = .01$; 72 hours, $P = .03$; Table 2) and moving VAS scores (12 hours, $P < .01$; 24 hours, $P < .01$; 36 hours, $P = .02$; 72 hours, $P = .02$; Table 3) after surgery.

Regarding the inflammatory factors, there were no significant differences before surgery in serum IL-6 ($P = .35$; Table 4) and CRP ($P = .64$; Table 4) between the 2 groups. However, there were significant differences after surgery in the serum IL-6 ($P < .01$; Table 4) and CRP ($P < .01$; Table 4) levels between the 2 groups.

As for adverse events, there were no significant differences in occurrence rate of adverse events (sedation, $P = .47$; nausea/vomiting, $P = .59$; pruritus, $P = .76$; dyspepsia, $P = .50$; headache, $P = .65$; hypotension, $P = .49$; Table 5) between the 2 groups.

4. Discussion

Pain control is a difficult issue that affects elderly patients after THA. Several analgesic modalities, such as parecoxib and FICB, have been reported to help patients recover from surgery and decrease pain intensity. Although previous studies have reported the effects of parecoxib and FICB on pain control after THA, no study has investigated the effects of parecoxib combined with FICB on pain management in elderly patients after THA.

In this study, we explored the effects of FICB as an adjunctive therapy to parecoxib on pain control after THA. The results showed that patients in the treatment group had more promising outcomes in terms of resting VAS, moving VAS, and inflammatory factors (IL-6 and CRP) than those in the control group. This suggests that parecoxib combined FICB may be more effective than parecoxib alone.

In addition, no significant differences were identified in the occurrence of adverse events, such as sedation, nausea/vomiting, pruritus, dyspepsia, headache, and hypotension, between the 2 groups. This indicated that the patients in both groups had similar safety profiles.

This study had several limitations. First, it had a limited sample size, which may have affected the results. Second, all patient record data were collected from a single center at The Second Affiliated Hospital of Inner Mongolia Medical University. Third, this study

Table 1

Patient general characteristics and demographics.

Characteristics	Treatment group (n = 36)	Control group (n = 36)	*P*
Age (year)	73.4 (4.2)	75.0 (3.8)	.09
Gender			
Males	15 (41.7)	17 (47.2)	.64
Females	21 (58.3)	19 (52.8)	-
Race (Chinese Han)	36 (100.0)	36 (100.0)	-
BMI (kg/m^2)	23.3 (2.6)	22.9 (3.1)	.55
ASA, n (%)			
I	6 (16.7)	8 (22.2)	.55
II	18 (50.0)	17 (47.2)	.81
III	12 (33.3)	11 (30.6)	.80

Data are presented as mean ± standard deviation or number (%).
ASA = American Society of Anesthesiologists; BMI = body mass index.

Table 2

Comparison of postoperative pain intensity by resting VAS.

Resting VAS	Treatment group (n = 36)	Control group (n = 36)	*P*
12 h	3.5 (0.9)	4.3 (1.1)	<.01
24 h	4.7 (1.4)	6.0 (1.7)	<.01
36 h	3.8 (1.2)	4.6 (1.5)	.01
72 h	3.3 (1.5)	4.0 (1.3)	.03

Data are presented as mean (range).
VAS = visual analog scale.

Table 3

Comparison of postoperative pain intensity by moving VAS.

Moving VAS	Treatment group (n = 36)	Control group (n = 36)	*P*
12 h	3.6 (1.1)	4.4 (1.3)	<.01
24 h	5.7 (1.5)	6.9 (1.9)	<.01
36 h	4.2 (1.4)	5.0 (1.6)	.02
72 h	3.9 (1.3)	4.7 (1.5)	.02

Data are presented as mean (range).
VAS = visual analog scale.

Table 4

Comparison of inflammatory factors between the 2 groups.

Inflammatory factors	Treatment group (n = 36)	Control group (n = 36)	*P*
Before surgery			
IL-6 (pg/mL)	88.1 (3.3)	87.4 (3.0)	.35
CRP (mg/L)	7.7 (0.8)	7.8 (1.0)	.64
72 h after surgery			
IL-6 (pg/mL)	126.5 (10.7)	180.9 (11.4)	<.01
CRP (mg/L)	26.8 (2.0)	37.3 (2.3)	<.01

Data are presented as mean (range).
CRP = C-reactive protein; IL-6 = interleukin 6.

Table 5

Incidence of adverse events.

Adverse events	Treatment group (n = 36)	Control group (n = 36)	*P*
Sedation	24 (66.7)	21 (58.3)	.47
Nausea/vomiting	8 (22.2)	10 (27.8)	.59
Pruritus	7 (19.4)	6 (16.7)	.76
Dyspepsia	6 (16.7)	4 (11.1)	.50
Headache	3 (8.3)	2 (5.6)	.65
Hypotension	1 (2.8)	0 (0)	.49

Data are presented as number (%).

had an intrinsic limitation because it was a natural drawback of this retrospective study. Fourth, this study did not explore the long-term effects of parecoxib alone or FICB as an adjunctive therapy to parecoxib on pain control after THA. Finally, this study did not utilize blindings to the patients, researchers, and data analysts, because we collected and analyzed these data from patient case records. Therefore, these findings warrant future studies.

5. Conclusion

The findings of the present study found that FICB as an adjunctive therapy to parecoxib may be superior to parecoxib alone for pain control after THA. Further studies are needed to confirm the current findings.

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Author contributions

Response: The author contribution section is as follows:
Conceptualization: Xiao-yan Li.
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Investigation: Yi Qiu.
Methodology: Liang Zhang.
Supervision: Yi Qiu.
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