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The effect of ultrasound-guided dexamethasone compound ropivacaine iliofascia space space block on pain caused by lumbar anesthesia in patients with total hip replacement

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Abstract:	Objective: To evaluate the effect of dexamethasone combined with ropivacaine in reducing lateral side pain in patients undergoing total hip arthroplasty. Methods: A total of 120 patients aged 45-75, undergoing unilateral total hip replacement, were randomly divided into four groups (n=30 each). Group A received 5 μg of sufentanil before lumbar anesthesia. Group B received ropivacaine and saline, Group C received dexmedetomidine and ropivacaine, and Group D received dexamethasone and ropivacaine. Vital signs, including heart rate (HR), mean arterial pressure (MAP), and pain visual analogue score (VAS), were recorded at multiple time points (T0-T3). Intraoperative and postoperative outcomes, including anesthesia satisfaction, adverse reactions, and postoperative analgesia use, were also documented. Results: No significant differences were observed in baseline characteristics ($P > 0.05$). Group D showed smaller fluctuations in HR and MAP 10 minutes after dosing (T2) compared to the other groups ($P < 0.05$). VAS scores in Group D were significantly lower than in Groups A, B, and C at T1-T3 ($P < 0.05$). Groups C and D required significantly fewer presses of the postoperative analgesia pump than Groups A and B ($P < 0.05$). The incidence of hypotension, bradycardia, and nausea was not significantly different across groups ($P > 0.05$). Conclusion: Ultrasound-guided dexamethasone combined with ropivacaine significantly reduces pain during total hip arthroplasty, stabilizes hemodynamics, enhances patient comfort and anesthesia satisfaction, and reduces opioid use. It is superior for postoperative rehabilitation and clinical application.

The effect of ultrasound-guided dexamethasone compound ropivacaine iliofascia space space block on pain caused by lumbar anesthesia in patients with total hip replacement

Abstract: Objective To observe the effect of dexamethasone complex ropivacaine on reducing lateral side pain in patients undergoing total hip arthroplasty. **Methods** 120 patients aged 45 to 75 years who were proposed to undergo unilateral total hip replacement, ASA ~ grade, and $L_{2\text{-}3}$Gap for puncture. The 120 patients were randomly divided into four groups of 30 each. In group A, 5 μ g sufentanyl injection was injected before lumbar anesthesia; in the other three groups; in group 1, ropivacaine and saline in group B; dexmedetomidine combined with ropivacaine in group C; dexamethasone plus ropivacaine in group D. After entering the operating room, electrocardiogram and pulse oxygen saturation were routinely monitored (SpO_2), Invasive mean arterial pressure (MAP), heart rate (HR), and pain visual analogue score (VAS). Monitoring and recorded into the operating room (T_0), The iliac fascia lacuna block or vein, 5min after administration (T_1), 10min after iliac fascia space block (T_2), 15min after iliac fasspace block (T_3, When SA changes the body position) of HR, SpO_2, MAP, and VAS score values. The operation duration, anesthesia operation duration, intraoperative bleeding volume, patient anesthesia satisfaction, adverse reactions of hypotension, bradycardia, chills and nausea and vomiting, and the number of postoperative intravenous analgesia pump dosage presses were recorded. **Results** Sex, age, height, weight, and bleeding conditions (P> 0.05).(1) Comparison of the hemodynamic changes between the groups: in T_2The fluctuations in heart rate and arterial blood pressure in group D (10min after dose) were smaller than those of the other three groups, with statistically significant differences (P <0.05); in T_3The arterial blood pressure and heart rate fluctuations in groups B, C and D were smaller than those in group A, with A statistically significant difference (P <0.05).(2) Comparison of VAS scores: change within ①group: four groups of patients, T_2、T_3Time points with T_0Significant changes in VAS scores were statistically significant (P <0.05); where D group T_1Time point VAS score with T_0Comparison, statistically significant (P <0.05); change between ②groups: Group D compared to groups A, B and C in T_1The changes in VAS scores were statistically different (P <0.05); compared with group A, groups B and C were in T_1The difference in VAS score change at time points was not statistically significant (P> 0.05); in T_2、T_3VAS scores, but in groups B, C and D, were statistically lower (P <0.05); (3) Comparison of intraoperative complications: the incidence of hypotension, bradycardia, nausea and vomiting, and local anesthetic poisoning (P> 0.05). In groups C and D, the number of postoperative analgesic pump dosage presses was significantly less than that in groups A and B, with a significant difference (P <0.05). **Conclusion** Ultrasound-guided dexamethasone compound ropivacaine iliac cia space block can significantly reduce the pain caused by lateral lumbar anesthesia in total hip replacement surgery, and facilitate the hemodynamic stability of patient, better patient comfort and higher satisfaction with anesthesia. Combined dexmedetomidine and dexamethasone had better postoperative analgesia and less opioid use in the analgesic pump. Compared with the dexamethasone compound ropivacaine group, the nerve block was faster and patients were more satisfied with anesthesia, which was conducive to postoperative rehabilitation and worthy of clinical promotion and application.

Keywords: dexamethasone; iliac fasspace block; total hip replacement; lumbar anesthesia; ultrasound guidance

With the aging of China's population, coupled with people's living habits, dietary structure changes and other reasons, more and more patients suffer from hip joint diseases. Due to the increase in the proportion of elderly patients, the condition of patients with hip disease is more complicated, often combined with hypertension, diabetes, coronary heart disease and other basic diseases[1-3]. Total hip replacement (Total hip anthroplasty, THA) is the most representative treatment for end-stage hip disease[4]. Searching for interventions to reduce the perioperative risk has become a clinical focus, and anesthesia and analgesia are an important link[5]. Therefore, safe and effective anesthesia methods and comfortable analgesia measures play an increasingly important role in THA treatment programs, and have a direct impact on the functional recovery of surgical patients and the satisfaction of the surgical effect. Waist anesthesia (Spinal Anesthesia, SA) has gradually become one of the main methods of anesthesia for hip replacement surgery because of its rapid effect, accurate anesthesia effect and good muscle relaxation[6-8]. The duration of SA anesthesia is not long, which has certain postoperative analgesic effect, which is conducive to early functional exercise and promote rapid rehabilitation[9-10]. However, the pain caused by the change of patient body position (i. e., from supine to lateral position) during SA operation is unbearable for most patients, and the severe pain has a great impact on the hemodynamics of patients. Therefore, the pain of SA operation body position change brings many difficulties to safe and comfortable anesthesia[11]. In recent years, there have been reports of acute pain in patients with hip injury, FICB analgesia in emergency department, and good analgesic effect[12]. The anatomical iliofascia space is the potential space between the iliofascia and the outer membrane of the iliopsoas muscle, which is the iliac fascia in front and the iliac muscles in the pelvis in the back. The beginning of the femoral nerve, obturator nerve and the beginning of the lateral femoral cutaneous nerve were walked behind the iliac fascia. Therefore, successful FICB can block the femoral nerve, obturator nerve and the femoral lateral cutaneous nerve, thus achieving the analgesic effect of blocking the innervated area[13]. FICB injected the anesthetic drugs into the fascia but not directly to avoid the femoral nerve and its surrounding blood vessels to reduce the risk of nerve and blood vessels. It can simultaneously block the femoral nerve, obturator nerve and lateral femoral skin nerve in the fascia layer, which is safe and has better analgesic effect than the femoral nerve block alone. Ropivacaine is used clinically in several ways for postoperative analgesia[15]. It was found that the use of 0.2% to 0.5% ropivacaine in the peripheral nerve block was more effective[16]。Shariat[17]Using 30 ml volume of ropivacaine at a concentration of 0.375%, et al gave ultrasound-guided FICB to patients undergoing THA surgery, with good postoperative analgesia. Several studies have shown that dexamethasone can enhance the analgesic effect of local anesthetic and prolong the analgesic time[18-22]. In recent years, some scholars used dexamethasone as an adjuvant for brachial plexus block, and observed that it could significantly shorten the onset time of local anesthetic[23]. At present, the mechanism is not clear, and the possible mechanism is: dexamethasone, as an exogenous glucocorticoid, can increase the sensitivity of local blood vessels to catecholamines, thereby increasing the tension of blood vessels; and dexamethasone may strengthen the combination of local anesthetic and neuroaxon, so as to enhance and prolong the effect of nerve block time[24]. This study observed the clinical analgesic effect of dexamethasone complex ropivacaine in FICB and compared it with ropivacaine alone and dexmedetomidine complex

ropivacaine, aiming to provide theoretical and data support for the choice of hip postoperative analgesia options.

1. Data and methods

1.1 Study subjects

General Information

The study was approved by the Ethics Committee of Guilin Medical College, and the informed consent was signed with the patient or family members before the start of the study. In this study, 120 patients with unilateral hip replacement were selected and divided into four groups: A, B, C and D, with 30 patients in each group.

Inclusion criteria

(1) ASA ~ level;

(2) Age: 45~75 years old;

(3) Patients with unilateral total hip replacement;

(4) Sign the informed consent form.

Exclusion criteria

(1) Patients with obvious bleeding tendency or blood coagulation disorder;

(2) The puncture site infection;

(3) Severe symptoms of systemic infection;

(4) History of allergy to local anesthetic;

(5) History of trauma and surgery at the puncture site;

(6) Long-term history of taking psychotropic drugs;

(7) Mental development disorders or mental abnormalities can not cooperate.

Elimination criteria

(1) Patients who change to general anesthesia due to difficulty in puncture of lumbar anesthesia or poor anesthesia effect;

(2) Failure of fasiliac block for various reasons.

1.2 Drugs, materials and equipment

Main drugs

The names, specifications, registration numbers and manufacturers of the major drugs used in this study are shown in Table 1-1

Table 1-1, Major medicinal products

Materials and instruments and equipment

The names and manufacturers of the main materials and instruments used in this study are shown in Table 1-2 below

Table 1-2: Main materials and instruments

1.3 Experimental method

Group grouping method

Using the random number table method, 120 patients were randomly divided into four groups A, B, C, and D, with 30 patients in each group. In group A, sufentanyl was given intravenously before lumbar anesthesia; in groups B, C, and D performed the ultrasound block before lumbar anesthesia.

Group A: 5 ug of intravenous sufentanyl injection before lumbar anesthesia;

Group B iliofascia space block combination drug: 15ml0.75% ropivacaine mixed with 15ml of normal saline into 0.375% ropivacaine mixture 30 ml;

Group C iliofascia space block combination: 15ml0.75% ropivacaine + 0.5 μ g / kg dexmedetomidine 15ml saline mixed into 0.375% ropivacaine dexromedetomidine mixture 30 m l;

Group D iliofascia space block: 15ml of 0.75% ropivacaine + 5mg dexamethasone 15 ml of normal saline into 0.30 m l of 0.375% ropivacaine dexamethasone mixture.

Anesthesia method

According to the anesthesia routine, the patient reached the preoperative fasting and drinking time. After entering the operating room, the nurse was instructed to open the venous channel and nasal catheter for oxygen, and routinely performed electrocardiogram, blood pressure, heart rate, respiratory rate and blood oxygen saturation (SpO_2) guardianship. Under local infiltration anesthesia, the radial artery catheterization was uniformly selected to

establish invasive artery monitoring. Patients in Group A underwent lumbar anesthesia after intravenous injection of 5 μ sufentanil for analgesia; patients in Group B, C and D were given the FICB before a single SA.

the ultrasound-guided operation method of FICB

The patient lay supine and routinely sterilized. Using a portable color two-dimensional ultrasound instrument, high-frequency line array probe. The probe was positioned in the sagittal plane beside the inguinal ligament, found the iliopsoas muscle and femoral artery, moved the probe laterally, and adjusted the ultrasound probe to obtain the best position. Use one-use injection needle (0.750mm), to observe the tip position and enter the needle layer by layer. When the tip reached the iliac fascia space and had no gas or blood, a small amount of normal saline was injected to observe its diffusion. If the saline spreads well in the iliofascia space, inject 30ml of the previously prepared drug into the iliofascia space. The iliac fascia space was expanded by injecting large volume fluid, then rotate the probe to the transverse position to find the femoral and femoral nerves, and observe the local anesthetic along the femoral artery and the diffusion in the fascia space. Ultrultrasound is shown in Figures 1 – 1 and 1 – 2.

Fig.1-1 ultrasonic imaging of iliac fascia cavity 1. femoral artery; 2. iliac fascia; 3. iliopsoas muscle

Figure 1-2 Successful imaging of iliac block 4. puncture needle tip; 5. medicinal solution

1.4 Observing indicators

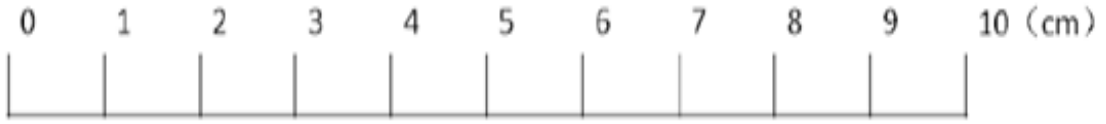
Record the general condition of patients: age, height, weight and gender. The duration of anesthesia operation, operation duration were recorded and the blood loss was counted.

Monitoring and recording of all patients when admitted to the operating room (T_0) HR, MAP, and SpO during movement and at rest$_2$, VAS score, 5min after the end of intravenous sufentanil or FICB injection (T_1), 10min after administration (T_2), 15min after drug administration (T_3) Of HR, MAP, and SpO_2, VAS price.

Observe the intraoperative adverse reactions and the number of postoperative analgesic pump dosage presses: including bradycardia, hypotension, respiratory depression (RR less than 12 times / min), local anesthetic poisoning, nausea and vomiting, chills, and low oxygen (SpO_2<90%) and other occurrence of adverse reactions.

The VAS pain score scale has 10 scales, 0 for the absence of any pain, and 10 for

intolerable severe pain.3 points below: represents the patient, with mild pain, tolerable.4~6, the patient has significant pain and affects the quality of sleep, but can tolerate it.7~10, the patient appears strong pain affects sleep quality and appetite, unbearable. The VAS scoring scale is shown in the following figure.



Scale bar graph of the VAS score

1.5 Statistical Methods

In this study, SPSS 23.0 was used for statistical data processing, measurement data were expressed as mean ± standard deviation (± S), one-way analysis of variance was used for intra-group and intergroup comparisons, and P <0.05 was considered statistically significant.

2 Results

2.1 Comparison of general data

The present clinical observation data are divided into four groups. The ASA grade, gender, age, height, weight, anesthesia operation time, operation time, and bleeding volume were not significantly different in the four groups (P> 0.05). See Table 2-1 for further details.

Table 2-1 ASA grade, gender, age, height, weight anesthesia time, time at surgery, intraoperative, bleeding volume of the four groups (± s)

2.2 Comparison of hemodynamic changes: Comparison within Group ①: within Group D, T_1Time snack rate, mean arterial pressure and T_0Compared, the difference was significant and statistically significant (P <0.05); within three groups B, C and D, T_2、T_3Time snack rate, mean arterial pressure and T_0In contrast, the difference was significant and statistically significant (P <0.05).②Comparison between groups: in the T_1Time point D, heart rate and mean arterial pressure were statistically significant (P <0.05); in T_2、T_3Groups B, C and D compared with Group A showed statistically significant fluctuations (P <0.05); almost no difference in oxygen saturation; as shown in Table 2-2.

Table 2-2 Comparison of Vital signs at four time points (± s)

2.3 Comparison of VAS scores: ①Within-group comparison: with T_0Time point comparison, T within three groups B, C and D_2、T_3Time point VAS, significant change in score, statistically significant difference (P <0.05); and T_0Time-point comparison, D group T_1Time point VAS, statistically significant change (P <0.05); change between ②groups: Group D in T compared to Group A_1The VAS scores were statistically significant (P <0.05); compared with group A, in T_1No difference in VAS scores between time points B and C, not significant (P> 0.05); compared with group A, in T_2、T_3VAS scores in groups B, C, and D were statistically significant (P <0.05); detailed in Table 2-3.

Table 2-3 Comparison of Differential VAS scores at four time points (± s)

2.4 Comparison of adverse anesthesia reactions and the number of postoperative analgesic pump presses

None of the four groups had adverse anesthetic reactions, and there was no significant difference between the four groups (P> 0.05). Groups C and D and Group B were statistically different (P <0.05), and significantly from Groups B, C and D (P <0.05); as shown in Table 2-4 for details.

Table 2-4 Comparison of number of analgesic pumps in four Groups (± s)

3 Discussion

In recent years, with the popularization of ERAS concept in the surgical system, surgery has paid more and more attention to reducing surgery-related complications, shorten hospital stay and reduce medical costs, and perioperative pain management is an important part of accelerating rehabilitation surgery. At present, the use of opioid analgesia is the main way of perioperative analgesia, but its related side effects and adverse reactions are also very obvious, which brings a lot of trouble for patients' rapid rehabilitation and comfort experience. Multimodal analgesia can significantly reduce the use of perioperative opioids, mainly including regional nerve block, intravenous analgesia, intraspinal analgesia, local infiltration anesthesia, etc. As an important means of multimodal analgesia, regional nerve block is more and more favored by anesthesia and surgeons because of its simple and safe operation, few adverse effects and definite analgesic effect.

3.1 Application of regional nerve block in total hip replacement

At present, peripheral nerve block is lumbar plexus block, femoral nerve block, FICB, hip capsule peripheral nerve block, etc. Lumbar plexus nerve block although can block including femoral nerve, obturator nerve, femoral lateral cutaneous nerve, all branches of the lumbar plexus, can provide better analgesia after total hip, but the lumbar plexus position is deep, ultrasound guide lower lumbar plexus block operation is more complex, if the operator inexperienced or not skilled, have the possibility of piercing intestines, kidney and even large

vessels, and has the possibility of bilateral block[24], There are even case reports of total spinal anesthesia[25], Security still needs to be further improved. In addition, the lumbar plexus block requires the patient to lie in the lateral position, without avoiding pain during the pendulum position. Therefore, although lumbar plexus block can provide precise postoperative analgesia, it does not provide good analgesia in the anterior lateral position of lumbar anesthesia in patients with THA. Studies have shown that the femoral nerve block can effectively relieve the pain of patients with hip fracture, and can effectively reduce the pain caused by patients when changing their position[26]; However, due to the limitation of the femoral nerve in the sensory area of the hip, blocking the femoral nerve can only relieve some pain in patients with hip fracture, and the limited duration of a single block is unable to control the effects of inflammatory mediators[27], Therefore, other analgesics are needed to make up for the lack of femoral nerve analgesia. Femoral nerve, obturator nerve joint branches and other lines walk through the hip capsule, so the hip capsule peripheral nerve block can provide good analgesia[28], However, simple hip capsule block can not block the lateral femoral cutaneous nerve, so a single ultrasound guided hip capsule peripheral nerve block can effectively relieve the pain of patients with hip replacement, but still some patients can not obtain satisfactory analgesia, there are some limitations. FICB injects local anesthetic in the space between the iliac fascia and iliac muscle, which can block the femoral nerve, obturator nerve and lateral femoral cutaneous nerve; Zou Lu et al[29]Preoperative anesthesia with ultrasound-guided FICB in 40 elderly patients with hip fracture showed that ultrasound-guided FICB could provide well-established perioperative analgesia, which is consistent with the results of this study. The space of the iliofascia fascia is shallow, and there are no important organs and large vessels around. FICB can clearly distinguish the nerves and blood vessels in the iliofascia space, and the diffusion of the liquid can be observed under ultrasound, indicating that the ultrasound guided FICB has good analgesic effect and high safety.

3.2 Clinical application and advantages of ultrasound-guided FICB

The FICB of traditional FICB mainly judges whether to reach the iliac fascia space space through "breakthrough feeling" or "disappointed feeling". The success rate of puncture is related to the operation of anesthesiologists, and blind wear is easy to damage nerves and blood vessels, and the success rate is low. Therefore, although the traditional method is simple and easy to learn, it has a certain failure rate[30]。

In this study, the fascia iliac space block used the ultrasound-guided single administration method. With the support of ultrasound visualization technology, the nerve block was descending, the puncture needle could be positioned under direct vision, and the successful puncture was judged by observing the diffusion of the liquid, which ensured the reliability of the selected patients' FICB[31]. Some studies have confirmed that ultrasound-guided FICB in THA patients has a high success rate and definite analgesia, which is related to the improvement of puncture accuracy by ultrasound guidance[32]。

In this study, the postoperative follow-up of the four groups, the analgesic pump presses in group B were less than group A, and the analgesia pumps in groups C and D were significantly less than group A and B, which was statistically significant. It can be inferred that ultrasound-guided FICB for THA can significantly reduce the dosage of opioids, and that

dexamethasone and dexmedetomidine as adjuvants for FICB could further reduce the dosage of opioid analgesics. Studies have shown that regional nerve block analgesia can significantly reduce the amount of opiids, thus reducing the adverse effects of opioid analgesia and increasing the perioperative safety of patients[33], This was also confirmed by patients using FICB in this study using less opioids for postoperative analgesia.

3.3 Advantages of dexamethasone compound ropivacaine for FICB

This study was documented in the T_1(5min after administration) Hemodynamics and VAS scores of the four patients at the time point, and found that the HR, MAP fluctuation and VAS scores in Group D were significantly lower than groups A, B and C, and the difference was statistically significant; the results showed that dexamethasone compound ropivacaine for FICB could significantly shorten the onset time of local anesthesia, to reduce THA and the pain caused by patients undergoing SA transformation, and maintain the hemodynamically stable; By comparison of this study, it was found that in T_3The VAS score (during lumbar anesthesia change) in the D group was lower than that of the remaining three groups, proving that dexamethasone compound ropivacaine enhanced the analgesic intensity of FICB and further improved the anesthesia comfort of patients. A more recent Meta-analysis[34]Showed that ropivacaine combined with dexamethasone shortened the onset and prolonged the analgesic effect compared with dexmedetomidine, as demonstrated by the results of this study. In this study, by comparing the T_2The VAS score of patients at time point found that groups C and D were lower than groups A and B, which concluded that dexamethasone or dexmedetomidine compound ropivacaine applied to FICB had faster onset time and greater analgesic intensity than ropivacaine alone;

3.4 Limitations of this study

This study also has its own shortcomings. First, this study is a single-center study with a short study period and a small number of samples, so we hoped that more cases can be collected later. Secondly, this study focuses on how to quickly, safely and effectively reduce the pain in the process of lumbar anesthesia, and observe the amount of postoperative opioid analgesic drugs used. Although it was confirmed that FICB can provide good postoperative analgesia, detailed postoperative follow-up and recording of postoperative analgesia were not performed in all patients, and it is impossible to confirm which drug provides longer analgesia in patients undergoing ultrasound-guided FICB. Finally, due to the limitations of clinical conditions, this study did not detect the content of catecholamine and cortisol in the blood of patients at each time point, which cannot directly reflect the stress status of patients in the perioperative period.

4 Conclusion

Ultrasound-guided dexamethasone combined with ropivacaine iliofascial space block for total hip replacement surgery faster, can reduce THA faster, pain caused by SA change, maintain the patient, hemodynamic stability. In addition, the postoperative analgesic effect is good, the opioids are used less in the analgesic pump, and the anesthesia satisfaction of

patients is higher, which is conducive to the rapid postoperative recovery of patients, and is worthy of clinical promotion and application.

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Figure

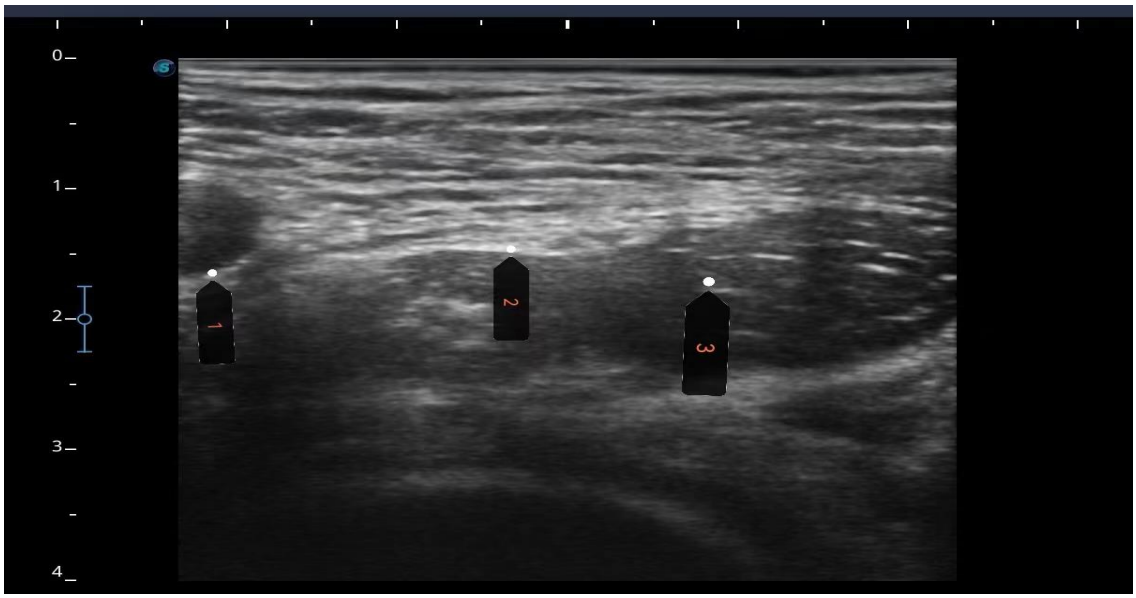

Fig.1-1 ultrasonic imaging of iliac fascia cavity 1. femoral artery; 2. iliac fascia; 3. iliopsoas muscle

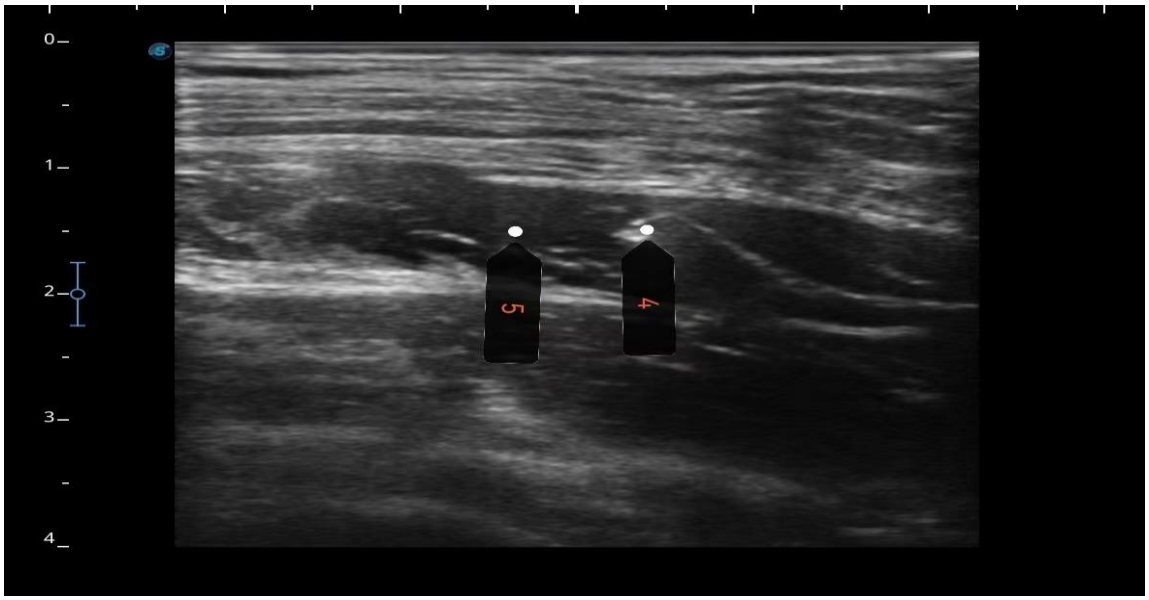

Figure 1-2 Successful imaging of iliac block 4. puncture needle tip; 5. medicinal solution

Tables

Table 1-1, Major medicinal products

Drug name	specifications	Registration certificate number	manufacturer
Dexamethasone sodium phosphate injection	1ml:5g	H41020036	Sinopharm Group Rongsheng Pharmaceutical Co., LTD
Ropivacaine hydrochloride solution for injection	10ml:75mg	H20140764	AstraZeneca Company, Sweden
0.9% saline	100ml:0.9g	H20013310	Chenxin Pharmaceutical Co., Ltd
Dexmedetomidine injection	2ml:0.2mg	H 20183219	Yangzijiang Pharmaceutical Group Co., LTD

Table 1-2: Main materials and instruments

Name of the materials, instruments and equipment	manufacturer
ECG monitor: Mindray PM-9000	Shenzhen Mindray Biomedical Electronic Co., LTD
Single-use anesthesia needle: 0.750mm	Henan Tuoren Medical Device Group Co., LTD
Single-use anesthesia puncture kit: AS-S	Henan Tuoren Medical Device Group Co., LTD
Portable sonometer	Sonosa Medical Device, Inc

Table 2-1 ASA grade, gender, age, height, weight anesthesia time, time at surgery, intraoperative, bleeding volume of the four groups (± s)

group	A group	B group	C group	D group
ASA(II/III)	11/19	15/15	12/18	12/18
Gender (male / female)	13/17	14/16	12/18	11/19
Age (year)	57.3±13.7	56.6±14.3	58.1±10.2	57.7±12.3
stature (cm)	156.7±18.6	160.6±14.3	16.5±13.5	162.4±14.6
weight (kg)	59.6±12.4	60.5±13.3	63.7±12.5	61.9±14.6
Anesthesia time (min)	16±4.5.8	15.9±5.8	17.2±3.4	17.0±3.6
Time of surgery (min)	95.4±16.5	93.1±18.4	92.3±18.6	94.3±17.2
amount of bleeding (ml)	192.6±13.6	188.8±16.1	183.5±13.7	180.4±16.3

Table 2-2 Comparison of Vital signs at four time points (± s)

vital sign	group	Observation time point			
		T_0	T_1	T_2	T_3
heart rate （bpm）	A group	97.3±5.5	95.2±8.8	96.6±5.5	96.2±7.4
	B group	98.3±5.2	96.9±6.4	72.5±4.1$^{\triangle\blacktriangle}$	71.6±5.4$^{\triangle\blacktriangle}$
	C group	96.5±5.6	95.6±6.6	72.2±3.3$^{\triangle\blacktriangle}$	71.2±5.3$^{\triangle\blacktriangle}$
	D group	97.6±5.6	77.2±3.3$^{\triangle\blacktriangle}$	73.3±3.4$^{\triangle\blacktriangle}$	71.1±4.6$^{\triangle\blacktriangle}$
MABP （mmHg）	A group	103.5±5.3	98.6±7.5	99.5±6.2	100.6±7.2
	B group	101.6±4.2	93.6±7.2$^{\triangle}$	92.6±6.5$^{\triangle\blacktriangle}$	96.8±4.8$^{\triangle}$
	C group	103.2±6.4	91.3±7.6$^{\triangle\blacktriangle}$	90.4±5.8$^{\triangle\blacktriangle}$	93.2±4.3$^{\triangle\blacktriangle}$
	D group	101.5±5.6	87.2±5.6$^{\triangle\blacktriangle}$	87.5±5.3$^{\triangle\blacktriangle}$	88.2±4.5$^{\triangle\blacktriangle}$
Oxygen saturation of the finger pulse （%）	A group	97.2±0.3	97.5±0.5	97.5±0.3	97.4±0.5
	B group	97.2±0.6	97.3±0.3	97.4±0.3	97.6±0.2
	C group	97.4±0.5	97.5±0.7	.597±0.6	.697±0.4
	D group	97.3±0.3	97.7±0.2	97.5±0.4	97.2±0.3

Note: With T_0Time-point comparison,$^{\triangle}$P <0.05; compared with group A,$^{\blacktriangle}$P < 0.05.

Table 2-3 Comparison of Differential VAS scores at four time points (± s)

group	A group	B group	C group	D group
N	30	30	30	30

T_0(tranquillization)	5.83±0.62	5.90±0.71	5.86±0.50	5.72±0.75
T_0(movement)	7.83±0.67	7.95±0.40	7.78±0.57	7.80±0.72
T_1	5.90±0.55	5.87±0.70	$4.97±0.34^{\triangle▲}$	$3.37±0.34^{\triangle▲}$
T_2	5.77±0.56	$5.17±0.53^{\triangle}$	$3.95±0.54^{\triangle▲}$	$2.57±0.34^{\triangle▲}$
T_3	6.35±0.46	$3.95±0.72^{\triangle▲}$	$3.15±0.40^{\triangle▲}$	$2.20±0.32^{\triangle▲}$

Note: With T_0Group comparison,$^{\triangle}P$ <0.05; compared with group A,$^{▲}P$ < 0.05

Table 2-4 Comparison of number of analgesic pumps in four Groups (± s)

group	A group	B group	C group	D group
N	30	30	30	30
Number of analgesic pump presses	15.3±1.0	$8.2±1.5^{▲}$	$5.8±1.4^{\triangle▲}$	$5.4±1.2^{\triangle▲}$

Note: Compared with Group B,$^{\triangle}P$ <0.05; compared with group A,$^{▲}P$ < 0.05

The effect of ultrasound-guided dexamethasone compound ropivacaine iliofascia space space block on pain caused by lumbar anesthesia in patients with total hip replacement

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Manuscript is approved by all authors for publication.

Availability of data and materials
The data and materials of this experiment are available.

Competing interests
No conflict of interest exits in this manuscript.

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Author contributions
Li Aiguo and Peng Lingyun contributed to the conception and design of the study. Zhang Xu oversaw the data collection and analysis. Li Aiguo and Zhang Xu drafted the manuscript. Peng Lingyun provided critical revisions. All authors read and approved the final version of the manuscript for submission.

Figure

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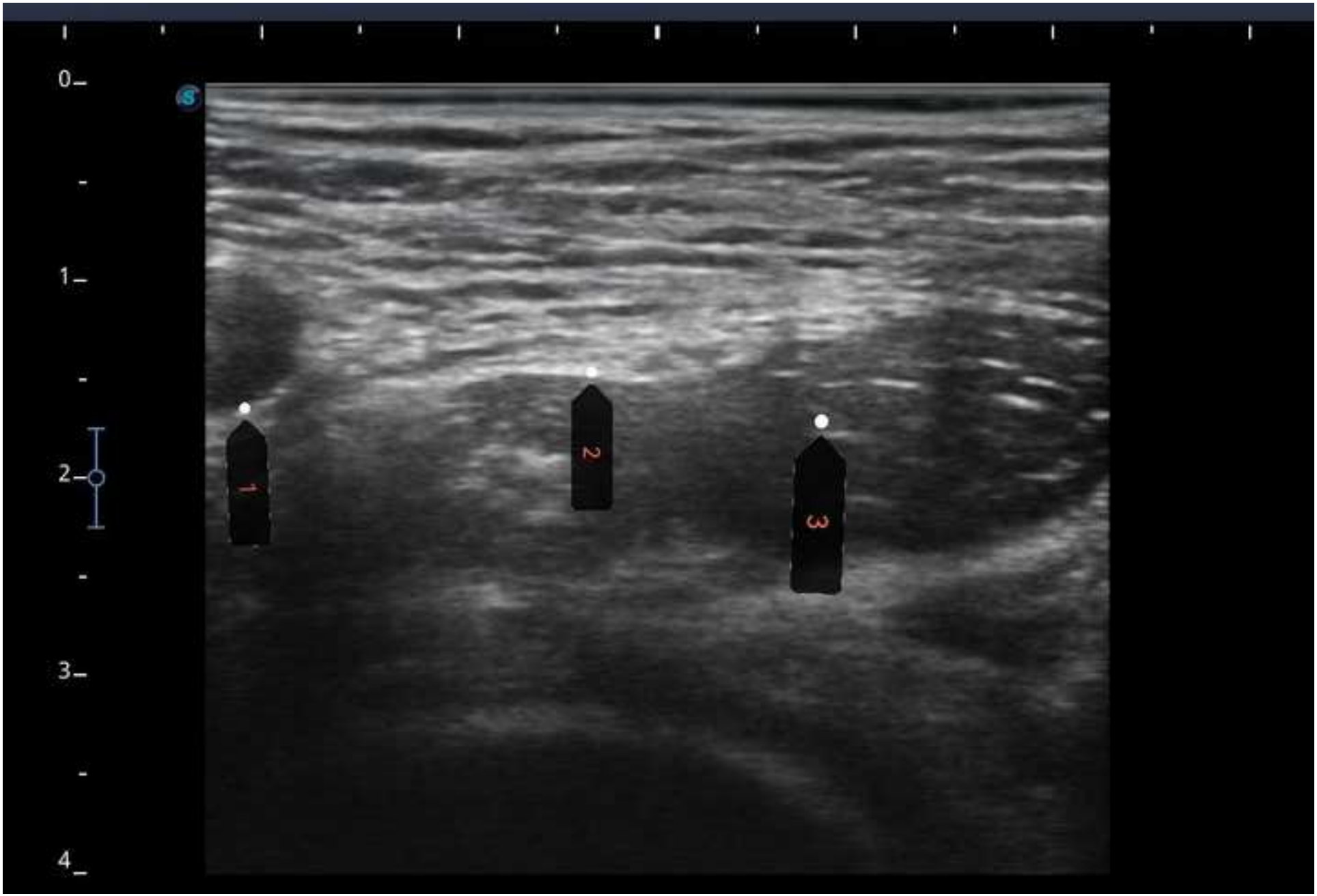

Figure

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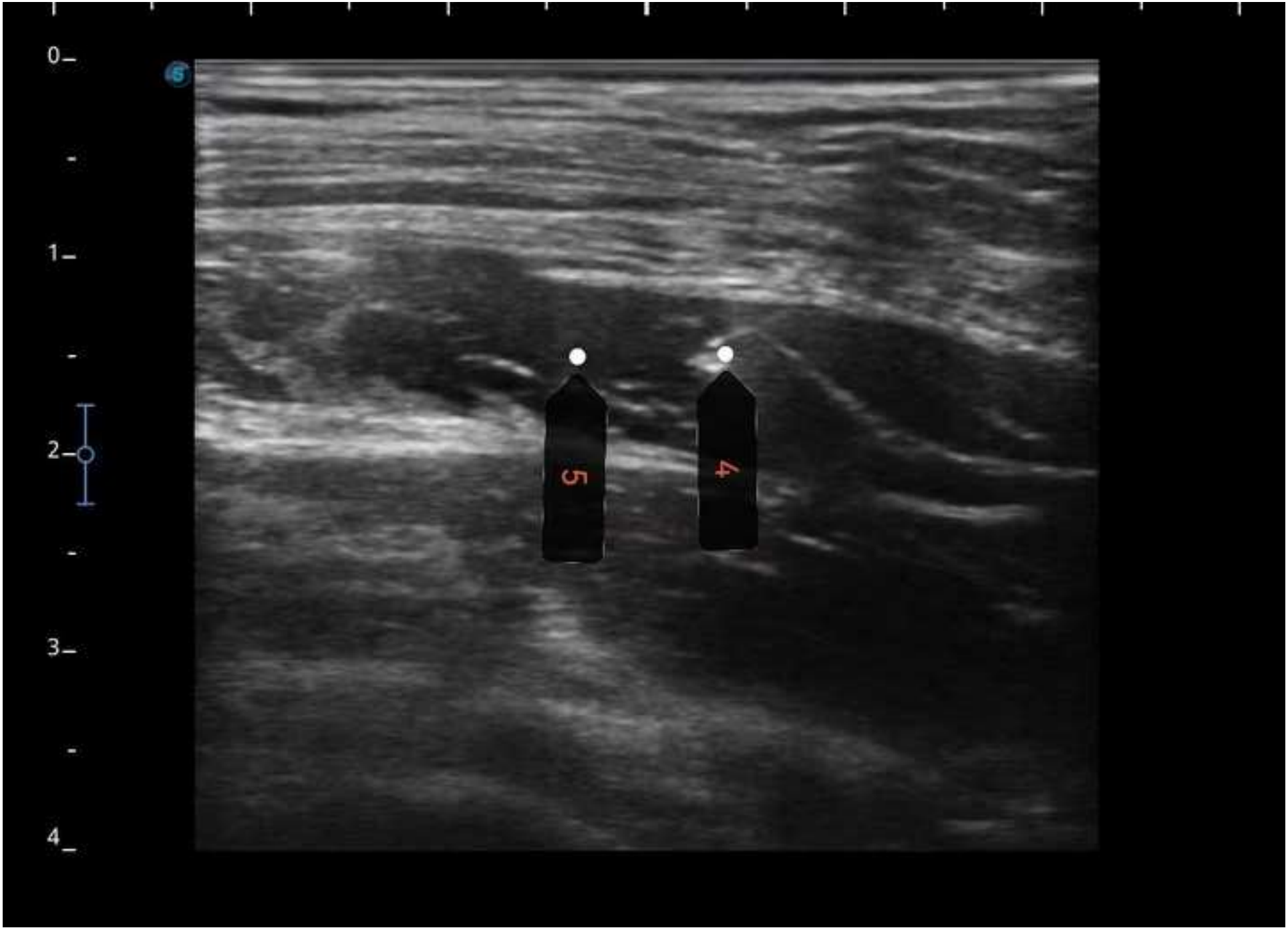

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Note: Compared with Group B,$^{\triangle}P$ <0.05; compared with group A,$^{\blacktriangle}P$ < 0.05