Journal of Clinical and Nursing Research

Research Article

BIO-BYWORD SCIENTIFIC PUBLISHING PTY LTD

Analysis of Ultrasound-guided Ilioinguinal and Iliohypogastric Nerve Block in Tension-Free Inguinal Hernia Repair in Elderly Patients

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Abstract: ***Objective:*** To explore the value of ultrasound-guided ilioinguinal and iliohypogastric nerve block (IINB) in tension-free inguinal hernia repair in elderly patients. ***Methods:*** A total of 70 elderly patients with tension-free inguinal hernia repair who treated in the hospital from April 2018 to November 2019 were selected and divided into two groups according to the random number table method, with 35 cases each. The control group underwent infiltration of local anesthesia(LA), and the study group added with IINB. The visual analogue scale (VAS) scores of the two groups of patients were compared. ***Results:*** The VAS score of the study group when pulling the hernia sac was lower than that of the control group, and the difference was statistically significant (P<0.05). ***Conclusion:*** IINB has good analgesic effect in tension-free inguinal hernia repair in elderly patients, and it is worth promoting.

Keywords: Tension-free hernia repair; Ultrasound guided; Ilioinguinal and iliohypogastric nerve block

Publication date: March, 2020

Publication online: 31 March, 2020

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1 Introduction

Tension-free inguinal hernia repair can effectively treat inguinal hernia. However, operations such as pulling the bowel during the operation can easily cause stress reactions, which causes decreased blood pressure and heart rate in patient, and increase the risk of surgery. Therefore, it is very important to choose an appropriate anesthetic method. Infiltration of local anesthesia (LA) is a commonly used method, which has the advantages of less time, simple operation, and economical price, but its analgesic effect is not good. Ultrasound-guided ilioinguinal and iliohypogastric nerve block (IINB) is widely favoured for its precise operation and high safety[1]. This study aimed to explore the value of IINB in tension-free inguinal hernia repair in elderly patients. Details as follows.

2 Materials and methods

2.1 General information

Seventy elderly male patients with tension-free inguinal hernia repair who treated in the hospital from April 2018 to November 2019 were randomly divided into 2 groups with 35 patients each after being approved by the Medical Ethics Committee. The control group was 66 – 78 years old, with an average (70.58 ± 4.50) years of age; the course of disease was 3 – 18 months, with an average of (6.54 ± 1.25) months. The age of the study group was 67 – 78 years, with an average of (70.60 ± 4.53) years; the course of disease was 4 – 18 months, with an average of (6.60 ± 1.40) months. There was no significant difference in general information between the two groups (P>0.05), and the study was comparable. All patients signed informed consent.

2.2 Method

All patients were monitored for vital signs after entering the operating room. They were placed in supine position, veins of the upper limb were established, and oxygen was taken (oxygen flow 5L/min).

2.2.1 Control group

Before incising the skin, 20 mL of bupivacaine (Wuhu Kangqi Pharmaceutical Co., Ltd., National Medicine Standard H34021983, specification of 5 ml: 25 mg) and 1% of 20 mL lidocaine (Hunan Kelun Pharmaceutical Co., Ltd., National Medicine Standard H20184147, specification of 10 mL: 0.2 g) were used to infiltrate layer by layer at the intended incised area.

2.2.2 Study group

On the basis of the control group, the long axis of the ultrasound probe was placed near the anterior superior iliac spine, and one end of the probe pointed to the umbilical part. The abdominal wall muscle tissue can be seen under ultrasound. The ilioiguinal nerve and iliohypogastric nerve were found between the transverse abdominal muscles and the internal oblique muscles. The ultrasound features are two oval structures with high echo shadow outside and low echo shadow inside. After finding the targeted nerve, sterilize the puncture point, pierce the puncture needle parallel to the long axis of the probe, confirm that there is no blood drawn back, and inject 0.4% of 20 mL ropivacaine (Zhejiang Xianjing Pharmaceutical Co., Ltd., National Medicine Standard H20163207, specification of 10 ml: 20 mg) plus 0.5% of lidocaine. Should the patients in both groups still have pain during the operation, 50 μg of fentanyl can be injected intravenously (Jiangsu Enhua Pharmaceutical Co., Ltd., National Medicine Standard H20113509, specification of 10 mL: 0.5 mg). If the heart rate less than 50 times/min, 0.5 mg of atropine (Jiangsu Langou Pharmaceutical Co., Ltd., National Medicine Standard H32021060, specification of 1 mL: 0.5 mg) can be injected.

2.3 Evaluation Index

The two groups were compared for the degree of pain when incising the skin, suturing the skin, and pulling the hernia sac. The visual analogue scale (VAS)[2] was used for the evaluation. The score was 0 – 10. The higher the score, the more severe the pain.

2.4 Statistical methods

The data was processed using SPSS 22.0 software to represent measurement data, and independent sample *t*-test was used between groups. $P<0.05$ was considered statistically significant.

3 Results

There was no significant difference in VAS scores between the two groups in incised and sutured skins ($P>0.05$). When the hernia sac was pulled, the VAS score of the study group was lower than the control group, and the difference was statistically significant ($P<0.05$). See Table 1.

Table 1. Comparison of VAS scores between two groups of patients ($\bar{x} \pm s$, points)

Groups	When incision of skin	When pulling the hernia sac	When suture of skin
Control group (n=35)	1.30 ± 0.45	4.87 ± 1.24	0.75 ± 0.32
Study group (n=35)	1.25 ± 0.50	2.46 ± 0.58	0.79 ± 0.20
t	0.440	10.415	0.627
P	0.662	0.000	0.533

4 Discussion

The early symptoms of inguinal hernia are not obvious. With the development of the disease, the mass in the inguinal area of the patient will gradually increase, accompanied by pain, which seriously affects the normal life of the patient. Tension-free inguinal hernia repair is the main method for treating inguinal hernia, and the choice of anesthesia method is of great significance for the surgical effect. LA is easy to operate and has a fast onset of effect. It is a commonly used anesthesia method in clinical practice. However, its blocking effect is poor. Patients often have pain due to pulling during the operation, which affects the smooth operation. Therefore, more effective IINB is needed.

The results of this study showed that there was no difference in the VAS scores of the two groups when incising the skin and suturing the skin, but the VAS score of the study group when pulling the hernia sac was lower than that of the control group, indicating that the combination of IINB and LA in elderly patients with tension-free inguinal hernia repair has better analgesic effect. The reason is that the tension-free inguinal hernia repair incision is located in the skin segment dominated by the L1 nerve and T12 nerve. The terminal branch of the ilioinguinal nerve and the cutaneous branch of the iliohypogastric nerve which can innervate the inguinal skin are both L1 nerves. IINB can block nerves under

ultrasound guidance to strengthen the analgesic effect [3]. However, the ilioinguinal and iliohypogastric nerve are often accompanied and dominate the abdominal wall muscles. During IINB implementation, it is necessary to choose the starting point from the above two nerves. However, the ilioinguinal and iliohypogastric nerve belong to the sensory and motor nerves. Should severe pulling occurs, it will still cause pain to the patient. At this time, analgesics should be combined to relieve pain.

Yang *et al*[4] also showed in the study that the anesthetic effect of LA combined with IINB is stronger than that of LA alone, which can effectively reduce the pain of patients when pulling the hernia sac. This can reduce the use of additional local anesthetic drugs, and has higher safety, which is consistent with the results of this study. However, due to the limited number of cases in this study, the results may be biased and require further study.

In summary, IINB has good analgesic effect in tension-free inguinal hernia repair in elderly patients, and it is worth for promotion.

References

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