

**VERTEBRAL CANCELLOUS BONE INFILTRATION ANESTHESIA IN
VERTEBROPLASTY AND RAPID REHABILITATION AFTER OPERATION****Marofe Hossain^{1,2}, Sun Hao^{1,2}, Feng Xinmin^{1,2}, Tao Yuping^{1,2}, Yang Jiandong^{1,2}, Zhong Xiaoli^{1,2} and Wang Yongxiang^{1,2*}**¹Clinical Medical College, Yangzhou University, Yangzhou, 225001, Jiangsu, China.²Department of Orthopedics Surgery, Northern Jiangsu People's Hospital, Yangzhou, 225001, Jiangsu, China.***Corresponding Author: Wang Yongxiang**

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ABSTRACT

Background: To compare the effect of traditional local infiltration anesthesia and local infiltration anesthesia combined with vertebral cancellous bone infiltration anesthesia on pain relief during vertebroplasty. **Methods:** 40 patients with vertebral compression fractures were randomly divided into traditional local infiltration anesthesia group (group A) and local infiltration anesthesia combined with vertebral cancellous bone infiltration anesthesia group (group B). **Results:** There was no significant difference in operation time between the two groups ($P > 0.05$). There were no vascular and nerve injury, respiratory depression, hemodynamic instability, and other adverse reactions during and after the operation. There was no significant difference in the VAS score between the two groups before and after the operation, but the VAS score of group A was higher than that of group B ($P < 0.05$). **Conclusion:** local anesthesia combined with vertebral cancellous bone infiltration anesthesia has a better effect on vertebroplasty.

KEYWORDS: Vertebroplasty; Kyphoplasty; Osteoporosis; Anesthesia.**I. INTRODUCTION**

Percutaneous vertebroplasty (PVP) and percutaneous kyphoplasty (PKP) are the main methods for treating OVCF with the advantages of small trauma, obvious pain relief, significantly improved quality of life, fewer complications, and correction of kyphosis.^[1,2]

Local anesthesia has high safety and few complications, but the pain is obvious during the operation, especially when the puncture channel is established, and bone cement is injected. The main reason is that the traditional local anesthesia only completes the skin and soft tissue infiltration anesthesia and has no noticeable effect on bone tissue.^[3] And once the local anesthetic is absorbed into the blood, it can cause side effects on the central nervous system and circulatory system. Using the least local anesthetic drugs to achieve the best anesthetic effect through the local anesthesia method's improvement is our direction of efforts.

This study will compare the effect of traditional local infiltration anesthesia and local infiltration anesthesia combined with vertebral cancellous bone infiltration anesthesia on pain relief during vertebroplasty.

II. MATERIALS AND METHODS**1. General information**

From June 2019 to May 2019, 40 patients with vertebral compression fractures were enrolled. According to the random number table method, 20 patients were divided into traditional local infiltration anesthesia group (group A), and 20 patients were divided into local infiltration anesthesia combined with vertebral cancellous bone infiltration anesthesia group (group B). Inclusive criteria: 1. Obvious low back pain; 2. New vertebral compression bone confirmed by imaging, with surgical indications. 3. Single vertebral fracture. Exclusion criteria: 1. Skin infection of operation site or infection of other parts. 2. Cannot cooperate with the follow-up researchers. 3. Severe liver, kidney, and heart disease. 4. Other contraindications. The study was approved by the ethics committee of Clinical Medical College of Yangzhou University. All patients signed the consent to join the study.

In group A, there were 8 males and 12 females, aged 55-79 (66.7 ± 10.6) years old, weighing 42-75 (67.8 ± 10.9) kg; vertebral fractures: T10 3 cases, T11 2 cases, T12 4 cases, L1 3 cases, L2 3 cases, L3 3 cases, L4 2 cases. In group B, there were 9 males and 11 females, aged 51-81 (67.5 ± 12.6) years old and weighing 44-76 (63.1 ± 9.3). vertebral fractures: T10 3 cases, T11 1 case, T12 4 cases, L1 4 cases, L2 3 cases, L3 3 cases, L4 2 cases. Gender of

2 groups ($\chi^2 = 0.22$, $P = 0.61$), age ($t = 1.98$, $P = 0.77$), body weight ($t = 1.24$, $P = 0.11$) and fracture segment ($\chi^2 = 0.13$, $P = 0.58$) between the two groups ($P > 0.05$). (Table 1)

Table 1.

	A	B	t / χ^2	P
Years	66.7 ± 10.6	67.5 ± 12.6	t = 1.98	0.77
Sex				
Male	8	4	$\chi^2 = 0.22$	0.61
Female	12	11		
Fracture Segment				
T10	3	3	$\chi^2 = 0.13$	0.58
T11	2	1		
T12	4	4		
L1	3	4		
L2	3	3		
L3	3	3		
L4	2	2		

2. Operation mode

(1) Group A: after X-ray fluoroscopy positioning, the subcutaneous tissue, deep fascia, and periosteum were infiltrated into subcutaneous tissue layer by layer after 5 mL 1% lidocaine at the puncture point, and then the periosteum was sealed around the puncture point for routine vertebroplasty.

(2) Group B: the subcutaneous tissue, deep fascia, and periosteum were infiltrated layer by layer after 5mL of 1% lidocaine at the point of needle insertion 5mm small incision was cut with the needle as the center. The puncture needle with cannula was inserted and reached the periosteum. At the puncture point, 1mL of 1% lidocaine was added to strengthen the periosteum anesthesia. Under the X-RAY monitoring, the needle was gradually inserted along the pedicle and penetrated through the bone cortex. After removing the inner core, 1 mL of 1% lidocaine was injected into the pedicle's canceled bone through the puncture needle. The puncture was continued to the front of the vertebral body's posterior edge, and 3 mL of 1% lidocaine was injected into the cancellous bone of the vertebral body. Then the working casing was replaced, and bone cement was injected.

3. Observation index

The operation time, preoperative, intraoperative, and postoperative 2 hours visual pain score (VAS).

Table 2: VAS score.

Group	n	Preoperative	Intraoperative	After 2 hours
A group	20	8.1 ± 1.1	5.4 ± 1.1	1.8 ± 1.2
B group	20	7.8 ± 1.4	4.3 ± 1.2	1.5 ± 1.0
t value		0.64	3.02	0.85
P value		0.53	<0.01	0.40

IV. DISCUSSION

Local anesthesia is a commonly used anesthesia method in clinical practice. It has the advantages of simple, effective, and fast. It is commonly used in superficial surgery and minimally invasive surgery. LIU^[4] and

4. Statistical methods

The data were analyzed by SPSS 16.0 statistical software. The measurement data followed a normal distribution and expressed as mean ± standard deviation ($\bar{x} \pm s$). The comparison between groups was conducted by Student's t test; the count data comparison was conducted by χ^2 test, with $P < 0.05$ as the difference was statistically significant.

III. RESULT

40 operations were completed successfully, the surgical time in group A (38.4 ± 4.9) min and the group B (40.3 ± 5.7) min; There was no significant difference in operation time between the two groups ($P > 0.05$). There were no vascular and nerve injury, respiratory depression, hemodynamic instability, and other adverse reactions during and after the operation.

The difference in VAS scores between the two groups of patients before and after the operation was not statistically significant. The difference in VAS scores in group A was greater than in group B (Table 2).

others believe that in vertebroplasty, local anesthesia can keep the patients awake during the operation, and can better feel the discomfort during the operation. The surgeons can also monitor and adjust the operation process accordingly and detect the nervous system

symptoms to avoid nerve injury. Simultaneously, local anesthesia avoids the potential of sedation and general anesthesia. There are some symptoms. Therefore, most doctors advocate the use of local anesthesia for vertebroplasty.^[5]

Sesay M shows that local anesthesia can play an effective analgesic effect in 85% of vertebroplasty.^[6] Bonnard E Also showed that vertebroplasty under local anesthesia is feasible and has a perfect effect in 76% of patients.^[7] Part of the anesthesia effect is not satisfactory; it may be that vertebroplasty involves deep bone tissue. Patients undergoing vertebroplasty under local anesthesia often suffer from severe pain at the puncture site. In vertebroplasty, the pain during puncture is more serious than that during local anesthesia and bone cement injection.^[5] Although general anesthesia can be used to solve the intraoperative pain, because vertebral compression fractures are more common in elderly patients, they are usually combined with various complications such as heart disease, respiratory system disease, malnutrition, and reduced exercise volume, which brings additional risks to surgery and anesthesia and also increases the additional cost of anesthesia. And general anesthesia has a great influence on the whole body and has more adverse reactions. Comparatively speaking, local anesthesia's advantages lie in its simple operation, avoiding tracheal intubation, and having little effect on the whole body, especially in patients with various complications. However, there may be some risks in local anesthesia. A case report introduced a patient who underwent vertebroplasty under local anesthesia experienced the transient loss of sensation and movement of lower limbs after anesthesia, suggesting that we should pay attention to the safety of puncture and drug dosage during local anesthesia.^[8]

Our study shows that the vertebral cancellous bone infiltration anesthesia group's anesthesia effect is better than that of the traditional local anesthesia group. Our previous experience concluded that there was no adverse reaction when 4mL of 1% lidocaine was injected into vertebral cancellous bone.

V. CONCLUSION

Local anesthesia combined with vertebral cancellous bone infiltration anesthesia has a better effect on vertebroplasty.

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