

Clinical Effect Observation of Percutaneous Vertebroplasty in the Treatment of Osteoporotic Spinal Fractures in the Elderly

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Abstract: The clinical efficacy of percutaneous vertebroplasty in the treatment of osteoporotic spinal fractures in the elderly was observed. 86 cases of elderly osteoporotic spine fracture patients admitted to our hospital from January 2021 to June 2023 were selected as study subjects and randomly divided into the control group and the study group. In the control group, 43 cases were given traditional conservative treatment; in the study group, 43 cases were given percutaneous vertebroplasty. The vertebral body indexes of the two groups before and after treatment were compared, including anterior margin height, midline height, posterior margin height and posterior convexity angle; the quality of life of the two groups was compared, including social function, emotional function, cognitive function and somatic function; and the treatment satisfaction of the two groups was compared. The comparison of vertebral indexes between the two groups before treatment was not obvious, and there was no comparison significance in all four indexes, $p > 0.05$; after treatment, the anterior margin height, midline height, posterior margin height, and posterior convexity angle of the study group were significantly better than that of the control group, $p < 0.05$; the scores of the study group's social functioning, emotional functioning, cognitive functioning, and somatic functioning were significantly higher than those of the control group, $p < 0.05$; and the study group's total satisfaction rate was 97.67%, which was higher than 81.40% in the control group, $p < 0.05$. Percutaneous vertebroplasty has a better clinical effect in the treatment of osteoporotic spinal fracture in the elderly, which is worthy of popularization.

1. Introduction

Spinal fracture is a relatively common disease, and as one ages, there will be severe osteoporosis in old age. In this case, the probability of fracture will greatly increase^[1]. Due to osteoporosis, the spine of elderly people becomes brittle and can also experience fractures without external force^[2]. Long term pain can bring great mental pressure to patients, greatly reducing their quality of life. There are also some elderly people who have compression fractures, with no obvious pain in the early stages, but intense exercise leads to symptoms such as inability to stand or bend over; If not treated actively, it may worsen the condition^[3]. Due to the poor physical function of elderly people and their poor tolerance to surgery, conservative treatment is generally used, but the results of

conservative treatment are not ideal^[4]. Percutaneous vertebroplasty is a minimally invasive and easy to operate new surgery that not only reduces patient pain, but also maintains the stability of the fracture end, making it very suitable for the elderly. This article selects 86 elderly patients with osteoporotic spinal fractures admitted to our hospital from January 2021 to June 2023 as the research subjects, aiming to observe the clinical effect of percutaneous vertebroplasty in the treatment of elderly osteoporotic spinal fractures. The content is as follows.

2. Materials and Methods

2.1 General Information

This article selects 86 elderly patients with osteoporotic spinal fractures admitted to our hospital from January 2021 to June 2023, and is randomly divided into a control group and a study group. A control group of 43 patients, including 18 male patients and 25 female patients, with an average age of (68.34 ± 5.16) years; There were 43 patients in the study group, including 15 male patients and 28 female patients, with an average age of (67.83 ± 5.09) years. Statistical analysis was conducted on the general data of the two groups of patients, and the difference was not significant ($p > 0.05$). All patients and their families are fully aware of this study and voluntarily sign an informed consent form. Our ethics committee is fully aware of this study and has approved it.

2.2 Method

The control group was given traditional conservative treatment: immediate pain relief treatment and medication conservative treatment after hospitalization. At the same time, guide the patient to perform rehabilitation exercises in bed, place the fixation frame at the injury site, adjust the position of the fixation frame, and adjust the position of the fixation frame. After reducing chest, waist, and back pain, replace the hard cushion and persist in waist exercise for about 30 minutes every day. After 3-4 weeks, the patient will be able to walk on the ground with the stent.

Provide the research group with percutaneous vertebroplasty treatment: ① After hospitalization, corresponding examinations should also be conducted to understand the patient's physical condition and whether surgery is suitable. During the surgery, the patient is first placed in a prone position, followed by local disinfection, and then the nurse cooperates with the anesthesiologist for anesthesia. Secondly, through the C-arm X-ray film, the patient's fracture and surrounding conditions can be seen, thereby determining the accurate position of the surgery and marking the corresponding position. After completing all of this, Lingran checked again and used a 15 degree angle to start the puncture from the outside of the pedicle of the vertebral arch until it was 3/4 in front of the spine before stopping and removing the needle. ② During the placement of the balloon, the injection of the balloon contrast agent was also completed. During the compression process, with the assistance of X-ray films, observe for any leakage. ③ At this point, it is necessary to add an appropriate amount of 0.9% sodium chloride injection to the bone glue of polymethyl methacrylate (PMMA) and mix it into a paste. Then, under the monitoring of the C-arm X-ray, the bone cement syringe is inserted into the puncture needle, and the bone cement is slowly injected into the lesion. ④ During the injection process, a C-arm X-ray film is used to monitor the bone cement in real time, gradually infiltrating into the trabecular space and forming a spear shape, before slowly spreading to the bone cortex. During this period, if bone cement is found to enter the spinal canal or outside the vertebral body, the injection of bone cement should be stopped. ⑤ After the bone cement has completely hardened, it is necessary to remove the puncture needle and perform hemostasis and bandage on the wound. ⑥ Postoperative patients need to use conventional

antibiotics under the guidance of a doctor, as well as receive rehabilitation training and dietary guidance.

2.3 Observation indicators

①Spinal indices, including anterior margin height, midline height, posterior margin height and posterior convexity angle, were compared between the two groups of patients before and after treatment. ②Quality of life, including social functioning, emotional functioning, cognitive functioning and physical functioning, was compared between the two groups of patients. The higher the score, the better the quality of life of patients. ③A self-made questionnaire from our hospital was used to compare the treatment satisfaction of the two groups of patients, with total satisfaction rate = very satisfied + quite satisfied.

2.4 Statistical Analysis

The obtained data was analyzed and processed using SPSS 20.0 statistical software. Indicating measurement data. $\bar{x} \pm s$ represents measurement data, t-test; n(%) represents counting data, chi square test; $P < 0.05$ indicates that the data difference is statistically significant.

3. Results

3.1 Comparison of vertebral body indicators

The comparison of vertebral body indicators between the two groups of patients before treatment was not significant, and all four indicators had no comparative significance ($p > 0.05$); After treatment, the height of the leading edge, midline, trailing edge, and posterior convex angle in the study group were significantly better than those in the control group, $P < 0.05$. See Table 1.

Table 1: Comparison of vertebral body indicators between two groups of patients ($\bar{x} \pm s$).

group	Number of cases	Leading edge height(%)		Center line height(%)		Trailing edge height(%)		Posterior convex angle(°)	
		Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment	Before treatment	After treatment
Study group	43	67.34±4.37	82.79±4.50	71.46±5.31	83.06±4.18	69.74±5.28	80.46±3.34	20.16±2.05	8.46±1.37
Control group	43	66.92±4.25	68.76±4.83	72.12±4.88	75.43±4.72	70.25±4.93	73.24±4.51	20.28±2.19	17.90±3.26
<i>t</i>		0.452	13.936	0.600	7.946	0.463	8.436	0.262	17.505
<i>p</i>		0.653	0.000	0.550	0.000	0.645	0.000	0.794	0.000

3.2 Comparison of Quality of Life

Table 2: Comparison of Quality of Life between Two Groups of Patients ($\bar{x} \pm s$, point).

group	Number of cases(n)	Social function	Emotional function	Cognitive function	Physical function
Study group	43	80.43±3.74	82.09±2.53	81.06±3.43	79.09±3.64
Control group	43	75.16±4.56	74.27±3.48	77.54±4.35	73.31±3.20
<i>t</i>		5.860	11.918	4.167	7.820
<i>p</i>		0.000	0.000	0.000	0.000

The scores of social function, emotional function, cognitive function, and physical function in the study group were significantly higher than those in the control group ($p < 0.05$). See Table 2.

3.3 Comparison of Treatment Satisfaction

The total satisfaction rate of the research group was 97.67%, which was higher than 81.40% of the control group ($p < 0.05$). See Table 3.

Table 3: Comparison of treatment satisfaction between two groups of patients [n (%)].

Group	Number of cases	Perfect contentment	Quite satisfied	Dissatisfied	Total satisfaction rate
Study group	43	26(60.47)	16(37.21)	1(2.33)	42(97.67)
Control group	43	9(20.93)	26(60.47)	8(18.60)	35(81.40)
χ^2					6.081
p					0.014

4. Discussion

With the aging of the population, the incidence rate of osteoporotic fractures gradually increases, and the incidence rate of women is twice that of men^[5]. Osteoporosis fracture is a very painful disease that requires a long period of time to recover. However, if a patient's fracture cannot heal, it can lead to local pain and decreased mobility, leading to bone loosening and poor blood circulation throughout the body. In this case, the mortality rate caused by osteoporosis is also high^[6]. Therefore, it is crucial to provide effective treatment for elderly patients with osteoporotic spinal fractures. Percutaneous vertebroplasty (PVP) is a method of injecting osteogenic material into the spinal canal under the guidance of imaging equipment to enhance the stiffness, safety, prevent vertebral collapse, alleviate pain, and enable patients to fully or partially restore the length of the cervical spine^[7]. This technology has the advantages of safety, minimal trauma, less bleeding, fast recovery, and good analgesic effect.

This study gave the control group traditional conservative treatment, while the study group received percutaneous vertebroplasty treatment. The results showed that the comparison of vertebral body indicators between the two groups of patients before treatment was not significant, and all four indicators had no comparative significance ($p > 0.05$); After treatment, the leading edge height, midline height, trailing edge height, and posterior convex angle of the study group were significantly better than those of the control group, $P < 0.05$; The scores of social function, emotional function, cognitive function, and physical function in the study group were significantly higher than those in the control group, $p < 0.05$; The total satisfaction rate of the research group was 97.67%, which was higher than 81.40% of the control group ($p < 0.05$). The results indicate that percutaneous vertebroplasty is more effective than traditional conservative treatment for elderly patients with osteoporotic spinal fractures. It can more effectively improve the patient's vertebral condition, improve their quality of life, and also increase their treatment satisfaction.

In summary, percutaneous vertebroplasty has a good clinical effect in the treatment of elderly osteoporotic spinal fractures and is worth promoting.

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