

Research of the Clinical Effect of Kyphoplasty in the Treatment of Multiple Senile Osteoporotic Spinal Fractures

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Abstract: Objective: To evaluate the clinical effect of kyphoplasty in the treatment of multiple osteoporotic vertebral fractures in the elderly. **Methods:** The duration of the study was selected from January 2018 to December 2020, and 38 patients with multiple osteoporotic spinal fractures were selected for study evaluation. All patients were treated with kyphoplasty. The clinical indicators of the two groups were compared and analyzed. **Results:** The total effective rate was 94.7% and the complication rate was 5.3%. The height of midline, anterior and posterior vertebral body, Cobb angle, VAS score, ODI score and ADL score of 38 patients before and after treatment were compared, which were significantly better than those before treatment ($P < 0.05$). **Conclusion:** The clinical effect of kyphoplasty in the treatment of elderly patients with multiple osteoporosis is significant, which can be promoted in all levels of medical institutions.

Keywords: Kyphoplasty; Osteoporosis; Spinal fracture

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1 Introduction

The elderly are affected by age and other factors, multiple organ failure, physiological function gradually weakened, mostly accompanied by osteoporosis^[1]. Osteoporosis in the elderly can lead to a significant reduction of bone mass, damage of micro bone tissue structure, increase of bone fragility, and increase of fracture incidence. The incidence

rate of spinal fractures is high in elderly patients with osteoporosis. Such fractures are critically ill, with high disability and mortality rate, and poor prognosis. Therefore, we should take symptomatic treatment plan in time according to the fracture condition of patients^[2]. Kyphoplasty is a new scheme for the clinical treatment of multiple osteoporotic spinal fractures in the elderly. There is no targeted evaluation study on its clinical application effect^[3]. This study summarized and analyzed the basic clinical research data of patients in our hospital, and studied and analyzed the related problems of kyphoplasty.

2 Material and methods

2.1 General information

The duration of the study was selected from January 2018 to December 2020, and 38 patients with multiple osteoporotic spinal fractures were selected as the study evaluation samples. All patients were diagnosed as spinal fractures by CT and other imaging examination and clinical symptom analysis, without infectious diseases and liver and kidney diseases, and agreed to participate in the study. The basic clinical data of 38 patients were collected and evaluated. There were 21 males and 17 females, with an average age of (71.29 ± 5.08) years ranging from 65 to 77 years, and an average duration of (1.55 ± 0.48) months ranging from 5 days to 3 months. There were 15 cases of 2 vertebral bodies, 13 cases of 3 vertebral bodies, and 10 cases of 4 vertebral bodies.

2.2 Methods

38 patients were treated with kyphoplasty, the anesthesia scheme was general anesthesia, the doctor

adjusted the patient's position to prone position. Percutaneous puncture was performed by C-arm fluoroscopy, and the balloon was properly placed through bilateral pedicle region. Adjust the patient's position to make the vertebral lamina parallel to the X-ray projection direction. In the normal position, the bilateral pedicle of spinal canal is completely symmetrical, and the distance between spinous process and bilateral pedicle of spinal canal is consistent. When the puncture needle was used, the tip of the needle should reach the upper edge of the pedicle shadow. The C-arm machine was adjusted to the lateral position, the core needle was inserted, and the needle tip was placed in the middle line of the pedicle shadow in the positive position. Adjust to lateral display, drill in the puncture needle, and stop the operation after continuously drilling in the puncture needle for 3 mm, so that the needle tip is inserted into the posterior wall area of vertebral body. In the positive display state, the needle tip position needs to reach the inner edge area of pedicle shadow. The inner core of the puncture needle was drawn out and the guide needle was placed in a standardized way. The distance between the front end of the working cannula and the anterior area of the posterior cortex of the vertebral body was controlled to be 3 mm. In the lateral position, the drill should reach 1/2 of the vertebral body. In the normal position, the drill should not exceed 1/2 of the connecting line between spinous process and pedicle. The balloon was placed in the anterior 3/4 position after lateral drilling. The syringes were properly connected and bilateral balloon dilation was performed. The fracture reduction and balloon dilation were observed in detail. If the effect of fracture reduction was good or the balloon dilated to the cortical area around the vertebral body, the compression could be stopped. After the balloon was taken out, the bone cement was injected. During the operation, C-arm fluoroscopy was used to observe. If the bone cement tended to overflow the vertebral body, the injection should be stopped. After the bone cement is completely solidified, the working cannula can be taken out, and the puncture site can be disinfected and sutured after the operation.

2.3 Evaluation criteria

The total effective rate of 38 patients was evaluated, and the relevant criteria were set as disappearance of clinical symptoms, normal vertebral height and

normal spinal activity. The effective related criteria were clinical symptom relief, significant increase of vertebral height, mild limitation of spinal activity, and invalid in other cases. The patients evaluated as markedly effective and effective were all effective. The incidence of postoperative complications in 38 patients was analyzed.

The height of midline, anterior edge, posterior edge and Cobb angle of 38 patients before and after treatment were compared. The VAS score, ODI score and ADL score of 38 patients before and after treatment were compared. The VAS score was pain score, the score was 0-10 points, and the score was proportional to the degree of pain. ODI score was Oswestry disability index, the score was 0-50, and the score was directly proportional to the degree of dysfunction. Barthel score was used to evaluate ADL, with a score of 0-100, and the score was directly proportional to ADL.

2.4 Statistical methods

SPSS 23.0 software was used to calculate all kinds of data. In this study, the measurement data was ($\bar{x} \pm s$), the test method was t, the count data was (%), and the test method was χ^2 . If $P < 0.05$, there were differences between groups.

3 Results

3.1 Evaluate the total effective rate and complication rate of 38 patients

The mean operation time was (58.83 ± 2.76) min (42-78 min), the mean intraoperative blood loss was (42.28 ± 3.09) ml (36-59 ml), the mean bone cement injection was (5.08 ± 1.22) ml (4-7 ml), and the mean postoperative hospital stay was (12.25 ± 1.77) d (8-16 d). After treatment, 22 cases were evaluated as markedly effective, 14 cases as effective, and 2 cases as ineffective. The total effective rate was 94.7%. There were 1 case of spinal nerve injury and 1 case of bone cement leakage. The incidence of complications was 5.3%.

3.2 Compare the clinical indexes before and after treatment

The height of midline, anterior and posterior vertebral body, Cobb angle, VAS score, ODI score and ADL score of 38 patients before and after treatment were compared, which were significantly better than those before treatment ($P < 0.05$).

Table 1. Comparison of clinical indexes before and after treatment ($\bar{x} \pm s$)

Group	Center line height (%)	Leading edge height (%)	Trailing edge height (%)	Cobb angle (°)	VAS score	ODI score	Activities of daily living score
Study group (n = 38)	73.28±9.63	62.03±8.94	68.22±12.77	17.85±3.24	6.02±1.28	48.77±1.42	40.59±3.62
Control group (n = 38)	87.75±12.96	85.76±12.15	86.94±13.01	2.71±1.05	1.85±0.49	30.22±1.28	75.98±8.25
T value	5.524	9.697	6.330	27.402	18.755	59.814	24.214
P value	0.000	0.000	0.000	0.000	0.000	0.000	0.000

4 Discussion

The elderly group is affected by age and other factors, such as the destruction of the internal micro structure of the bone, bone loss is more serious, combined with the influence of gravity and other factors, resulting in lateral position of the spine, scoliosis and vertebral compression and deformation fractures under the action of external force^[4]. Clinical treatment of multiple senile osteoporotic spine fractures mostly adopts manipulative reduction and other treatment schemes. Such treatment schemes have single operation force line and long postoperative bed rest time, which can easily induce various complications. Therefore, it is necessary to adjust the treatment scheme according to the patient's condition^[5].

Limb kyphoplasty is a new scheme for the clinical treatment of multiple osteoporotic spine fractures in the elderly. The bilateral approach and double balloon dilatation treatment mode are used in the operation, which can ensure that the collapsed endplate returns to the normal position, achieve good effect of integral reduction, and ensure the symmetry of bilateral bone fracture, so as to effectively correct the Cobb angle and restore the original height of the vertebral body^[6]. In the treatment of different stages of osteoporotic spinal fracture, kyphoplasty can determine the targeted intervention measures according to the patient's fracture situation, which has no serious adverse effect on the surrounding normal vertebral body, has high operation safety, and can maximize the retention of vertebral mobility, so as to shorten the overall operation time, reduce the damage of intraoperative operation to the body, and shorten the postoperative period. The overall recovery time, improve the treatment and prognosis effect^[7-8].

Kyphoplasty can be used in the treatment of single or multiple vertebral bodies, and the injection of bone cement into the injured vertebral body is the key link of this operation. In this study, polymethylmethacrylate bone cement was used, and the injection operation should ensure that the

injection pressure of bone cement is appropriate and the fluidity is good. During the operation, the state of bone cement injection should be closely monitored. If the position of bone cement is close to the posterior wall of vertebral body, the injection should be stopped. In addition, doctors need to accurately grasp the timing of bone cement injection, and it is suggested to choose early agglomerate phase or late wire drawing phase to inject bone cement, so as to improve the controllability of injection operation.

The total effective rate of 8 patients was 94.7%, and the complication rate was 5.3%. After treatment, the height of vertebral midline, anterior edge, posterior edge, Cobb angle, VAS score, ODI score, activity of daily living score were better than those before treatment. It can be considered that kyphoplasty is safe and effective in the treatment of multiple senile osteoporotic spinal fractures, and can be used as an effective treatment. Restore the height of vertebral body, improve the activity ability and relieve pain.

In conclusion, the clinical effect of kyphoplasty in the treatment of elderly patients with multiple osteoporosis is significant, which can be promoted in all levels of medical institutions. At the same time, the total number of patients in this study is small, and the duration is short. The application effect of kyphoplasty still needs to be continuously analyzed.

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