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Study on the Indications of Interbody Fusion and Internal Fixation for Lumbar Vertebral Fractures with Expected Malunion

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Abstract

Objective: To explore the indications of interbody fusion and internal fixation for vertebral fractures with expected malunion by reporting the case of vertebral fractures. Because of lumbar fracture, the patient underwent posterior total laminectomy, spinal canal decompression and internal fixation without interbody fusion. After the internal fixation was removed, the patient developed kyphosis with symptoms of lower extremities, and was subsequently given interbody fusion and internal fixation. After the operation, the patient's lumbar spine stability was restored and the patient's symptoms were relieved. Conclusion: interbody fusion and internal fixation is suitable for vertebral fractures with expected malunion

Keywords: Lumbar fracture; malunion Interbody; Fusion indications

Introduction

Spinal fractures with nerve compression are generally treated with spinal canal decompression and internal fixation [1]. If the spine is reduced timely and the reduction is better. Then, less intervertebral fusion is performed. If the prognosis of vertebral fracture is poor, interbody fusion can not only increase the stability of the spine, but also overcome the spinal instability caused by poor healing of the vertebral body.

Case Summary

The patient is a 29-year-old male with lumbar fracture caused by fall injury. Lumbar imaging examination showed lumbar L2 fracture with spinal canal stenosis. The loss of lumbar height was 41.38%, the positive Cobb angle was 10.86 °, and the lateral Cobb angle was 28.44 ° (Figure

1.1). After decompression and reduction, the height of the vertebral body was reduced well, the placement of pedicle screw and titanium rod was satisfactory, and there was no kyphosis and lateral displacement (Figure 1.2). One year after operation, the patient removed the thoracolumbar internal fixation and developed progressive lower limb numbness and kyphosis (Figure 1.3). CT showed that the L2 vertebral body was not completely healed, the large fracture blocks were separated, and there was an "empty shell" phenomenon in the interior (Figure 1.4). In order to correct the spinal instability, L1 and L2 and L3 fusion were performed. The postoperative symptoms were improved and the stability of the spine was restored (Figure 1.5).

Discussion

In this case, the patient's vertebral fracture healing

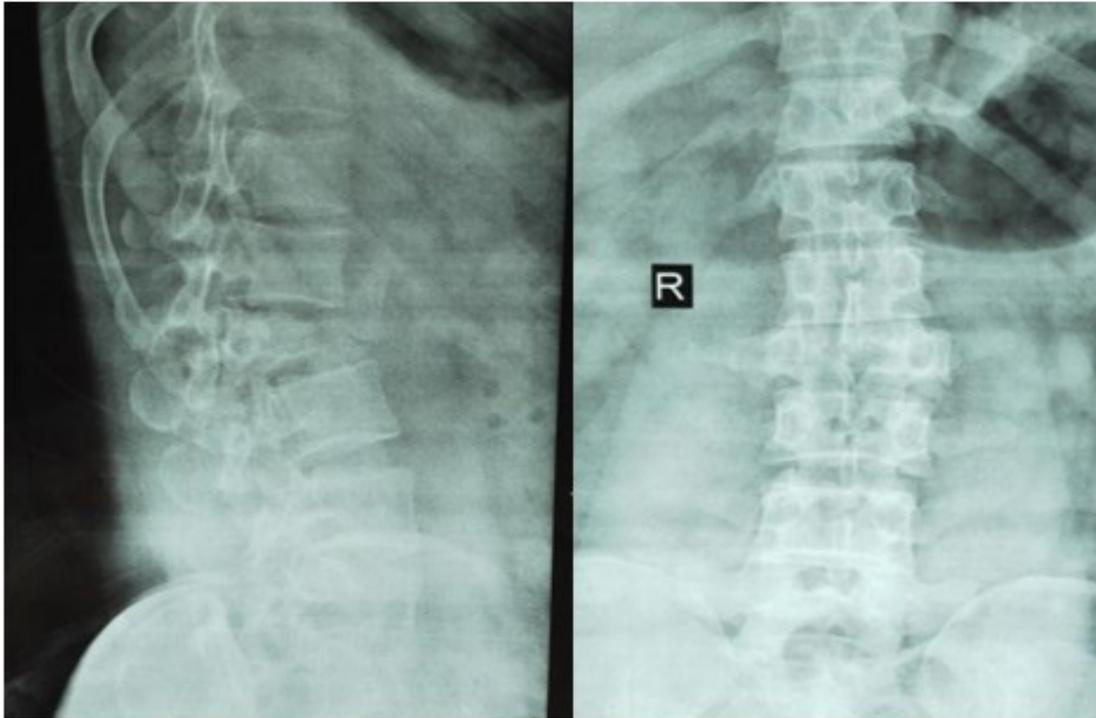


Figure 1.1



Figure 1.2



Figure 1.3

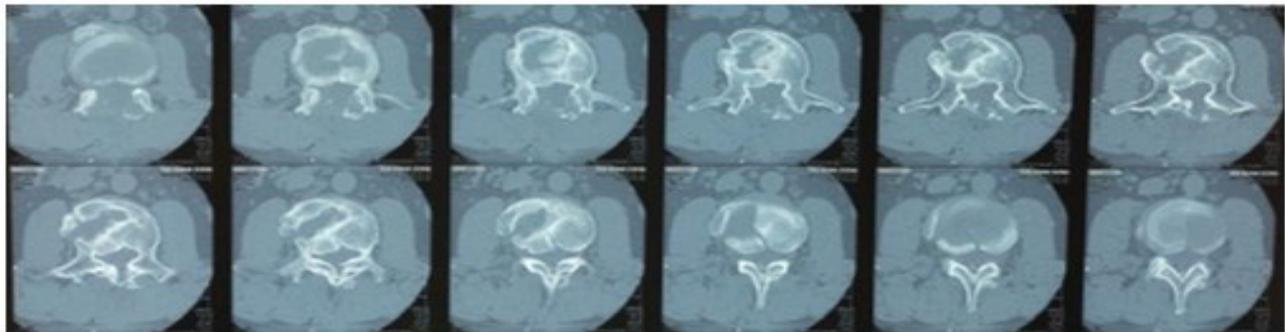


Figure 1.4

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Figure 1.5

is expected to determine the surgical plan [2]. Although surgical indications are still controversial [3], surgical options should be carefully selected if there is a poor recovery of anterior column height or poor expectation of vertebral body healing before operation, Because if the patient's vertebral body is healed poorly and can not bear axial pressure, there is a weak point of mechanical stress. The postoperative DR film seems to be highly recovered, but the healing of the vertebral body itself is poor and the supporting force of the anterior column is fragile, which can be regarded as a "reduction illusion". A cavity is formed between the fracture blocks, resulting in an "empty shell" phenomenon, resulting in an increase in the rate of nonunion [4-6]. Because of the large space between vertebral fracture blocks, the fretting of internal bone mass is also one of the physical factors of vertebral fracture nonunion [7]. Stabilizing vertebral internal fracture blocks plays a positive role in vertebral fracture healing. Correspondingly, the stability of vertebral body also provides stable biomechanical conditions for interbody fusion. In order to avoid this situation, the injured vertebrae should be scanned by CT and MR in time during or after operation [8]. In addition, there must be intervertebral disc injury after violent injury, which accelerates the process of spinal degeneration, and the biomechanical compression ability and stability have been lost. So the operation should be performed as soon as possible, together with intervertebral disc resection and fusion.

The clinical results are affected by many factors, in addition to intervertebral disc injury, patients' age, body weight, injury site, posterior column resection and postoperative nursing can also affect postoperative vertebral body healing and overall stability [9,10]. Improving the healing rate of injured vertebrae is an important link in the treatment of spinal fractures, and intravertebral bone grafting is a common means to promote the healing of vertebral fractures, which has achieved satisfactory results in clinic. Proper bone grafting can not only improve the success rate of internal fixation, but also effectively prevent progressive kyphosis of the spine. Pedicle screw titanium rod system is an important device for maintaining postoperative stability of lumbar fracture and dislocation. Its advantage in promoting fracture healing is to enhance the overall stability of the internal fixation system and the internal stability of the injured vertebrae. Early or hasty removal can easily lead to kyphosis. Because screws can disperse local stress and strengthen the overall stability of internal fixation, thus reducing the immediate height loss of injured vertebrae and slow height loss for a long time after operation. therefore, it not only promotes the fracture healing of injured vertebrae, but also reduces the risk of chronic deformity after operation.

Conclusion

Through clinical practice, intervertebral fusion can be directly selected if the expectation of fracture healing of

injured vertebrae is poor. If there is a possibility of upper and lower endplate injury or intervertebral disc injury, interbody fusion can also be performed directly to improve spinal stability. The expected evaluation method of vertebral fracture healing and the evaluation of the therapeutic effect of interbody fusion and internal fixation still need to be proved by more practice.

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