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A "rising" transpedicular access to anterior vertebral body: A case report

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ABSTRACT

INTRODUCTION: The transpedicular access is a common and effective procedure used to reach anterior vertebral body without passing through critical structures. after a transpedicular instrumentation, it is difficult to reach the anterior vertebral body because screws are placed in the way. We assume that an innovative transdiscal route could be used in patients with previous instrumentation, in order to perform a vertebroplasty or biopsy.

PRESENTATION OF CASE: We report the case of a 65-years-old woman who came to our Department complaining low back pain. Neurological examination showed a stable L4 wedge fracture under a previous lumbar L3–L4 posterolateral fusion performed 2 years before.

DISCUSSION: In order to perform a vertebroplasty and a biopsy of the collapsed L4 anterior vertebral body we had to deal with transpedicular screws, which prevent any standard transpedicular pproach.

CONCLUSION: In order to reach the L4 collapsed body we used an ascending transpedicular approach. We performed a biopsy and a subsequent vertebroplasty. Two days after surgery the patient reported a complete pain remission and was allowed to walk.

1. Introduction

Nowadays, an increasing number of vertebral injuries and spinal pathologies can be treated with surgery, thanks to new devices and new surgical techniques.

At the same time, patient's life expectancy is increasing and surgical components are becoming more wear-resistant and reliable, therefore it will be necessary to study alternative accesses to reach stabilized areas in order to treat a spine once again with minimally invasive methods [1–3].

In Europe, pedicular fixation devices have become the gold standard to treat an unstable spine because it is a simple way to correct deformity and to perform spinal fusion [4,5].

The presence of pedicle screws makes traditional transpedicular approaches to vertebral body difficult or even impossible to perform.

Degeneration of the intervertebral disc results in initial relative instability and hypermobility of the facet joints. This can lead to hypertrophy of the facet joint, particularly the superior articular process, resulting in reduced spinal canal dimensions and compressed neural elements [6,7]. Decompressive laminectomy and instrumented stabilization are the best surgical solution.

Vertebral fractures are an indicator for osteoporosis and/or osteopenia [8]. Vertebral body collapse can occur after instrumented fusion or due to osteoporosis. Vertebroplasty has been proved to be an effective new procedure in osteoporotic vertebral collapse fracture with debilitating pain [9]. Cement augmentation (vertebroplasty of kyphoplasty) helps stabilize painful osteoporotic vertebral fracture (OVF) refractory to medical treatment. This stabilization is thought to improve pain and functional outcome. Vertebroplasty is the injection of Poly (methyl methacrylate) (PPMA) into a fractured vertebra using a percutaneous transpedicular approach [10].

Also, several proliferative processes may be localized in the anterior portion of vertebral body, necessitating a biopsy of the involved structures.

We describe a case of percutaneous vertebroplasty performed in a 65-years-old woman with an L4 unknown anterior vertebral body lesion who underwent to previous lumbar L3–L4 fusion and a history of breast cancer 5 years before. We used a percutaneous modified posterolateral approach with an ascending angulation of the trocar introduced through L5 pedicles to reach L4 anterior body.

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The presented case has been reported in line with the SCARE criteria (Agha et al., 2016) [11].

2. Presentation of case

The patient was a 65-years-old woman with a history of breast cancer who underwent to L3–L4 posterolateral fusion 2 years before. After two years she felt a sudden lower back pain after a flexion of the spine. The walking perimeter was reduced to 50 m. The neurological examination was normal with no alteration of the inferior reflexes. A physical examination revealed pain during percussion over spinous processes of L4 and L5, bilateral contraction of paravertebral muscles and inability to maintain standing position up to 2 min. X-ray exam showed diffuse osteoporosis and a stable L4-wedge fracture without loosening of the pedicle screws.

We decided to perform a L4 biopsy and a percutaneous vertebroplasty in order to strengthen the collapsed vertebral body and considering her breast cancer history.

The percutaneous procedure required an accurate fluoroscopic imaging of the vertebral anatomy and a radiolucent operating table. The C-arms was oriented in AP direction on the lower interested vertebral pedicle and X-Ray beam had to be co-linear with the sagittal pedicle angle visible on the lateral view of the vertebral body.

On initial AP view, a radio-opaque instrument was placed on the skin to mark the levels and positions of vertebral pedicles, then local anaesthesia was obtained by injection of mepivacaine 2% near the pedicles of the inferior vertebra passing through the soft tissues and reaching the periosteum at the bony entry point.

A small skin incision was made at the interested level to allow a 11 G Jamshidi needle to reach the pedicle (Fig. 1).

With the needle placed on the inferior-lateral border of the X-ray pedicle appearance, a slight pressure was done to permit initial entry.

Needle was gently tapped 1–2 mm into the bone using a mallet with 45° caudo-cranial degrees and 25° latero-medial degrees of direction. Lateral fluoroscopy was necessary to give superior and inferior trajectory of the needle, whereas AP view gave medial and lateral trajectory. Repeated AP and lateral images were taken to follow the needle and to confirm accurate positioning (Fig. 2).

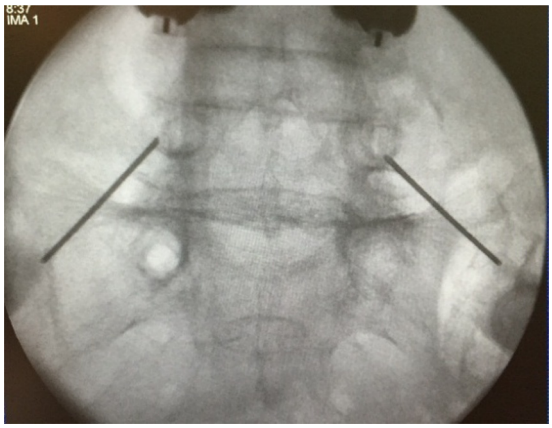

Fig. 1. Entry point of the trocar at the inferior-lateral border of the X-ray pedicle appearance.

To prevent excessive traumatic damage to L5 superior body wall, to the intervertebral disc and to L4 inferior body wall, a K wire inserted into the cannula was used to create the gateway (Fig. 3).

Once the trocar passed through the intervertebral space and entered the body, the needle was pulled out.

A10-ml syringe was then attached at the bottom of the trocar to create a negative pressure in order to drag biopsy tissue, while a rotating movement of the cannula simplified this operation.

The contralateral trocar was inserted using the same method.

Under lateral fluoroscopy, 3 ml of Polymethylmethacrylate (PMMA) was slowly injected from both trocar into the anterior part of the L4 vertebral body, then they were gently removed.

AP and lateral X-rays controls 3 days later shown cement in the correct area without leakage (Fig. 4).

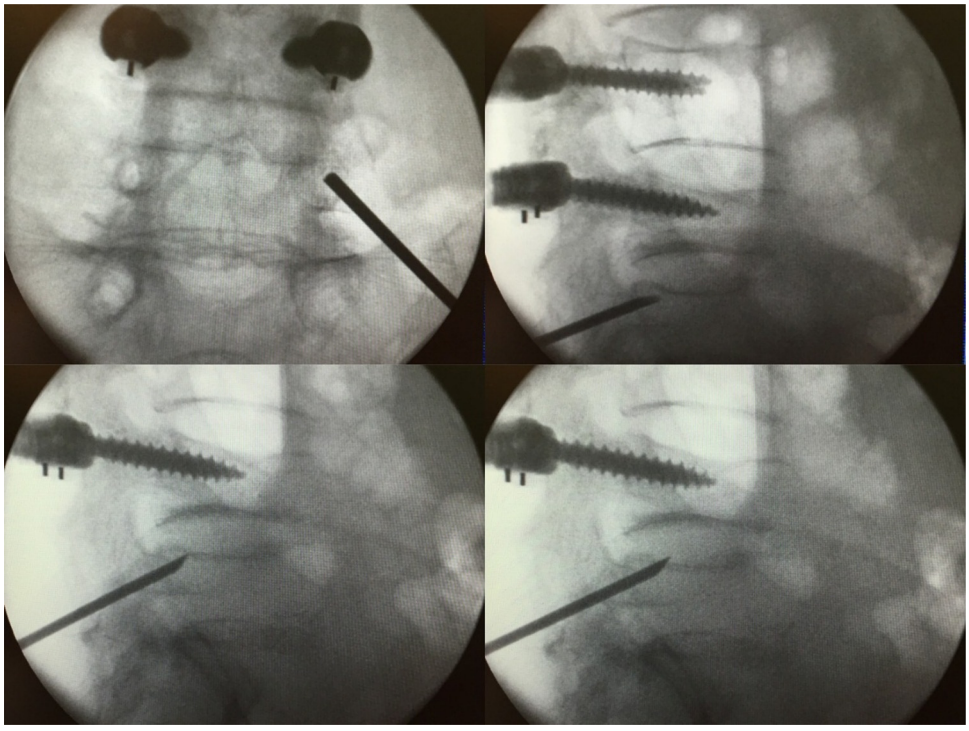

Fig. 2. Sequence of AP and lateral x-ray views during introduction of the needle through pedicle.