



International Journal of Orthopedics: Research & Therapy

Case Report

Intraoperative Anterior Dislodgement of a Cage into Retroperitoneal Space during Posterior Lumbar Interbody Fusion: a Case Report and Review of Literatures - @

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Submitted: 29 May 2018; **Approved:** 13 July 2018; **Published:** 16 July 2018

Cite this article: Chaichankul C, Panyaporn S, Gajaseni P. Intraoperative Anterior Dislodgement of a Cage into Retroperitoneal Space during Posterior Lumbar Interbody Fusion: a Case Report and Review of Literatures. Int J Ortho Res Ther. 2018;2(1): 005-007.

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ABSTRACT

Background: Posterior lumbar interbody fusion is acknowledged as the technique designed to take an advantage of making circumferential fusion by a single approach while avoiding the injury to anterior vascular structures. However, due to the increasing usage of the interbody techniques, there are emerging case reports and series of the vascular injury followed by the interbody fusion in addition to ALIF.

Material and methods: The author's demonstrated case by showing the incident during intra- and postoperative period, imaging studies related to the incident, and tried to investigate the incidence to reveal causes of surgery-related anterior cage dislodgement.

Conclusion: To consider risk factors related to the incident of major abdominal vessel injury during PLIF is important. In addition to the disc preparation step, a step of insertion the cage inside intervertebral disc space is also risky especially if two cages or larger cage are planned to be use. The preoperative planning is necessary to reduce this unfavorable complication.

Keywords: Posterior lumbar interbody fusion; Anterior cage dislodgement; Abdominal vascular injury

INTRODUCTION

Posterior Lumbar Interbody Fusion (PLIF) is one of the surgical techniques used to treat several spinal pathologies such as degenerative disc disease, spinal instability, trauma, and deformity [1].

PLIF is acknowledged as a technique that designed to take an advantage of making fusion 180 degrees or more by a single approach while avoiding the injury to anterior vascular structures, contrast to Anterior Lumbar Interbody Fusion (ALIF), which needs the combination of the posterior procedure to complete the circumferential fusion task [2]. Recently, due to the increasing usage of the interbody techniques, there are emerging case reports and series of the vascular injury followed by the interbody fusion in addition to ALIF [3-5].

Our case herein this report illustrates the possibility of anterior vascular structures endangered during PLIF procedure. We demonstrate the intra- and postoperative image studies and explore the risk factors that might related to our case as well as review some related literatures.

CASE REPORT

A 69-year-old man with lumbar spinal stenosis presented with low back pain and neurogenic claudication for 10 years. He had no previous history of trauma or spinal surgery. After unsatisfied with long conservative treatment, he was consented to surgical treatment as instrumented posterolateral and posterior interbody fusion from L2 to S1. The preoperative images were revealed, and preoperative planning was done thoroughly.

The operation was performed uneventfully following the standard surgical technique until a second cage was placed on the left side of L5/S1 intervertebral space. At that moment, the surgeon (CC) felt loss of resistance while banging the cage anteriorly. The lateral fluoroscopic image was checked immediately and demonstrated malposition of the cage anterior to the anterior vertebral body line (Figure 1). Because, there is no significant bleeding from the L5/S1 intervertebral disc space and patient was stable throughout the operation in terms of vital signs and other hemodynamic parameters. Therefore, the surgeon proceeded all procedures and completed the operation without removal the dislodged cage. Postoperative CT angiograph was performed immediately after the operation was done. It showed that the anterior dislodged cage was underneath a left common iliac vein without compression or indentation to major blood vessels or any other internal organs (Figure 2).

The patient was carefully monitored by CT angiography and serial radiographic examinations without sequela complications by the dislodged cage. At the last follow-up of 6 months postoperative, there was still no change of the cage position. Regarding to the degenerative spine, patient was satisfied with the postoperative outcome.

DISCUSSION

To create anterior column support via posterior approach, where is needed anyway for spinal canal decompression, is an attractive

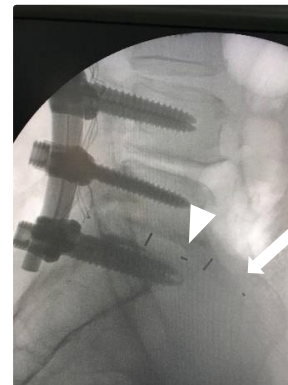


Figure 1: The white arrowhead demonstrated the first interbody cage at the proper site, while the white arrow demonstrated the second cage which located in retroperitoneal space.

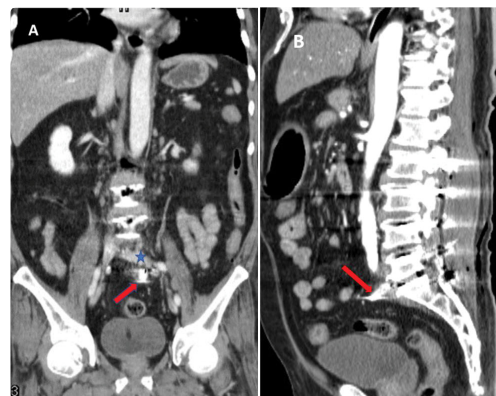


Figure 2: Showing the location of the malposition cage in retroperitoneal space. In figure A, the cage (red arrow) was underneath the left common iliac vein (blue star) and in figure B, the cage (red arrow) was posited in retroperitoneal space.

way of PLIF technique to give not only direct and/or indirect neural decompression, an enhancing environment for bony union, and proper lumbar sagittal alignment both coronal and sagittal planes but also an approach through the route that do not proximate to the abdominal major vessels [1,6].

Although the prevalence of vascular injury when performed PLIF is very few despite underestimated, there are reports of major abdominal vessel injury related to this technique recently [5,7]. Although the present report is not unique, but it does demonstrate and emphasize the surgeon who performed PLIF to concern the incident besides the disc preparation step that can injure abdominal vascular vessels and internal organs [5,7].

In addition to the disc preparation step while removal of disc material with pituitary rongeur almost claimed as the major moment of endanger to abdominal vessels, the step of insertion a cage into the intervertebral disc space is another important step at risk to abdominal vascular injury as in our case. After disc space preparation was accomplished, the spinal unit at that segment was unstable. The surgeon might impact the cage to the endpoint with exaggerate force though felt using force as usual, especially when inserted cage before rods placement. So, in the situation like this, the authors recommend pushing the cage with gradually incremental movement and checking the cage position by fluoroscopic periodically.

The other reason is the improper cage size. The oversized cage inserted into narrowing disc space need more forces than general situation that might lead cage dislodgement. Preoperative planning by meticulous evaluation of the images of MRI and CT is necessary to reduce this unfavorable complication.

The amounts of cage inside the intervertebral disc space can be one of risk factors causing accidentally pushing cage through the anterior Anulus Fibrosus (AF). In general, when surgeons plan to use two interbody cages per level, they tend to insert the second cage more laterally to avoid collision with the first one. Regarding to the topographical anatomy of disc, the anteroposterior dimension is generally narrow at the lateral area. When the surgeon inserts and impacts the cage in the extreme laterally, it is easier to push the cage through the anterior AF even by normal force.

In present case, regarding to postoperative CT angiogram, it can

be assumed that if the cage protrusion had occurred at the level above L5/S1, major abdominal vessels were damaged certainly.

Although PLIF is a fusion technique that is famous for avoiding the injury to anterior vascular structures when compared to ALIF [2,8], in case of major abdominal vessel injury happening, solving this catastrophic event during PLIF is more difficult and complex than in ALIF. Consequently, prevention is the most important.

CONCLUSION

To consider risk factors related to the incident of major abdominal vessel injury during PLIF is important. In addition to the disc preparation step, a step of insertion the cage inside intervertebral disc space is also risky especially if two cages or larger cage are planned to be use. The preoperative planning is necessary to reduce this unfavorable complication.

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