



Response to: Risk Factors Affecting Cage Retropulsion into the Spinal Canal Following Posterior Lumbar Interbody Fusion: Association with Diffuse Idiopathic Skeletal Hyperostosis

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Dear Editor,

We thank the author for their interest in our manuscript [1], and we would like to reply to their comments:

1. Did the location of cages (anterior/posterior) and undersized/lesser height cages have any effect in your study on cage retropulsion as reported by other authors [2]?

Response: Sagittal cage position (distance between the cage center and the disc center/caudal endplate distance) showed a negative value in 12 of our 15 cage retropulsion cases, and the average cage length was 21.8 ± 1.66 mm. The average negative value was -0.086 ± 0.035 in the 12 cases, and the average value was -0.062 ± 0.059 in the 15 cases overall. An undersized cage (cage height-preoperative disc height=negative value) was recognized in seven of our 15 cage retropulsion cases; average cage height was 8.4 ± 0.98 mm and average preoperative disc height was 10.97 ± 1.28 mm. The average undersized cage value was -2.54 ± 1.26 mm in seven cases, and the average value (cage height-preoperative disc height) was -0.62 ± 2.22 mm

in the 15 cases overall. The previous report referenced showed a negative value for sagittal cage position, and undersized cage was a risk factor for posterior cage migration following transforaminal lumbar interbody fusion [2]. Therefore, these were possible risk factors for cage retropulsion into the spinal canal following posterior lumbar interbody fusion (PLIF) in our study.

2. Does the rod system used in the study was titanium or polyether ether ketone (PEEK)? What is the author's recommendation from these two and does it have any effect on outcome [3]?

Response: The rod systems used in our study were all titanium rods, and I have never used a PEEK rod system before. In my opinion, rod material does not affect cage retropulsion into the spinal canal. Because PEEK rods were not associated with the risk of adjacent segment disease after posterior instrumented fusion in the lumbar spine [3], rod materials such as titanium or PEEK therefore probably do not affect the disc space, and I recommend the titanium rod for usability.

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3. What was the status of interbody fusion after single or double cage, did the number of cages alter the time and quality of fusion, and did the delayed fusion also contribute to delayed retropulsion?

Response: In the 15 cage retropulsion cases, interbody fusion was recognized in three of the four cases with a single cage and in eight of the 11 cases with a double cage. At 1 year postoperatively, reconstruction computed tomography (CT) showed similar results for interbody fusion in the single- and double-cage cases. Cage retropulsion occurred early (<1 month postoperatively) in all four single-cage cases, and interbody fusion was not recognized in the one case requiring no revision surgery. However, cage retropulsion was delayed (2–3 months postoperatively) in two double-cage cases. These two cases required no revision surgery, and interbody fusion was recognized in only one case.

4. Do the authors suggest using a double cage even in poor overall condition patients, as a single cage was associated with more incidences of retropulsion in this study [4]?

Response: A single cage compared to a double cage was a risk factor for cage retropulsion into the spinal canal following PLIF in our study. However, the rates were not significantly different for revision surgery and interbody fusion between the single- and double-cage cases in the 15 cage retropulsion cases. Therefore, we suggest that the overall condition of the patient takes priority over all surgical methods for PLIF.

5. The same size cage was used in this study at the time of revision surgery. Does the use of a bigger size cage make any difference, as suggested by a few authors [2]?

Response: Information from the referenced report indicates that an undersized cage (cage height–preoperative

disc height=negative value) may require changing to a bigger size cage during revision surgery in cage retropulsion cases [2]. Moreover, an undersized cage should be avoided to prevent cage retropulsion into the spinal canal following PLIF.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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