

The Feasibility of Anterior Spinal Access: The Vascular Corridor at the L5-S1 Level for Anterior Lumbar Interbody Fusion

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1

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Abstract

Study design: Cross-sectional study.

Objective: To analyze the feasibility of anterior spinal access to the vascular corridor at the L5-S1 junction, by evaluating three crucial anatomical landmarks. This provides a framework for risk-stratification for the clinician during preoperative evaluation.

Summary of background data: The anterior lumbar interbody fusion (ALIF) offers many advantages for fusion at the L5-S1 junction. However, the variant iliac vasculature may preclude safe anterior access.

Methods: Five hundred magnetic resonance imaging (MRI) images of the L5-S1 level were identified, with 379 meeting inclusion criteria. We graded the anterior access into three grades, namely, easy, advanced, or difficult by looking at three important anatomical landmarks-the vascular corridor (narrow if ≤ 25 mm, medium if 25-35 mm [inclusive], and wide if > 35 mm), the left common iliac vein (LCIV) location (grades A-D based on the relative position of the LCIV to the L5-S1 disc space), and the presence or absence of a fat plane.

Results: Our results showed that 43.27% of the patients had wide corridor for the anterior access, 19.26% of patients had no fat plane, and 7.65% had a LCIV that extended past the midline of the disc (Grade C, D: $> 50\%$). By combining these three factors, 37.20% would have easy anterior access, while a minority (1.85%) would have a difficult anterior access.

Conclusion: The ALIF at L5-S1 offers significant benefits to the patient. The surgeon should be aware of the dangers in an anterior access by looking at three crucial factors to determine whether the access is easy, advanced, or difficult. Patients with a difficult access should be attempted by experts, vascular access surgeons, or consider an alternative approach to L5-S1. Level of Evidence: 3.

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