

Laparoscopic Approach to L4–L5 for Interbody Fusion Using BAK Cages: Experience in the First 58 Cases

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Study Design. Operative reports were reviewed for patients who underwent laparoscopic fusion at the L4–L5 level and information regarding the mobilization of the vessels was recorded.

Objective. The purpose of this study was to describe variations in the approach used to address anatomical variations in the location of the great vessel bifurcation in the region of the L4–L5 intervertebral disc space when performing laparoscopic interbody fusion procedures.

Summary of Background Data. Recent interest in laparoscopic spine surgery using threaded cages has resulted in questions regarding the ability to safely access the L4–L5 disc using this approach. The laparoscopic transperitoneal approach to L5–S1 is below the bifurcation of the great vessels, thus requiring minimal mobilization of the iliac vessels. However, the transperitoneal approach to L4–L5 may be complicated by the bifurcation of the great vessels anterior to this disc space. Difficulty in placing two cages may occur if the vessels cannot be adequately mobilized.

Methods. Data were collected for the consecutive series of the first 58 patients (40 males, 18 females; mean age 42.5 years) undergoing laparoscopic anterior lumbar interbody fusion (ALIF) at the L4–L5 level using BAK cages. Operative notes were reviewed to determine variations in the operative approach. In particular, it was recorded if the L4–L5 disc was accessed above, or below the bifurcation of the aorta and the vena cava, or between these structures. The blood loss, operative time, and length of hospitalization were compared with respect to approach variation.

Results. In 30 patients, the L4–L5 disc was accessed above the great vessel bifurcation, in 18 patients below the bifurcation, and in the remaining 10 patients, by passing between the vessels. There were no statistically significant differences in the operative time, blood loss, or length of hospitalization with respect to the approach used. Three patients were converted to open procedures as a result of bleeding from segmental veins. None required transfusions and there were no postoperative sequelae. In two patients, successful endoscopic repair of segmental vein avulsion from the vena cava was performed using endoscopic loop ligatures. One patient had

a secondary procedure to remove a cage that was causing nerve irritation, and one patient reported retrograde ejaculation after a two level fusion. Another patient, in whom a posterior herniation was removed, later presented with a cerebrospinal fluid leak. Most of the operative complications occurred early in the series.

Conclusions. Laparoscopic transperitoneal approach to L4–L5 for insertion of threaded fusion cages is feasible. The laparoscopic L4–L5 procedure can be accomplished with few complications, provided a dedicated team of collaborative surgeons with experience in laparoscopic spine techniques is employed. Variations in vascular anatomy did not prevent successful insertion of two threaded fusion cages. [Key words: anterior lumbar interbody fusion, laparoscopic spine fusion, fusion cages, spinal anatomy, surgical approaches] *Spine* 1999;24:2171–2174

Recent interest in the laparoscopic approach to the lumbar spine for interbody fusion using threaded cages has resulted in questions regarding the feasibility of accessing the L4–L5 disc space. The laparoscopic transperitoneal approach to L5–S1 is below the bifurcation of the great vessels requiring minimal mobilization of the iliac vessels. However, the transperitoneal approach to L4–L5 may be complicated by the great vessel bifurcation anterior to this disc space. There may be difficulty in placing two cages if the vessels cannot be adequately mobilized. Based on a review of computer-generated series of abdominal arterial studies, Vraney et al reported that access to the L4–L5 disc space would be readily accessible in only about 33% of patients and in others would require significant dissection.¹ However, their study was based only on images and not on actual surgical cases or directly observed anatomy. The purpose of this study was to describe variations in the approach used to address anatomical variations in location of the bifurcation of the great vessels during laparoscopic L4–L5 interbody fusion procedures.

■ Materials and Methods

The studied population consisted of the consecutive series of the first 58 patients undergoing laparoscopic anterior lumbar interbody fusion (ALIF) at the L4–L5 level using BAK fusion cages (Sulzer SpineTech; Minneapolis, MN). In some of the most recent cases, a BAK cage and a Proximity cage (also SpineTech) were used at each operated level. All cases were performed by the same team of spine and laparoscopic surgeons. The study group consisted of 40 males and 18 females with a mean age of 42.5 years, ranging from 21 to 63 years. Indications for the procedures were symptomatic degenerative disc disease and/or postlaminectomy syndrome unresponsive

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