Orthopaedics & Traumatology: Surgery & Research (2013) 99, 155—161

Available online at
SciVerse ScienceDirect
www.sciencedirect.com

Elsevier Masson France
EM|consulte
www.em-consulte.com/en

ORIGINAL ARTICLE

Outcomes of anterior lumbar interbody fusion in low-grade isthmic spondylolisthesis in adults: A continuous series of 65 cases with an average follow-up of 6.6 years

G. Riouallon[a,*], C.-H.-F. Lachaniette[b], A. Poignard[b], J. Allain[b]

[a] Paris Saint-Joseph Hospital Group, 185, rue Raymond-Losserand, 75014 Paris, France
[b] Henri-Mondor Hospital, 51, avenue du Maréchal-de-Lattre-de-Tassigny, 94010 Créteil, France

Accepted: 10 December 2012

KEYWORDS
Spondylolisthesis;
Interbody fusion;
Anterior approach;
ALIF

Summary
Introduction: Surgical treatment of isthmic spondylolisthesis continues to be controversial. The fusion procedure can either be instrumented using a posterior and/or anterior approach or non-instrumented. The role of associated decompression, reduction of the slippage, disc height restoration and lordosis restoration has not definitely been established. The goal of this study was to evaluate the efficacy of anterior approach for interbody fusion (ALIF) without any reduction maneuver.
Materials and methods: Sixty-five patients with isthmic spondylolisthesis were operated on, using an ALIF. The average patient age was 40 years. The preoperative maximum walking time was 20 minutes. Ten patients had radiculopathy. The average preoperative Beaujon Hospital disability index was 9/20. Standard static and dynamic X-rays were evaluated in all patients; a CT scan was performed in 33 patients 1 year after the surgery. The olisthetic vertebra had slipped by an average of 12 mm. Thirty-five of the spondylolisthesis cases had abnormal vertebral motion.
Results: At an average follow-up of 6.6 years, lumbar pain and radicular pain had been reduced by 4.6 and 5 points on the visual analogue scale, respectively. Twenty-seven patients could walk for an unlimited amount of time. Three patients still had radiculopathy. The Beaujon Hospital disability index had improved by an average of 7.3 points. The fusion rate was 91%. The slippage had decreased by 30%, despite no specific reduction maneuvers at the time of surgery. The disc height had increased by 177%. On the sagittal plane, lordosis had improved by 5°, without any changes in the pelvic parameters.

* Corresponding author. Tel.: +33 1 44 12 00 09.
E-mail address: g.riouallon@gmail.com (G. Riouallon).

1877-0568/$ - see front matter
http://dx.doi.org/10.1016/j.otsr.2012.12.009

Conclusion: In situ ALIF provides results that are comparable to those obtained with other techniques. This study confirms the essential role of fusion in achieving good functional results, given that hypermobility of the olisthetic level contributes to the symptoms generation.
Level of evidence: Level IV. Retrospective study.

Introduction

Surgical treatment of isthmic spondylolisthesis continues to be controversial. The most common procedure consists of an instrumented fusion of the olisthetic level. This can be accomplished either through a posterior approach for posterolateral fusion (PLF) or posterolateral interbody fusion (PLIF or TLIF) or an anterior approach for interbody fusion (ALIF). In some cases, these techniques are combined to perform a circumferential fusion. Although many series have reported the results with PLF or PLIF, few results have been reported with ALIF [1,2]. In addition, the role of the slippage reduction, associated decompression (laminectomy, excision of Gill nodules) and restoration of the disc height and lumbar lordosis has not been clearly established [3—7]. Thus, it is difficult to define the ideal surgical strategy for isthmic spondylolisthesis in adults based on published data. Starting from the hypothesis that instability of the olisthetic level is the main cause of lumbar and radicular pain, we have always treated this pathology with anterior lumbar interbody fusion, without performing a reduction or direct inter-canal decompression.

We are reporting on the clinical and radiological results of a series of isthmic spondylolisthesis in adults treated with in situ anterior lumbar interbody fusion, without reduction.

Material and methods

The series

Seventy-five patients who were operated through an anterior approach in our department between 1985 and 2006 were reviewed retrospectively for this study. Ten patients who were lost to follow-up after less than 2 years were excluded from the results. For the 65 remaining patients, the test results at the last follow-up visit were taken into consideration. The study population consisted of 44 women and 21 men with an average BMI of 24.6 (range 16.3—36.3). The olisthetic level was at L5-S1 in 52 cases and L4-L5 in 13 cases. The indication for surgery was only made once conservative treatment had failed and there was radiographical evidence of listhesis.

Preoperative functional evaluation and clinical condition

Lumbar pain and radicular pain were evaluated using a visual analogue scale (VAS) with a rating of 0 to 10. The Oswestry [8] and Beaujon [9] scores were used to evaluate the preoperative and postoperative functional status of the patients.

The average preoperative EVA was 6.7 (range 2—10) in lumbar pain patients and 5.9 (range 0—10) in radicular pain patients. Fifty-eight patients presented with neurogenic claudication. The average preoperative maximum walking time was 20 minutes. The pain-free maximum walking time was 5 minutes or less in 43 patients. Eleven patients had a radiculopathy with loss of motor function. The motor deficit (based on an international scale from 0 to 5) was rated as 4 in 10 cases and 3 in one case. The average preoperative Oswestry [8] score was 55% (range 30—80). The average Beaujon score [9] was 9.2 points (range 4—14).

Preoperative radiographic evaluation and clinical condition

Standard AP, lateral and three-quarter oblique X-rays centered on the olisthetic level were sufficient to confirm the diagnosis of isthmic spondylolisthesis. The amount of slippage was quantified according to the classification proposed by Meyerding [10]. The disc height was calculated for the olisthetic levels and the levels above and below. The average was taken of the sum of the disc height measured on the anterior wall (AB) and the posterior wall (CD) and divided by the height of the anterior wall of the L5 vertebral body (EF) (Fig. 1). We also recorded parameters of sagittal equilibrium. For lumbar lordosis, this was measured between the sacral endplate and the upper L1 endplate. Dynamic X-rays of the lumbar spine in standing hyperflexion and hyperextension were used to measure the motion at the olisthetic vertebral level before and after the surgery. The motion was objectively determined by the change in slippage (in mm) parallel to the superior endplate of the vertebra below and by the change in the change in angle between the inferior endplate of the olisthetic vertebra and the superior endplate of the vertebra below on the various X-rays taken during

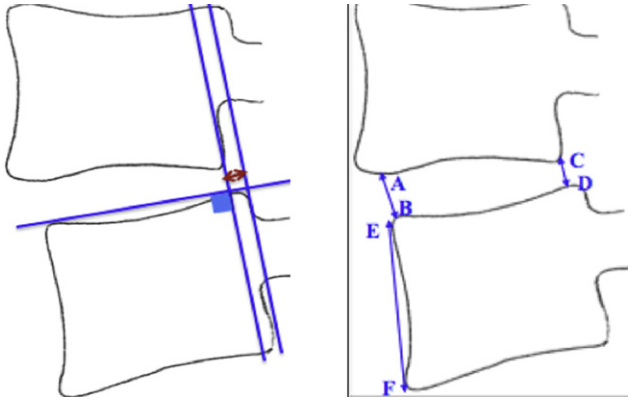

Figure 1 Measurement of slippage and vertebral body height.