SURGICAL MANAGEMENT OF MULTILEVEL LUMBAR SPONDYLOLISTHESIS

Thesis

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By

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LIST OF ABBREVIATIONS

AKA	Also known as
ALIF	Anterior lumbar interbody fusion
ALL	Anterior longitudinal ligament
AP	Anteroposterior
BMI	Body mass index
BWt	Body weight
CT	Computerized tomography
h	Disc height
H	Posterior wall height of the proximal vertebral body
h/H	Disc height%
Ht	Body height
i.e	That is to say
IVF	Intervertebral foramen
JOA	Japanese orthopedic association
LL	Lumbar lordosis
Mos	Months
MRI	Magnetic resonance image
N/ No	Number
NS	Non Significant
NZ	Neutral zone
P	Probability Value
PDF	Transpedicular fixation
PLIF	Posterior lumbar interbodyfusion
PLL	Posterior longitudinal ligament
PS	Pedicle screw
RCT	Randomized control study
ROM	Range of motion
S	Slippage
SA	Slip angle
SCS	Spinal canal stenosis
TENS	Transcutaneous electrical nerve stimulation
TLIF	Transforaminal lumbar interbody fusion
Yrs	Years

ABSTRACT

Spondylolisthesis refers to the forward displacement of one vertebra relative to another. Five types of spondylolisthesis have been described according to the Wiltse-Newman-MacNab classification system and include the isthmic, degenerative, dysplastic, traumatic, and pathologic forms older people most commonly affected.

Objectives: Surgical treatment options of multilevel spondylolisthesis: fixation by instrumentation with posterolateral fusion and fixation by instrumentation with interbody fusion (TLIF).

Methods: 30 patients were divided in two groups according to surgical treatment: group (A) 15 patients had decompression and fixation by rods and transpedicular screw with posterolateral fusion, group (B) 15 patients had fixation by rods and transpedicular screw and interbody fusion (TLIF).

Results: We found that group (B) had significant better outcome in improvement rate than group (A).

Conclusion: Fixation with interbody fusion had excellent outcome.

KEYWORDS:

Multilevel lumbar spondylolisthesis, fusion rate, roles and screw, TLIF, decompression, posterolateral fusion.

INTRODUCTION

Spondylolisthesis is defined as the forward displacement of one vertebra relative to another. This “slip” usually occurs when the locking mechanism constituted by the laminae and facet joints has failed, and may subsequently remain static or progress over time. 90% of cases occur at the L4/L5 and L5/S1 levels **(Jayakumar et al., 2006)**.

Spondylolisthesis is an easily recognized deformity, yet confusion persists over its natural history and preferred treatment. Some spondylolisthesis progress to severe deformity resulting in moderate pain and neurologic compromise. Other slips progress very little and produce significant symptoms. Sometimes, spondylolisthesis is only discovered incidentally. Why does this apparent paradox exist? Fourty years ago, **Dandy and Shannon** recognized that confusion arose from the mistaken belief that all spondylolisthesis must have a single cause **(Jayakumar et al., 2006)**.

It should now be understood that each type of spondylolisthesis is the similar radiographic end result of different and distinct disease processes. These disparate pathologic conditions produce spondylolisthesis because of the common morphology and biomechanical forces applied to the lumbosacral junction **(Hammerberg, 2005)**.

AIM OF THE WORK

1. To understand the standard treatments and the treatment option by:
    a. Interbody fusion with instrumentation.
    b. Posterolateral fusion with instrumentation.
2. To compare the fusion rates, clinical outcome, blood loss and postoperative hospital stay in different patient groups.
3. To detect advantages of interbody (TLIF and PLIF).
4. To detect disadvantages of this technique

HISTORICAL BACKGROUND

The first description of spondylolisthesis is attributed to Herbinaux, a Belgian obstetrician who made the first observation in a woman with difficult delivery secondary to narrowing of her pelvic outlet caused by a forward slip of the fifth lumbar vertebra over the sacrum **(Gray et al., 2008)**. The actual term of Spondylolisthesis was coined by Kilian in 1854 from the Greek spondylo meaning vertebra and listhesis meaning slip. In 1855 Robert of Koblenz noted the location of the defect in the pars but misidentified it as a sublaxation of the facets. Lambi in the same year correctly identified the nature of the defect **(Gray et al., 2008),** in **Schröder (2005)**. Neugebauer (1888) described the mechanism of elongation of the pars interarticularis. Degenerative Spondylolisthesis was described by **Junghans** as a translation with no identifiable defect in the posterior neural arch. He gave it the term Pseudospondylolisthesis **(Gray et al., 2008)**. **Newman** defined the pathologic process by describing facet arthritis and hypertrophy at the level of slippage **(Gray et al., 2008)**. He formally introduced the term degenerative spondylolisthesis **(Balderston and Brummet, 2003)**.

EPIDEMIOLOGY

Five types of listhesis have been described according to the Wiltse-Newman-MacNab classification system and include the isthmic, degenerative, dysplastic, traumatic, pathologic and iatrogenic forms ***(Guiot & Mendel, 2005).***

The prevalence of degenerative spondylolisthesis is about 10% in women in their seventh decade. Several Studies demonstrated that women are affected at a rate five times more than men **(Lombardi et al., 1985)**. In addition, patients with diabetes mellitus have an increased prevalence of degenerative spondylolisthesis. The prevalence of adult isthmic spondylolisthesis is about 6% across all demographic groups. The male to female ratio of adult isthmic spondylolisthesis is approximately 2: 1. Spondylolysis, or a defect in the pars without slippage, has been found to have an incidence of 6.4% in Caucasian men. The lowest incidence was found in African-American women with about 1.1%. Spondylolysis is most prevalent at L5 (87%) followed by L4 (10%) and the L3 level (3%). Pars defects are nearly twice as common in boys as in girls; however, high grade slippage is four times more common in girls **(Lenke and Bridwell, 1997; Balderston and Brummet, 2003)**.

ANATOMY OF THE LUMBAR SPINE

IMPORTANT STRUCTURES:

The important parts of the lumbar spine include:

- Bones and joints.
- Nerves.
- Connective tissues.
- Muscles.
- Spinal segments.
- This section highlights important structures in each category.

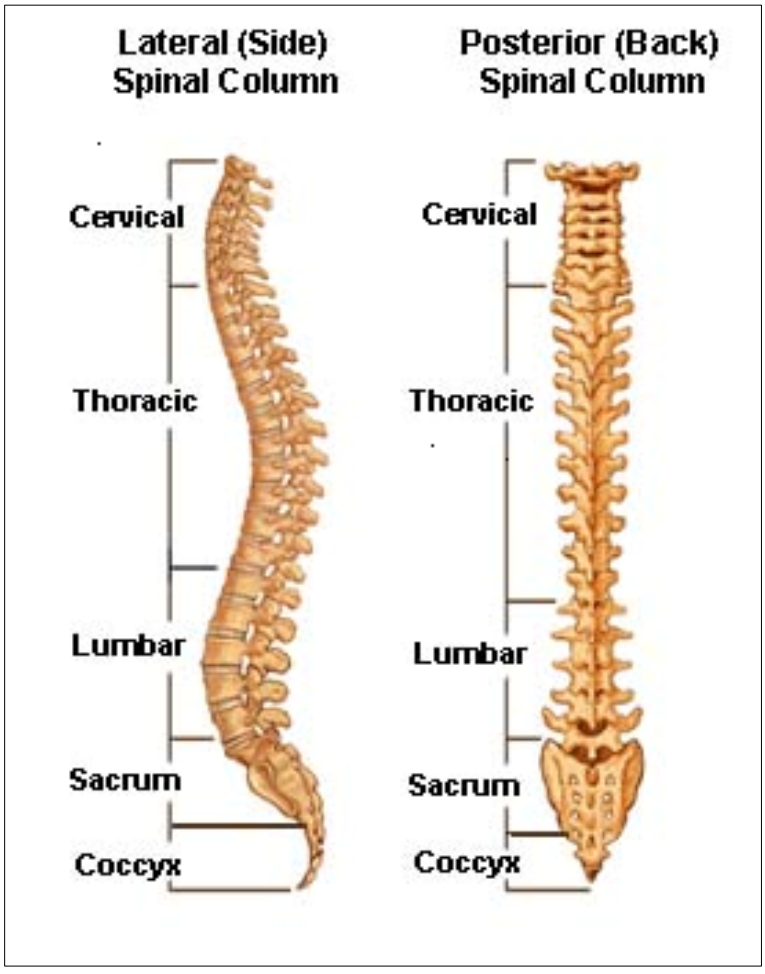

Fig. (1): General outline of the spine **(Wong and Transfeldt, 2007A)**