

Research Article

Incidence, diagnosis and management of adult cases presenting with symptomatic lumbar spondylolisthesis in a tertiary care hospital

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ABSTRACT

Background: Five lumbar vertebrae bridge between the thoracic and the sacral. The first four are typical in nature and the fifth is of a standalone atypical variety. Normal inward curvatures are observed in both cervical and lumbar regions of the vertebral column. These lordotic curvatures usually help in shock absorption and support the weight of the head. Spondylolisthesis occurs when one vertebra slips forward over the vertebra below it. This condition usually develops in the lumbar region of the vertebral column. It is due to the lumbar spine being exposed to directional pressures while carrying and distributing most of the body weight during activity and at rest. Such a combination of weight bearing and multidirectional movement may cause forward slippage of any random lumbar vertebra over the vertebra beneath it. The aim of this study was to observe retrospectively adult male and female cases presenting with spondylolisthesis in the outdoor clinic of the Department of Orthopaedics in a tertiary care hospital.

Methods: Adult cases of either sex presenting with low back pain were clinically and radiologically investigated. Data regarding age, sex and occupation were recorded.

Results: The incidence of symptomatic spondylolisthesis was reported to be 211 out of 5117 cases that presented with low back pain. We observed that majority of cases were in the age group of 23 to 57 years with higher preponderance among males. A small fraction of presenting cases were advised for laminectomy.

Conclusions: Incidence of symptomatic lumbar spondylolisthesis was high. Sex ratio among presenting cases was observed to be higher in males. Cases were clinically examined and diagnosed radiologically. Most cases were managed conservatively.

Keywords: Laminectomy, Lordotic, Lumbar, Slippage, Spondylolisthesis, Vertebra

INTRODUCTION

Low back pain disorders are an increasingly common condition involving visits to the orthopaedic clinic. Cases presenting with low back pain are predominantly concerned with being able to return to work in shortest possible time. Five massive lumbar vertebrae constitute an important bony bridge connecting the thoracic spine to the sacrum. These vertebrae are designed and adapted to and transmit the body weight in addition to movement. Spondylolisthesis is a clinical ortho-neurological disorder

involving slippage of one vertebral body over another, usually resulting in low back pain. The term is derived from two Greek words *spondylo* (vertebra) and *olisthenein* (to slip).¹ The first written description of spondylolisthesis is attributed to Herbiniaux, a Belgian obstetrician, who in 1782 described an osseous prominence anterior to the sacrum that caused narrowing of the birth canal.² Forward slippage of a vertebra is termed anterolisthesis while backward slippage is referred to as retrolisthesis.³ The fifth lumbar vertebra is the most commonly affected vertebra usually after a

break or fracture.⁴ Incidence of this condition varies according to age, sex, association with certain diseases, trauma and occupation. It can be classified as either asymptomatic or symptomatic. Prevalence of the condition has been reported to be 5-7% in American population.⁵⁻¹⁰ Lumbar spondylolisthesis is a major cause of spinal canal stenosis and is often related to low back and leg pain.¹¹ The most common site of spondylolisthesis is at the L₅-S₁ level because of an L₅ pars defect. Spondylolisthesis has never been recognized in any species other than humans. It is believed that the development of spondylolisthesis is related to man's ability to maintain an erect posture and the development of lumbar lordosis, the latter being unique to humans.^{12,13}

Classification of spondylolisthesis (Marchetti & Bartolozzi)¹

Developmental:

- a) High Dysplastic
 - With Lysis
 - Without Lysis
- b) Low Dysplastic
 - With Lysis
 - Without Lysis

Acquired:

- a) Traumatic
 - Acute
 - Stress
- b) Post Surgery
 - Direct Surgery
 - Indirect Surgery
- c) Pathological
 - Local Pathology
 - Systemic Pathology
- d) Degenerative
 - Primary
 - Secondary

Classification of spondylolisthesis (Herman & Pizzutillo).¹

- Type I = Dysplastic
- Type II = Developmental
- Type III = Traumatic
 - Acute
 - Chronic
- Type IV = Pathological

Most commonly used radiographic grading system for spondylolisthesis is that of Meyerding. In this system slip grade is calculated by determining the ratio between the anteroposterior diameter of the top of the first sacral vertebra and the distance the L5 vertebra has slipped anteriorly.

- Grade I = Displacement of 25% or less
- Grade II = Displacement between 25% to 50%
- Grade III = Displacement of between 50% to 75%
- Grade IV = Displacement more than 75%

Grade V = Position of the L5 vertebra completely below top of sacrum (Spondyloptosis)

In analysing spondylolisthesis the surgeon must first decide if the condition is developmental or acquired. The degree of lordosis, position of the gravity line and competency of the disc at the level of spondylolisthesis is also important. Restoration of spinopelvic balance is important in the treatment of spondylolisthesis.

METHODS

After prior approval from the Institutional Ethics Committee (IEC), this study was conducted in the Department of Orthopaedics. All adult cases of either sex and between the ages of 18 to 60 years that presented to the outdoor clinic with symptomatic low back pain were enrolled in this study. Data pertaining to age, sex and occupation of the patient was documented and each patient was clinically and radiologically examined. Cases not falling in the age group, cases with past history of spinopelvic fractures and pregnant cases were excluded from the study. Diagnosed cases of spondylolisthesis were managed conservatively and reviewed.

RESULTS

A total number of 5117 orthopaedic cases as demarcated, presenting with symptomatic low back pain were examined during the study period, out of which 211 (4.12%) cases were diagnosed with symptomatic spondylolisthesis as shown in Table 1. Out of 211, number of males and females were 122 (57.8%) and 89 (42.2%) respectively with a sex ratio of 1.37:1 being higher among males (Table 2). Majority of the cases presenting with symptomatic spondylolisthesis were in the age group of 23-57 years (Table 3). Out of 211 diagnosed cases only 17 (8.1%) were recommended for surgery and remaining were managed conservatively with moderate to satisfactory improvement observed during follow up.

Table 1: Incidence of symptomatic spondylolisthesis in this study.

No. of cases diagnosed	Total no of cases studied	Incidence (%)
211	5117	4.12

Table 2: Prevalence between both sexes in this study.

No. of cases diagnosed	Total no of male cases	Total no of female cases
211	122 (57.8%)	89 (42.2%)

Table 3: Distribution of cases between both sexes in specified age groups.

Age (Yrs)	No. of cases (Males)	Age (Yrs)	No. of cases (Females)
18-24	07	18-24	06
25-31	15	25-31	11
32-38	19	32-38	09
39-45	23	39-45	23
46-52	31	46-52	21
53-59	27	53-59	19

DISCUSSION

Spondylolisthesis is a complex and challenging multifactorial condition. Spondylolisthesis is the forwards slippage of one vertebra on another and may be the result of a spondylosis.¹⁴ In this study, we observed an incidence of 4.12% with the condition being higher in males than in females. Our incidence can be contrasted with that in the US.¹⁵⁻²⁰ The natural history of this condition is favourable, as only 10-15%, cases seeking treatment will eventually have surgery.²¹ Spondylolisthesis is easily recognized yet confusion persists over its natural history and preferred treatment. A better understanding of the natural history and disease pathogenesis is required to allow an evidence based approach to the management of spondylolisthesis. Diagnosis of this condition is rather simple and mainly based on imaging. The incidence of spondylosis is 5-6% in the general population, however the increased prevalence upto 12% is noted in adolescents with Scheuman's disease, weight lifters, athletes such as football linemen and gymnasts, signifies that mechanical factors may be important in the aetiology of this condition.²² Although many surgical techniques being available it is implied to opt for conservative management before implementing surgical intervention. Specific aims of nonsurgical treatments should focus on improvement of spinal segmental stability and relieving of symptoms due to spinal cord compression. In this study, we observed that incidence was higher in males. In males, maximum number of cases was in the age group 46-52 years. In females, maximum numbers of cases were in the age group 39-45 years. Depending on the severity of the case, we suggested physiotherapy with mild to moderate lifestyle changes and recommended exercises on a daily basis. Several studies suggest a congenital predisposition to spondylosis, with prevalence of 27-69% among family members of the affected individuals.²³ In the adult population, stenosis is more of a feature with pain due to degenerative changes more prevalent.^{24,25} The most commonly involved vertebrae are L₄ and L₅, which are the keystones of lumbosacral spine providing stability by supporting physiological loads and preventing unnecessary motion.

CONCLUSION

Understanding the multifactorial aetiology plays an important role in both conservative and surgical management of cases presenting with symptomatic lumbar spondylolisthesis. Nonoperative treatment is successful in most cases. Surgical intervention should be recommended in cases where radiating pain does not subside along with manifestation of bowel and bladder symptoms. Imaging remains the only accurate tool for understanding of tissues involved and to facilitate neurosurgery related decision making. Spondylolisthesis can be visualized using standard lateral films and oblique radiographs are best for detection. Radiographs taken in the position of maximum pain are also recommended. CT Scans and MRI Scans may be used preoperatively to assess the neurological compression, surrounding soft tissues and bony anatomy. Creating awareness about a healthy spine, spine injuries and prevention of spine related diseases can also prove beneficial.

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