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Original Article

A clinico-etiological study of spondylolisthesis in north Indian population

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ABSTRACT:

Objective: To study the clinico-etiological profile of spondylolisthesis in north Indian population.

Methods: This was a cross-sectional study. Detailed clinical evaluation was carried out in all the cases. The complete neurosurgical examination was done. Patient's age, sex, duration of symptom and type of symptoms were recorded in all the patients. After clinical examination, all the patients were subjected to plains X-ray lumbosacral spine anteroposterior, lateral, oblique and dynamic erect flexion and extension view, if necessary.

Results: Out of the total 24 of spondylolisthesis patients, 62.5% were males and 37.5% were females. The most affected age groups was 50-59 years (37.5%). Backache was the most common symptom (95.8%) among the patients. Slip percentage, 10-15 was in 16.7% and equally distributed in other groups. Meryerding's grade I was found in majority of patients (66.7%). Sacral rounding 11-20 and 21-30 was in 33.3% patients. Sacral inclination angle 41-50 was in 41.7%. However, Sacral horizontal angle 31-40 was in 45.8% patients. Lumbo sacral joint angle 10-14 was seen in 37.5% patients and Lumbar wedging/Lumber index 86-90 was observed in 37.5 patients.

Conclusion: This study describes varying clinical presentations of spondylolisthesis suggesting that different pain generators could be managed by different conservative approaches.

Key Words: Spondylolisthesis, Meryerding's grade, Clinical features

INTRODUCTION

The term spondylolisthesis was first used by Newman and Stone (1963) in their article on the etiology of spondylolisthesis. The North American Spine Society (NASS) Evidence Based Clinical Guidelines Committee (NASS Clinical Guidelines, 2014) defines degenerative spondylolisthesis as "an acquired anterior displacement of one vertebra over the subjacent vertebra, associated with degenerative changes, without an associated disruption in the vertebral ring." Isthmic spondylolisthesis is the anterior translation of one lumbar vertebra relative to the next caudal segment caused by an abnormality in the pars interarticularis. When symptomatic, this causes a variable clinical syndrome of back and lower limb symptoms.

The incidence of degenerative spondylolisthesis seen in women is twice that compared with men (Jacobsen et al, 2007; Kalichman et al, 2009). The anatomical differences leading to it are believed to be increased pelvic incidence, L4 vertebral inclination, and facets that are oriented more sagittally in women (Aono et al, 2010). The incidence of isthmic spondylolisthesis is reported to be about 5% to 6% in the adult population and about 12% in the adolescent population involved in high-impact sports such as football, performance athletics, or gymnastics, and in patients suffering from Scheuerman's disease (Fredrickson et al, 1984).

Spondylolysis is considered to be congenital predisposing factor to spondylolisthesis, with an incidence as high as 69% (Albanese and Pizzutillo, 1982). With a high incidence of sacral spina bifida reported,[9]mechanical stresses on a dysplastic spine are considered important etiologic factors (Wynne-Davies and Scott, 1979).

The present study was designed to study the clinico-etiological profile of spondylolisthesis in north Indian population.

MATERIAL AND METHODS

This was a cross-sectional study conducted in a tertiary care hospital in north India. The study was conducted on patients with signs and symptoms of spondylolisthesis who presented to the presenting to the Department of Neurosurgery, KG Medical University, Lucknow.

Detailed clinical evaluation was carried out in all the cases. The complete neurosurgical examination was done. Patient's age, sex, duration of symptom and type of symptoms were recorded in all the patients. The signs and symptoms were

included: back pain, pain in legs hamstring tightness, lower extremity weakness, sensory impairment in spinothalmic & posterior column, Gait disturbance, bladder bowel involvement and local deformity.

After clinical examination, all the patients were subjected to plains X-ray lumbosacral spine anteroposterior , lateral, oblique and dynamic erect flexion and extension view, if necessary.

In plain X-ray, lumbosacral spine grading of severity was done by Meyerding's systems and Taillard's system.

The results are presented in frequencies and percentages.

RESULTS

Out of the total 24 of spondylolisthesis patients, 62.5% were males and 37.5% were females. The most affected age groups was 50-59 years (37.5%) followed by 40-49 & 60-69 (20.8%), 20-29 & 30-39 (8.3%) and 10-19 (4.2%). Spondylolisthesis was higher in males than females in almost all the age groups (Table-1).

Table-1: Age and sex distribution of spondylolisthesis cases

Age in years	Male		Female		Total	
	No.	%	No.	%	No.	%
10-19	1	100.0	0	0.0	1	4.2
20-29	1	50.0	1	50.0	2	8.3
30-39	1	50.0	1	50.0	2	8.3
40-49	3	60.0	2	40.0	5	20.8
50-59	6	66.7	3	33.3	9	37.5
60-69	3	60.0	2	40.0	5	20.8
Total	15	62.5	9	37.5	24	100.0

Backache was the most common symptom (95.8%) among the patients. Radiating pain in lower limbs was the second most common symptom (70.8%). However, decrease sensory sensation was the third most common symptom (58.3%). Tingling and numbness was least common symptom (23.5%). The duration of symptom was <1 and 1-2 years in 25% each. However, the duration of symptoms was 3-4 years in 20.8% patients (Table-2).

Table-2: Distribution of symptomatology of spondylolisthesis cases

	No. (n=24)	%
Symptomatology *		
Backache	23	95.8
Radiating pain in lower limbs	17	70.8
Tingling and numbness	9	37.5
Decrease sensory sensation	14	58.3
Weakness in lower limbs	13	54.2
Duration of symptoms		
<1 years	6	25.0
1-2 years	6	25.0
2-3 years	4	16.7
3-4 years	5	20.8
>4 years	3	12.5

*Multiple response

Slip percentage, 10-15 was in 16.7% and equally distributed in other groups. Meryerding's grade I was found in majority of patients (66.7%). Sacral rounding 11-20 and 21-30 was in 33.3% patients. Sacral inclination angle 41-50 was in 41.7%. However, Sacral horizontal angle 31-40 was in 45.8% patients. Lumbo sacral joint angle 10-14 was seen in 37.5% patients and Lumbar wedging/Lumber index 86-90 was observed in 37.5 patients (Table-3).

Table-3: Distribution of spondylolisthesis cases according to gradings

Characteristics	No. (n=24)	%
Slip%		
10-15	4	16.7
16-20	5	20.8
21-25	5	20.8
26-30	5	20.8
>30	5	20.8
Meryerding's grading		
I	16	66.7
II	8	33.3
III	0	0.0
IV	0	0.0
V	0	0.0
VI	0	0.0
Sacral rounding (%)		
0-10	1	4.2
11-20	8	33.3
21-30	8	33.3
31-40	2	8.3
41-50	1	4.2
Sacral inclination angle		
20-30	3	12.5
31-40	6	25.0
41-50	10	41.7
51-60	4	16.7
61-70	1	4.1
Sacral horizontal angle		
10-20	0	0.0
21-30	3	12.5
31-40	11	45.8
41-50	8	33.3
51-60	2	8.3
Lumbo sacral joint angle		
10-14	9	37.5
15-19	7	29.2
20-24	4	16.7
25-29	4	16.7
Lumbar wedging/Lumber index		
70-75	1	4.2
76-80	1	4.2
81-85	7	29.2
86-90	9	37.5
91-95	4	16.7

DISCUSSION

The finding of this study support epidemiologic patterns previously reported and include a significant male predominance in term spondylolisthesis as well as a trend favoring females in terms of the prevalence of degenerative spondylolisthesis. In the present study, out of the total 24 of spondylolisthesis patients, 62.5% were males and 37.5% were females. These results are also in agreement with those previously reported (Rosenberg, 1975; Jacobsen et al, 2007). In a study (Leonid et al, 2009), out of the total 24 of spondylolisthesis patients, there were 8 (7.7%) males and 17 (21.3%) females.

In this study, The most affected age groups was 50-59 years (37.5%) followed by 40-49 & 60-69 (20.8%), 20-29 & 30-39 (8.3%) and 10-19 (4.2%). In a study (Leonid et al, 2009), spondylolisthesis was present in (1) 0% of <40-years-olds; (2) 2.1% of 40–49-years-olds, (3) 10.8% of 50–59-years-olds, (4) 41.7% of 60–69-years-olds and (5) 16.7% of ≥70-years-olds. The findings of the present study are in accordance with the results of the Copenhagen Osteoarthritis Study (Jacobsen et al, 2007) that also showed that spondylolisthesis was significantly associated with increased age in both sexes.

The duration of symptom was <1 and 1-2 years in 25% each in the present study. The finding of this study is in agreement with other studies Fitzgerald and Newman (1976) and Kazuo et al (1992).

In the present study, Slip% 10-15 was in 16.7% and equally distributed in other groups. Meryerding's grade I was found in majority of patients (66.7%). Sacral rounding 11-20 and 21-30 was in 33.3% patients. Sacral inclination angle 41-50 was in 41.7%. However, Sacral horizontal angle 31-40 was in 45.8% patients. Lumbo sacral joint angle 10-14 was seen in 37.5% patients and Lumbar wedging/Lumber index 86-90 was observed in 37.5 patients. These findings are almost to other studies (Samuel et al, 1970; Gill et al, 1955; Kazuo et al, 1992).

In the present study, Meryerding's grade I was found in majority of patients (66.7%). This is in contrast to the study by Hagenmaier et al (2013) in which grade II was most common. The difference between the studies might be due different socio-demographic profile of the patients.

The clinical presentation of spondylolisthesis is quite variable and is not well correlated with the degree of deformity or degenerative changes (Berven et al, 2002). Pain with concurrent symptomatic spinal stenosis is the most characteristic presentation of degenerative spondylolisthesis. The absence of a significant correlation in this study suggests that it may not actually be a major source of backache in the general population. Alternatively, these findings may again be due to the relatively small sample size.

CONCLUSION

This study describes varying clinical presentations of spondylolisthesis suggesting that different pain generators could be managed by different conservative approaches.

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