

Lumbar Intervertebral Disc Herniation: Age Distribution and Patterns of Herniation.

M AHMAD N AHMAD I A RAJA.

Deptt. of Neurosurgery, Lahore General Hospital / King Edward Medical College, Lahore

Correspondence to: Dr. Manzoor Ahmad,

This prospective study was conducted in the department of Neurosurgery, Lahore General Hospital, Lahore. It comprised of 160 patients of all age groups and of either sex who were operated for lumbar disc prolapse. The results were analyzed which showed that males were 72.5 % and females 27.5 % with a ratio of 2.6:1. Largest number of patients (35 %) presented in fourth decade of life. 90.6% patients had prolapsed intervertebral disc at a single level and 9.4 % at multiple levels. Most of the patients (92.4 %) had prolapsed disc at L4-L5 & L5-S1 levels. These results will be discussed in detail and compared with other studies.

Key Words: Intervertebral disc, herniation, incidence of.

Each lumbar disc consists of two components, the nucleus pulposus, and a lamina fibrosa container, the annulus fibrosus. The annulus fibrosus is reinforced anteriorly by the anterior longitudinal ligament and posteriorly by the posterior longitudinal ligament. Nucleus pulposus is slightly eccentric in a posterior direction. It blends imperceptibly with the annulus^{2,3}.

Mixter and Barr in 1934 published for the first time a clinically adequate description of disc herniation as the cause of leg pain^{1,2,13}.

Prolapsed intervertebral disc is not an uncommon problem in our society and constitutes about 10 % of all backache patients⁹. Patients with a proven lumbar disc prolapse have a higher risk for a subsequent proven disc prolapse than the general population. The risk for recurrent disc prolapse is about 10 times higher during the first 10 years after operation and five times higher in the following 10 years. The cumulative risk of having a second proven lumbar disc prolapse during the 20 years post-operatively is about 8 %.

Material & Methods :

This is a prospective study conducted in the department of Neurosurgery Lahore General Hospital, Lahore, from January, 1996 to December, 1998. The study comprised of 160 patients. Patients of either sex and of all age groups were included in the study. Only those patients were included who underwent surgery for lumbar prolapsed intervertebral disc with clear indications for surgery.

The results were analyzed which showed that out of the total 160 patients included in the study, males were 116 (72.5 %) and females were 44 (27.5 %) with a male to female ratio of 2.6 : 1 (Table 1)

Table 1 Sex Distribution

Sex	n	%
Male	116	72.5 %
Female	44	27.5 %

Male : Female = 2.6 : 1

The youngest patient was 21 years of age while the oldest was of 75 years. The age distribution of these patients was as shown in table 2.

Table 2 Age Distribution (n = 160)

Age	N	%age
21 to 30 years	42	26.25%
31 to 40 years	56	35.0 %
41 to 50 years	34	21.25%
51 to 60 years	20	12.50%
61 to 70 years	6	3.75%
71 to 80 years	2	1.25%

Out of the total 160 patients, 145 patients (90.6 %) had the prolapsed inter-vertebral disc at a single level while 15 patients (9.4 %) had the lesion at multiple (double) levels. Analysis of the patients with prolapsed inter-vertebral disc at single level (145 patients) showed the results as shown in tables 3,4&5.

Table 3 Level Of Prolapsed Intervertebral Disc (n = 145)

Level	n	%age
L1-L2	2	1.4 %
L2-L3	2	1.4 %
L3-L4	7	4.8 %
L4-L5	97	66.9 %
L5-S1	37	25.5 %

Table 4 Level Of Prolapsed Intervertebral Disc In Males (n = 103)

Level	n	age
L1-L2	2	2.0 %
L2-L3	3	3.0 %
L3-L4	8	8.0 %
L4-L5	60	58.0 %
L5-S1	30	29.0 %

Table 5 Level Of Prolapsed Intervertebral Disc In Females (n = 42)

Level	n	%age
L3-L4	2	4.7
L4-L5	33	78.6
L5-S1	7	16.7

Analysis of the patients with prolapsed intervertebral disc at multiple levels (15 patients) showed that males were 13 (86.7 %) and females were 2 (13.3 %). Nine patients (60 %) had the prolapsed inter-vertebral disc at L4-L5 and L5-S1, 5 patients (33 %) at L3-L4 and L4-L5, and one patient (7 %) had the lesion at L2-L3 and L4-L5.

Out of the total 160 patients, 10 patients (6.3 %) underwent surgery for recurrent prolapsed intervertebral disc. As far as the operative procedure is concerned, full / partial laminectomy with bilateral exposure was done in 124 patients (77.5 %) and unilateral exposure (fenestration) in 36 patients (22.5 %). In three of the patients, micro-discectomy was done, removing only the ligamentum flavum.

Discussion :

In this study males were 72.5 % and females 27.5 %, male to female ratio being 2.6 : 1. In a study by Bruske-Hohlfeld et. al., this ratio was 1.6:1. Weber reported a ratio of 1.4:1 and Spangfort a ratio of 2:1¹. In a study by Ilyas et.al., males were 60 % and females 40 %, with a ratio of 1.5:1(4). In another study, males were 65 % and females 35 %, with a ratio of 1.9:1⁵. In a previous study in this department in 1992, males were 80 % and females 20 %, with a ratio of 4:1⁶. The disease is more in males as they are engaged in more heavy manual work.

In this study the age distribution was as shown in table 2, which shows that the largest number of patients were in fourth decade (35 %) followed by third (26.25 %) and fifth decade (21.25 %). The age range was 21 to 75 years. In another study this range was 22-65 years (5). In 1992 a study in this department gave similar results_ 35.2 % in fourth and 28.5 % in fifth decade (6). So the pattern of disease has not changed much during the last 8-10 years. Another study showed that this disease was seen mainly in third & fourth decades⁸.

In this study, 9.4 % patients had prolapsed intervertebral disc at multiple (double) levels. In a study at Peshawar this figure was 15 %⁴ and at Faisalabad it was 11.8 %⁵. Two other studies had the incidence of 8.2 %⁶ and 12.6 %⁸.

In our study the largest number of patients had prolapsed intervertebral disc at L4-L5(66.9 %), followed by L5-S1(25.5 %). Combined together, 92.4 % patients had prolapsed intervertebral disc at L4-L5 and L5-S1 levels. On analyzing it further, in males the prolapsed intervertebral disc at L4-L5 was found in 58 % patients while in females it was quite high, 78.6 %. Likewise prolapsed intervertebral disc at L5-S1 was seen in 29 % males while in females it was in 16.7 % patients only. Another significant finding was that none of the female patients had prolapsed intervertebral disc at L1-L2 or L2-L3 levels.

Another study stated that approximately 95 % of disc herniations occur at the L4-L5 or L5-S1 level. Approximately 4 % occur at L3-L4 level and only about 1

% at L2-L3 and L1-L2 levels³. In a study at Faisalabad, herniated lumbar disc involved L4-L5 in 51 % and L5-S1 in 32 % of the cases⁵.

A study in 1992 showed that prolapsed intervertebral disc at L4-L5 was in 59.5 % patients and at L5-S1 in 29.6%⁶.

In a study by Decker & Shapiro, surgically proven disc herniations were as: 59.4 % at L5-S1, 37 % at the L4-L5, 2.9 % at L3-L4 and 0.7 % were noted at L2-L3 level⁷.

Spangfort studied 49 publications with a total of 15235 operations and found that most of the lumbar disc herniations were found at L4-L5 (49.8 %) and L5-S1 (46.9 %). Only 3.3 % were in the high lumbar levels (L1-L2, L2-L3, L3-L4). In his own series of 2504 operations, 50 % were at L5-S1, 47.4 % at L4-L5 and 2.1 % at higher lumbar levels⁷.

Kortelainen et.al. in a prospective study showed that 56.8 % of the herniations were at L4-L5 level; 40.7 % at L5-S1 level; 1.7 % at L3-L4 level; and 0.7 % of the herniations were at L2-L3 level⁷.

In our study 6.3 % patients had re-exploration for lumbar prolapsed intervertebral disc. In a study at Faisalabad re-explorations were 7 %⁵.

In three of our patients, micro-discectomy was done. In these patients very limited exposure was needed, excising only the ligamentum flavum. These patients had no intra-operative complications and had excellent post-operative course.

In a study by Stolke et.al., intra-operative complications were 7.8 % in micro-discectomies, 13.7 % in macro-discectomies and 27.5 % in re-operations. Post-operative complications were 3.9 % in micro-discectomies and 4.2 % in macro-discectomies¹².

Conclusion :

- Males were 72.5 % and females 27.5 % with a ratio of 2.6:1.
- Prolapsed intervertebral disc is a disease of relatively younger age group
- 82.5% patients were between 21-50 years.
- Most of the patients had prolapsed intervertebral disc at L4-5 and L5-S1levels
- 92.4 % combined.
- Prolapsed intervertebral disc at multiple levels was found in 9.4 % patients.
- Re-exploration was done in 6.3 % patients.

References :

1. Bruske-Hohlfeld I., Merritt J.L., Onofrio B.M., Stonnington H.H., Offord K.P., Bergstralh E.J., Beard C.M., Melton III L.J. and Kurland L.T. : Incidence of Lumbar Disc Surgery, A Population-Based Study in Olmsted County, Minnesota, 1950-1979. SPINE, Vol.15, No.1, 1990, 31-35.
2. Simeone F.A. : Lumbar disc disease. In Neurosurgery by Wilkins R.H. and Rengachary S.S. (edi.), Vol.3, 1985. McGraw-Hill Book Company (USA) ; pp.2250-2251.

3. Wilkins R.H. : Lumbar Intervertebral Disc Herniation. In Principles of Neurosurgery by Rengachary R.H. and Wilkins R.H.(edi.) ; Mosby-Year Book Company, Ltd., 1994 ; pp. 45.2-45.9 .
4. Ilyas M., Shah A.A.and Khan M.T. : Surgical management of lumbar intervertebral disc herniation .JPMI-1996;Vol.10 , No.1; 89-95 .
5. Salah-ud-din T., Naeem-ur-Rehman M. and Hussain A. : The Outcome of Surgery for Lumbar Disc Herniation, An analysis of 85 operated cases . The Journal of Pakistan Orthopaedic Association; Vol. 9, No. 14 , FEB.1997; pp. 63-68 .
6. Ahmad N., Ahmad B. and Sohail M.T. : Review of 840 cases of prolapsed intervertebral discs treated by surgery . The Journal of Pakistan Orthopaedic Association; Vol. 2, No.5 , August, 1992 . pp. 107-113 .
7. Hsu K., Zucherman J., Shea W., Kaiser J., White A., Schofferman J. and Amelon C. : High Lumbar Disc Degeneration ; Incidence and Etiology . Spine , Vol.15 No. 7, 1990 ; pp.679-682 .
8. Waheed S., Anjum M.N. and Javaid A. : Low back pain-Review of 100 cases . Pakistan postgraduate medical journal ; Vol.7 No.1-2, 1996 ; pp.19-22.
9. Harada Y. and Nakahara S. : A Pathologic study of lumbar disc herniation in the elderly. Spine , Vol.14, No.9; 1989;pp.1020-1024.
10. Kataoka O., Nishibayashi Y. and Sho T. : Intradural lumbar disc herniation ; Report of three cases with a review of the literature . Spine,Vol.14 No.5, 1989, pp.529-532.
11. Hodge C.J.,Jr. : Lumbar intradural disc rupture .: In Neurosurgery by Wilkins R.H. and Rengachary S.S. (edi.) , Vol.3 , 1985 . McGraw-Hill Book Company (USA) ; pp.2264-2265.
12. Stolke D., Sollmann W-P. and Seifert V. : Intra- and Postoperative Complications in Lumbar Disc Surgery .Spine , Vol.14 No.1; 1989. pp.56-59.
13. Finneson B.E.: Lumbar disc excision. In Operative Neurosurgical Techniques .By Schmidek H.H. and Sweet W.H. (edi.) ; 2nd. edition; Vol.2 . W.B. Saunders Company (USA) ;1988.pp.1375-1392 .