



## IMMEDIATE RELIEF OF LUMBER RADICULAR PAIN AFTER SURGICAL EXCISION OF PROLAPSED INTER VERTEBRAL DISC

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### ABSTRACT:

**Objectives:** The objectives of this study was to determine the efficacy of disc excision for the relief of lumbar radicular pain.

**Study Design:** Descriptive study.

**Place and Duration of Study:** Department of Orthopaedics and Spinal Surgery Ghurki Trust Teaching Hospital, Lahore, from September 2008 to August 2009.

**Patients and Methods:** Fifty cases fulfilling the inclusion criteria were selected. Efficacy of disc excision was determined by improvement in Denis pain scale and improvement in straight leg raising (SLR) test. These were noted on 1<sup>st</sup> and 2<sup>nd</sup> post operative days and on 1<sup>st</sup> follow up after 02 weeks.

**Results:** Post operative results were good in 41 (82%) patients, fair in 7 (14%) patients and poor in 02(4%) case.

**Conclusion:** Limited disc excision either through hemilaminectomy or fenestration is a safe, effective and reliable surgical technique for treating properly selected patients of sciatica due to prolapsed intervertebral disc at L4-5 and L5-S1 level. Surgical discectomy provides immediate relief from Radicular Pain than conservative management.

**Keywords:** Sciatica, prolapsed intervertebral disc, limited disc excision.

### INTRODUCTION:

Low back pain due to lumbar disc prolapse is the major cause of morbidity throughout the world affecting mainly the young adults.<sup>1</sup> Lifetime incidence of low back pain is 50-70% with incidence of sciatica more than 40%. However clinically significant sciatica due to lumbar disc prolapse occurs in 4-6% of the population. Male suffer more than females with a ratio of 2.6:1.<sup>2</sup> Majority of patients have herniated disc at single level either at L4-5 or L5-S1 level.<sup>2</sup> The intervertebral disc in adults is composed of the annulus fibrosus and the nucleus

Pulposus. The annulus fibrosus is composed of numerous concentric rings or layers of fibrocartilagenous tissue. The nucleus pulposus, a gelatinous material, forms the center of the disc. The degeneration of the disc results from many factors and can lead to prolapse into the intervertebral foramen, particularly at L4-5 or L5-S1. The L3-L4 and L2-L3 account for the majority of remaining herniations of the outer most layers of the annulus fibrosus, stretching or tearing of the posterior longitudinal ligament and

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pressure on the dura. If the disc protrudes to one side it may irritate the dural covering of the adjacent nerve root causing pain in the buttock, posterior thigh and calf. This radiating pain is called sciatica or lumbar Radiculopathy.<sup>3</sup> Pressure on the nerve root itself causes paraesthesia and / or numbness in the corresponding dermatomes, as well as weakness and depressed reflexes in the muscles supplied by the nerve root. Detailed history, clinical examination supplemented by relevant radiological investigations can differentiate from other causes low back pain and sciatica.<sup>2</sup>

The natural history of sciatica due to disc prolapse is characterized by exacerbations and remissions with eventual improvement regardless of treatment.<sup>4</sup> Initial management of the patient with sciatica is conservative with bed rest, analgesics, physiotherapy and caudal epidural injections.<sup>5</sup> Conservative treatment may decrease costs compared to surgery but possibly at the expense of delayed recovery.<sup>6</sup> Indications for operative removal of herniated lumbar disc are:

- 1-Cauda Equina compression syndrome.
- 2-Neurological deterioration while under conservative treatment.
- 3-Persistent pain and signs of sciatic tension after conservative treatment for at least six weeks.

The presence of a prolapsed disc, and the level, must be confirmed by MRI before surgery.<sup>3,7</sup> Surgical Discectomy for patients with sciatica due to lumbar disc prolapse provides faster relief from the acute attack than conservative management.<sup>8</sup>

## PATIENTS AND METHODS:

**Objectives of the study:** The study was conducted to determine the efficacy of disc excision for the relief of lumbar radicular pain.

### Operational Definitions:

#### Efficacy:

1. Improvement in Denis Pain Scale
2. Improvement in straight leg Raising(SLR)

### Hypothesis

Excision of the prolapsed intervertebral disc improves low back pain and provides immediate relief of radicular pain (Sciatica)

**Setting:** Department of Orthopaedics and Spinal Surgery, Lahore Medical & Dental College / Ghurki Trust Teaching Hospital, Lahore

**Duration:** One year from September 2008 to August 2009.

**Study Design:** Descriptive study

**Sample Size:** 50 cases fulfilling the inclusion criteria were included.

**Sampling Technique:** Non probability: purposive sampling.

**Inclusion Criteria:** Age range 25-45 years, either sex, MRI proven cases of disc prolapse at L4-5 and L5-S1 level with Radiculopathy (sciatica) not responding to conservative treatment for at least six weeks, SLR less than 60 degree.

**Exclusion criteria:** Cauda equina Compression syndrome, Failed back syndrome, Presence of infection (Discitis), History of bleeding disorder.



**Data Collection:** The study was performed on 50 patients admitted in our ward. After taking history, chief complaints were noted. Severity of radicular pain was assessed according to Denis Pain Scale. Demographic information (age, gender and occupation) were recorded. Clinical examination was performed and neurological findings including SLR in degree were noted. Provisional diagnosis of herniated disc was confirmed by Magnetic Resonance Imaging (MRI) of Lumbo-sacral spine and the type of disc lesion (Protruded, extruded, sequestered) recorded. Confounding variables were controlled by strictly following the inclusion and exclusion criteria. If clinical diagnosis and MRI findings were consistent with herniated disc then infection was ruled out with CBC + ESR and patient was booked for the study. Procedure was explained and written informed consent was taken. Bleeding disorders were ruled out only on history. Disc Excision was performed either through fenestration or through Hemilaminectomy. Efficacy of disc excision was determined by improvement in Denis pain scale and SLR. These were noted after two weeks. All information was recorded in a proforma.

**Data Analysis:** The collected data was transferred and analysed by using SPSS version 10.0. The analysed variables included demographic information (age, gender, occupation), chief complaints, side of radiculopathy (Right or Left) type of disc lesion on MRI, improvement in Denis pain scale and SLR. The quantitative data e.g., age was calculated and represented as using mean and standard deviation. Variables of qualitative data e.g., gender, occupation

chief complaints, type of disc lesion, side of Radiculopathy and procedural complications was assessed by using frequency / percentage. Improvement in Denis pain scale and SLR before and after the intervention was compared by using chi-square test. P value = 0.05 was taken as statistically significant.

### RESULTS:

The study group comprised 50 patients who underwent open lumbar discectomy over one year period, from September 2008 to August 2009. 31 patients (62%) had disc herniation at L4-L5, 16 (32%) had disc prolapse at L5-S1 and remaining 3 (6%) had two level disc prolapse at L4-L5 and L5-S1 (Table I). The mean age of the patients was  $37.4 \pm 5.68$  years. There were 19 (38%) patients of age range 25 - 35 years and 31 (62%) patients of age range of 36-45 years. 28 (56%) were males and 22 (44%) were females. 43 (86%) patients presented with back pain and Radiculopathy and 7 (14%) presented with unilateral radiculopathy with out back pain. 32 (64%) patients had Rt. Radiculopathy while 18 (36%) patients had Lt Radiculopathy.

Regarding neurological status, 7 (14%) patients had absent anklejerk on the affected side while 18 (36%) patients had weakness of Eextensor hallucis longus. Remaining patients had intact neurology. In the distribution of type of disc lesion on MRI, there were 43 (86%) patients of protruded disc, 5 (10%) patients of extruded disc and 2 (4%) patients of sequestered disc.

Disc excision through fenestration was adequate in 33 cases (66%). Only 17 cases (34%) required unilateral hemilaminectomy for discectomy.



According to Denis pain scale, before disc excision there was no patient of no pain, (P1) and mild pain (P2), 10 (20%) of moderate pain (P3), 32 (64%) patients of severe pain (P4) and 8 (16%) patients of constant pain (P5). Postoperatively at 02 weeks, there were 41(82%) patient of no pain (P1), 7 (14%) patients of mild pain (P2) and 02 (2%) patient of moderate pain (Table II)

In the improvement of SLR, before disc excision there were 50 (100%) patients of less than 60° SLR. Postoperatively at 02 weeks, there were 3 (6%) patients of 51-60 SLR, 7 (14%) patients of 61-70 SLR, 13 (26%) patients of 71-80 SLR, 23 (46%) patients of 81-90 SLR and 4 (8%) patients of more than 90 SLR (Table III).

**TableI:** Distribution of cases according to level of involvement (n=50)

PIVD	Frequency	Percentage
L4 L5	31	66.0
L5 S1	16	32.0
L4 L5, L5 S1	3	16.0
Total	50	100

**TableII:** Distribution of cases according to Denis pain scale (n=50)

Preoperative Denis Pain Scale			Postoperative Denis Pain Scale		
Denis Pain Scale	Frequency	Percentage	Denis Pain Scale	Frequency	Percentage
P1	0	0	P1	41	82
P2	0	0	P2	7	14
P3	10	20	P3	2	4
P4	32	64	P4	0	0
P5	8	16	P5	0	0

**Key Points:**

- P1: No pain
- P2: Minimal pain that does not require regular medication
- P3: Moderate pain that require regular medication
- P4: Severe pain that is severe enough to interfere with work and normal activities
- L5: Constant pain.

**Note:** The difference between the dennis pain scale before and after operation was tested through Epi Cal c 2000.

**TableIII:** Distribution of cases according to SLR in Degree (n=50)

Preoperative SLR in degree			Post operative SLR in degree		
SLR in degree	Frequency	Percentage	SLR in degree	Frequency	Percentage
20-30	3	6	20-30	0	0
31-40	11	22	31-40	0	0
41-50	5	10	41-50	0	0
51-60	31	62	51-60	3	6
61-70	0	0	61-70	7	14
71-80	0	0	71-80	13	26
81-90	0	0	81-90	23	46
>91	0	0	>91	4	8

Uncorrected Chi Square = 225.65

Df=7

P=0.0002

**Note.** The difference between the SLR in degrees before and after the Operation was tested through Epi Calc 2000

**DISCUSSION:**

Patients with back pain can be grossly divided into two groups. The first has primary back pain with little or no component of radicular symptoms due to nerve root irritation. The second has primary radicular pain, which usually has some component of back pain. Surgical treatment for primary back pain associated with prolapsed disk but without radiculopathy is more controversial and less successful. In contrast, for primary



lumbar radicular pain syndrome or sciatica, the common clinical perception has been that surgical treatment is more effective. In working-age group, by far the most common cause of sciatica has been lumbar disk herniation.<sup>9</sup>

Literature review reveals success rates for lumbar discectomy from 46-96%. The outcome of lumbar discectomy depends more on patient selection than on surgical technique. In our study, fenestration was adequate in 37 cases (74%). No hemilaminectomy was required in these cases. Remaining 13 patients (26%) required hemilaminectomy. Most of these patients had disc prolapse at L4-L5. The interlaminar approach without hemilaminectomy gives adequate space for disc excision at L4-5 and L5-S1 levels in the majority of the cases. A few authors have reported a higher level of success, a shorter hospital stay and a quicker return to work with microdiscectomy but that has not been established in well-controlled studies. In our series, the operating time, in patient stay and success rates were comparable to the results of microdiscectomy reported in various series.<sup>10</sup> This might be due to close similarity of the two techniques.

A Cochrane review summarised the available randomised clinical trials evaluating disc surgery and chemonucleolysis.<sup>11</sup> In chemonucleolysis the enzyme chymopapain is injected in the disc with the purpose of shrinking the nucleus pulposus. The review reported better results with disc surgery than with chemonucleolysis in patients with severe sciatica of relatively long duration varying from more than four weeks to more than four months. Chemonucleolysis was more effective than placebo. Indirectly therefore the review suggested that disc surgery is more effective than placebo. On the basis of data from three trials the authors concluded

that evidence is considerable that surgical discectomy provides effective clinical relief for carefully selected patients with sciatica as a result of lumbar disc prolapse that fails to resolve with conservative care. A recent review came to the same conclusion.<sup>12</sup>

The large spine patient outcomes research trial (a randomized trial) and related observational cohort study was carried out in the United States.<sup>13,14</sup> Patients with sciatica for at least six weeks and confirmed disc herniation were invited to participate in either a randomized trial or an observational cohort study. Patients in the trial were randomized to disc surgery or to conservative care. Patients in the cohort study received disc surgery or conservative care based on their preference. In the randomized trial (n=501) both treatment groups improved substantially over two years for all primary and secondary outcome measures. Small differences were found in favor of the surgery group, but these were not statistically significant for the primary outcome measures. The observational cohort included 743 patients. Both groups improved substantially over time, but the surgery group showed significantly better results for pain and function compared with the conservative group. The authors did mention caution in interpreting the findings because of potential confounding by indication and because outcome measures were self reported.<sup>14</sup> The results indicate that both conservative care and disc surgery are relevant treatment options for patients with sciatica of at least six weeks' duration. Surgical intervention may provide quicker relief of symptoms compared with conservative care, but no large differences have been found in



success rate after one or two years of follow-up. Patients and doctors may thus weigh the benefits and harms of both options to make individual choices. This is especially relevant because patients' preference for treatment may have a direct positive influence on the magnitude of the treatment effect.

### CONCLUSION:

1. Surgical discectomy for carefully selected patients with sciatica due to lumbar disc prolapse provides immediate relief from the acute attack than conservative management.
2. Recovery from sciatica makes early surgery likely to be cost effective compared with prolonged conservative care.

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