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Comparative Study of Conservative Treatment Vs Discectomy For Management Of lumbar Inter Vertebral DISC PROLAPSE

Dr.MOHAN CHAKRI GAVARA(M.S.ORTHO)[1],Dr.RISHI KUMAR GORLE(M.S.ORTHO)[2],Dr.S.SASI BHUSHANA RAO, M.S,M.Ch ORTHO[3],

[1](Junior resident, Department of Orthopaedics, Maharajah's institute of medical sciences, Nellimarla, Vizianagaram, Andhra Pradesh-535217,India.),

[2](Junior resident, Department of Orthopaedics, Maharajah's institute of medical sciences, Nellimarla,Vizianagaram,Andhra Pradesh-535217,India.),

[3](HOD &Professor, Department of Orthopaedics, Maharajah's institute of medical sciences, Nellimarla, Vizianagaram, Andhra Pradesh-535217,India.),

ABSTRACT

INTRODUCTION: *Lumbar disc prolapse is significant medical problem. But efficacy of treatment and type of treatment to choose is less clear. Either conservative treatment or surgical treatment requires careful and detailed approach in management of Lumbar disc prolapse.*

METHODS:*It was aHospital based Prospective Observational study done in the Department of Orthopedics, Maharajah's Institute Of Medical Sciences, Nellimarla, Vizianagaram during the period between January 2021 to June 2022 with Convenient sample of thirty cases of lumbar intervertebral disc prolapse patients of age between 20 to 80yrs, with clinical symptoms & signs and radiological evidence treated either conservatively or surgically. All patients were assessed for follow-up review at 6, 24 & 36 weeks using Visual-analogue scale(VAS) for back and leg pain, Oswestry Disability index (ODI) Scores.*

RESULTS : *In conservatively treated group 100% improvement of sensory deficit was seen followed by motor deficit recovery around 83.3%. Whereas in surgical group 85.7% improvement of motor deficit was seen followed by sensory deficit recovery around 75%. There was rapid decline in VAS score among surgical group at 6weeks follow up postoperatively compared to conservative treatment group later a gradual decrease at follow-up during 24 and 36 weeks which was statistically significant. There was statistically proved highly significant difference in ODI scores(p value <0.01) between two groups during later follow up visits at 24 weeks and 36weeks.*

CONCLUSION: *Surgical treatment shown benefit on recovery compared to conservative treatment – statistically proven. Patients who underwent surgery for prolapsed lumbar disc achieved better improvement in outcomes than nonoperatively treated patients.*

KEYWORDS: *lumbar disc prolapse, Visual-analogue scale, Oswestry Disability index Scores.*

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I. Introduction:

Now-a-days, low back pain- ancient curse, appearing as modern epidemic. At some time in life, 80% of population gets affected by pain in lower back region. Impairments of spine is frequent cause of activity limitation in people of all age groups. Mainly Lumbar disc region is responsible for over 90% of organic symptoms causing low backache.

Lumbar disc prolapse, considered to be main cause of low backache & sciatica. Sciatica- characterized by radiating pain in gluteal region and leg caused by compression of one (or more) nerve roots in lumbar or sacral spine. Sometimes it is also associated with both sensory & motor deficits. Sciatica resulting from a lumbar intervertebral disc herniation is the most common cause of radicular leg pain in adult working populations. Lumbar disc prolapse is significant medical problem. But efficacy of treatment and type of treatment to choose is less clear. Either non-surgical i.e., conservative treatment or surgical treatment requires careful and detailed approach in anticipating, prevention and management of Orthopedic complications that are part of treatment of the spine for discogenic disease. Lumbar discectomy - one most popular surgical procedure performed in patients suffering with sciatica [1,2] Lumbar region intervertebral disc herniation occurs even in non-symptomatic patients also, and sometimes often spontaneously regress without surgery.[3,4,5] Conservative treatment, including physical therapy, non-surgical treatment, are alternative approaches for symptomatic

patients. Nearly 90% sciatica cases caused by prolapsed lumbar disc resolve with conservative treatment.[6] Conservative treatment of prolapsed lumbar disc has low risk of complications compared to surgery & preferred by majority of patients.[7]Surgical treatment was open discectomy as described by Delamarter & McCulloch and Spengler, with examination of involved nerve root, with patient under general anesthesia, in knee–chest position.[8]

With this background presentstudy was doneto evaluate and compare the outcome of conservatively treated intervertebral lumbar disc prolapse cases with discectomy.

II. MATERIALS AND METHODS:

It was aHospital based Prospective Observational study done in the Department of Orthopedics, Maharajah's Institute Of Medical Sciences, Nellimarla, Vizianagaram during the period between January 2021 to June 2022 (for 18 months duration). This study included Convenient sample of thirty cases of lumbar intervertebral disc prolapse patients of age between 20 to 80yrs, with clinical symptoms & signs and radiological evidence treated either conservatively or surgically in Orthopedics Department at MIMS, Nellimarla, Vizianagaram. Allocating patients to treatment interventions was decided based on patients clinical indications. Cases were followed up to evaluate and compare outcome of both conservative and surgical management.

INCLUSION CRITERIA-

1. Patients of age between 20 to 80yrs with persistent clinical symptoms,
2. Imaging evidence -MRI(Magnetic resonance imaging) scan
3. Motor deficit

EXCLUSION CRITERIA:lumbar intervertebral disc prolapse Patients with

1. Structural scoliosis
2. Spondylolisthesis
3. Congenital anomalies
4. Developmental dysplasia
5. Infections of spine specific or nonspecific
6. Cauda Equina syndrome
7. Failed back syndrome
8. Disc herniations at multiple levels
9. Tumors of lumbar spine

After considering inclusion criteria, history in detail was taken and also clinical examination was done based on which patients were categorized either conservatively or surgically treated with discectomy after getting written informed consent from them regarding risks and complication involved. Study included total 30 patients among them 15 were operated for intervertebral disc prolapse by discectomy and 15 were treated conservatively. All patients were assessed for follow-up review at 6, 24 & 36 weeks. All the patients were assessed using Visual-analogue scale(VAS) for back and leg pain, Oswestry Disability index (ODI) Scores findings assessed at 6, 24 & 36weeks.

Visual Analog Scale (VAS) is most commonly straight 10cm line, without demarcation, with words "no pain" at the left-most end and "worst pain imaginable" at the right-most end.[9] Oswestry Disability index(ODI)[10] is an extremely important tool used to measure patient's permanent functional disability pertaining to low back pain. Good or excellent outcomes represented minimal to no disability scores of 15% or less. Fair outcomes represented levels of minimal to moderate disability scored between 15 and 30%. Poor outcomes represented levels of moderate-to-severe disability scores of>30%. In this study, we have taken MRI based Pfirrmann grading system[31] for proper selection process of patients. Present study, compared outcomes of patients with lumbar disc herniation, who underwent surgery with patients who took conservative treatment. MRI Scan was carried out to confirm the diagnosis and know level and type of lesion. Patients were counselled for both means of treatment and were explained all related complications. Surgical treatment in the form of standard lumbar open discectomy was planned. The nonsurgical treatment protocol was minimum of 3 weeks of strict bed rest. Mobilization was gradually instituted once patient had substantial pain relief and muscle spasm. Bed rest was supplemented with NSAIDS or Opioids depending on patient's tolerance and muscle relaxants for 4weeks. As pain diminishes, patient was encouraged to begin home-based spinal exercises, walking within comfort limits was encouraged. Prolonged sitting, especially riding a car or bike was discouraged, interferential therapy and short-wave diathermy were also advised.

Ethical Considerations: An approval for the study was obtained from Institutional Ethical Committee. Informed written consent was obtained from the participants after explaining about study.

III. RESULTS:

Age of patients varied from 21 – 80 years with mean age as 48.3years.Mean ageofmale patientswas 46±3.7yrsand mean ageoffemales patientswas 44±5.4yrs.

Incidence of disc prolapse among conservative treatment group was high(46.6%) among patients of 21-40yrs age group whereas among surgically treated patients maximum incidence(60%) was in 41-60yrs age group. There were total 18 males (60%) and 12 females (40%). Out of15 patients in conservatively treated group 11 (73.3%) were males & 4(26.7%) were females.Out of 15 patients in surgically treated group 8(53.3%) were females & 7(46.7%) weremales. Out of 15 patients in surgically treated group 73.3% were heavy workers whereas 66.7% in conservatively treated group were light workers.

All cases both in conservatively and surgically treated groups came with complaints of low backache and radicular pain. Among theconservatively treated group, 6 patients had weakness and 5 patients had paraesthesia when compared to 13 & 10 patients in surgically treated group respectively.

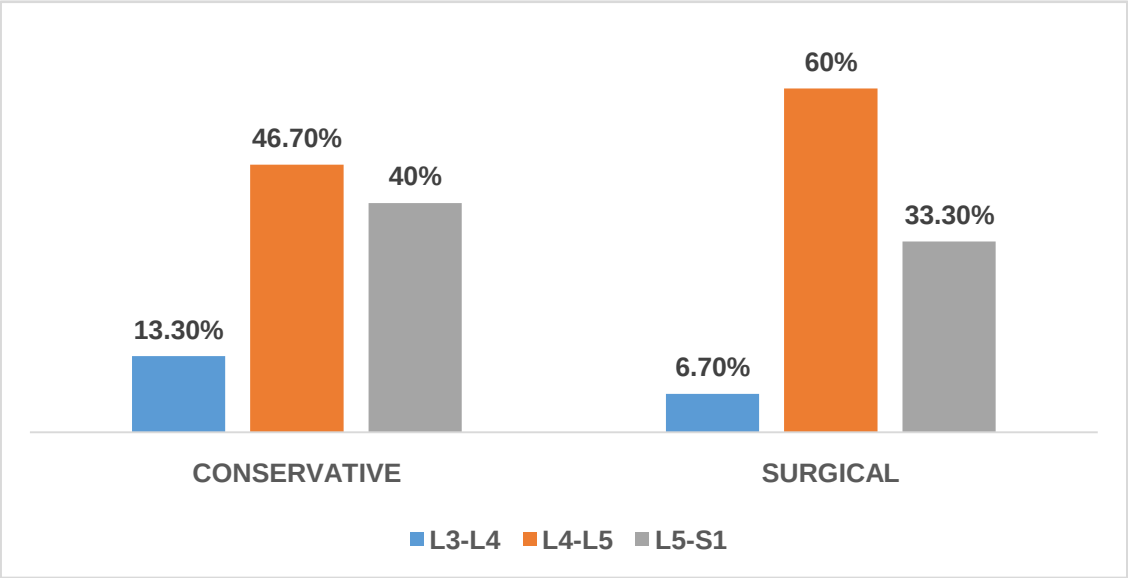

Figure 1- Pie diagram showing lesion level wise distribution of patients

Commonest level of prolapse was at L4–L5(46.7%), followed by L5-S1(40%) and in surgically treated group at L4–L5(60%) and L5-S1(33.3%).

Majority of patients both in conservative treatment 9(60%) & surgically treated 7(46.7%) groups have disc prolapse in stage of protrusion followed by prolapse in conservative treatment 4(26.7%) & surgically treated 6(40%) groups.

Table 1: Distribution of patients based on signs & symptoms treated conservatively and surgically in this study

Signs	Conservative- treatment	Surgical treatment
	No of patients(%) n=15	No of patients(%) n=15
SLRT	13(86.7%)	15(100%)
Paraspinal spasm	12(80%)	13(86.7%)
Restricted spinal movements	10(66.7%)	10(66.7%)
Motor deficits	6(40%)	7(46.7%)
Sensory deficits	6(40%)	8(53.3%)
Sluggish or absent ankle jerk	3(20%)	4(26.7%)

Majority of patients had positive SLRT along with paraspinal spasm. Motor& Sensory deficits were high in surgically treated group when compared to conservatively treated group.

	Conservatively Treated			Surgically Treated		
	Improved	Not improved	Total	Improved	Not improved	Total
Motor	5(83.3%)	1(6.7%)	6	6(85.7%)	1(14.3%)	7
Sensory	6(100%)	0	6	6(75%)	2(25%)	8

Table 2: Distribution of patients based on outcome of neurological deficits among conservatively and surgically treated in the study

In conservatively treated group 100% improvement of sensory deficit was seen followed by motor deficit recovery around 83.3%. Whereas in surgical group 85.7% improvement of motor deficit was seen followed by sensory deficit recovery around 75%.

Table 3- Distribution of patients based on VAS Scores for back pain and radicular pain among patients treated conservatively and surgically in this study

	Conservative Treatment		Surgical Treatment		P value
	Mean	sd	Mean	sd	
VAS before t/t	5.3	0.6	6.9	0.6	P<0.0001
VAS 6 weeks	3.8	0.5	1.5	0.7	P<0.0001
VAS 24 weeks	2.9	0.7	1.3	0.5	P<0.0001
VAS 36 weeks	2.2	0.8	1.0	0.6	P<0.0001

Assessment of VAS score differences on back pain between two treatment groups was performed by comparing their means. Effect of treatment at each point of follow-up period was presented in the above table. There was statistically proven highly significant difference(p value <0.01) of VAS Scores before treatment and during initial follow-ups after 6 weeks,24 weeks and 36 weeks between two groups. There was rapid decline in pain score among surgical group at 6weeks follow up postoperatively compared to conservative treatment group later a gradual decrease at follow-up during 24 and 36 weeks which was statistically significant.

Table 4- Distribution of patients based on ODI Scores among patients treated conservatively and surgically in this study

	Conservative Treatment		Surgical Treatment		P' value
	Mean	sd	Mean	sd	
ODI before t/t	54.8	11.8	68.5	9.9	P=0.0018
ODI 6 weeks	38.6	10.1	31.8	5.6	P=0.0304
ODI 24 weeks	30.2	6.3	24.7	4.4	P=0.0098
ODI 36 weeks	22.8	4.8	18.2	3.2	P=0.0045

Assessment of ODI scores differences between two groups was performed by comparing means. Effect of treatment at each point of follow up period was presented in the above table. There were statistically proven significant difference(p value <0.05) of ODI Scores during initial follow-up after 6 weeks between two groups. There was statistically proved highly significant difference(p value <0.01) between two groups during later follow up visits at 24 weeks and 36weeks.

Pre - OP SLRT of 50-60

^{0}Post - OP SLRT of 80^{0}

Assessing Power of FHL

EDL

SLRT of 60^{0} after Conservative management

IV. DISCUSSION:

Disc prolapse surgery was falsely accredited as first done by Mixter & Barr, but was done by- Oppenheim & Krause, Berlin, but interpreted as enchondroma - spinal disc. In Mixter and Barr's[11]classical paper -"Ruptured intervertebral disc with involvement of spinal canal" laid path to diagnosis and surgical treatment of intervertebral prolapsed lumbar disc. That approach showed effectiveness of Laminectomy and Discectomy in intervertebral prolapsed lumbar disc management, there was an increasing enthusiasm in treating sciatica problem surgically by discectomy. Even though minimally invasive surgeries like percutaneous

nucleotomy[12,13]and micro-endoscopic discectomy[14] gained attention, discectomy is choice of management by most of surgeons still, and with its favourable outcomes and affordability was reported.[15]

Arfaaz SK, Mohanty SN, Panda AP, Nanda SN, Kumar A, Biswas S conducted prospective observational study on Comparison- surgical and non-surgical treatment in intervertebral lumbar disc prolapse with motor deficit, which included 75 cases with motor deficit in a tertiary healthcare center. Mean age was 33.1 years (surgery-33.2 years, nonsurgery-33 years) and ratio of male and female was 2.57-1 (male:54,female: 21).There was no statistically proven significant difference in patients clinical profile relating to age, gender, and symptoms duration between two groups[16] whereas in the present study, there were total of 18 males (60%) and 12 females (40%) with mean age as 48.3years.

In Rathod et al study, age of patients was between 31 – 65 years,mean age as 45.32 years. Higher incidence of disc prolapse such as 25(50%) was seen in patients between 31-40 years age. Maximum patients 13(43.33%) in conservative treatment group were between age group 51-60yrs whereas in surgical treatment group, maximum patients 19(76 %) were of 31-40-year age.[17] In present study incidence of disc prolapse among conservative treatment group was high(46.6%) among patients of 21-40yrs age group whereas among surgical treatement patients maximum incidence(60%) was in 41-60yrs age group on contrary to the findings of Rathod et al study.[17]

With similar findings as in Rathod et al study[17] all cases both in conservative and surgical groups were with low back pain & radicular pain. Imaging technique used was MRI scan for confirmation of diagnosis among patients. MRI scan was done for all the patients, that documented in conservative group, commonest level of prolapse was at L4–L5(46.7%), followed by L5-S1(40%) and in surgical group at L4–L5(60%) and L5-S1(33.3%). Similar Findings were observed in Rathod et al study[17] and also in Arfaaz SK, Mohanty SN, Panda AP, Nanda SN, Kumar A, Biswas S prospective observational study commonest level was L4–L5.

In this present study majorityofpatientsbothinconservative 9(60%)&in surgical group 7(46.7%) havediscprolapseinprotrusion stage followed by prolapse inconservative treatment4(26.7%)& in surgical treatment group 6(40%)similar to Rathod et al study[17] in which majority patients both in conservative 20(80%) & surgical 17(68%) groups had disc prolapse in stage of protrusion - confirmed by MRI scan.

In this study among conservative group 100% improvement of sensory deficit was seen followed by motor deficit recovery around 83.3%. Whereas in surgical group 85.7% improvement of motor deficit was seen followed by sensory deficit recovery around 75% whereas in Rathod et al study[17] patients with motor deficits were 11 in conservative group & 13 in surgical treatment group whereas patients with sensory involvement were 15 -conservative & 17- surgical group. Mostly patients had neurological recovery except 3 following discectomy & 6 patients in conservative group have no complete neurological recovery.In Arfaaz SK , Mohanty SN, Panda AP, Nanda SN, Kumar A, Biswas S prospective observational study[16] on examination positive SLRT (Lt sided) was most common finding later followed by restricted spinal movements which was similar to this study.

Gugliotta M et al found no evidence of surgical treatment, when compared to conservative treatment, like reduced severity of sciatica or improved quality of life in patients with prolapsed lumbar disc in long term. Pain got relieved quickly in patients who had surgical treatment (at 3-week follow-up), but difference between groups was not there after 3 months duration. Patients in surgical group had less physical impairment during 1-year follow-up, but not in previous or subsequent visits. They concluded surgery was not more effective for neurogenic symptoms or improvement in quality of life over course of study. After one year follow-up, difference of mean scores between groups for any outcome was minimal, including leg pain. Main advantage of early surgical treatment was fast sciatica relief.[18]

Assessment of VAS score differences on back pain between two groups was performed by comparing their means. There was statistically proved highly significant difference(p value <0.01) of VAS Scores before treatment and during initial follow-ups after 6 weeks,12 weeks and 24 weeks between two groups. There was rapid decline in pain score among surgical group at 6weeks follow up postoperatively compared to conservative treatment group. Later a gradual decrease at follow-up during 12 and 24weeks which was statistically significant.

On contrary in Arfaaz SK, Mohanty SN, Panda AP, Nanda SN, Kumar A, Biswas S prospective observational study, assessment of VAS score between two groups was done by RM-ANOVA. There were statistically proved significant differences during initial follow-ups at 1 month, 3 months, and at final 6 months respectively between two groups. They found that there was rapid decline of pain score in surgical group within first 1-month postoperatively compared to conservatively treated group but at final follow-up at 12 months, no statistically proven significant difference was found between two groups.[16]

Assessment of ODI scores differences between two groups was performed by comparing means. There

were statistically proved significant difference(p value <0.05) of ODI Scores during initial follow-up after 6 weeks between two groups. There was statistically proved highly significant difference(p value <0.01) between two groups during later follow up visits at 24 weeks and 36 weeks.

Contrarily in ArfaazSK ,Mohanty SN, Panda AP, Nanda SN, Kumar A, Biswas S prospective observational study, assessment of ODI score between two groups was performed by RM-ANOVA. There was statistically proven significant difference during initial follow-ups at 1; 3 & 6 months, respectively between both groups. At final follow-up, it was found that there was no statistically proven significant difference between two groups. Results revealed that ODI score was affected by treatment modality during the initial period, but still, it is not affected by any sort of treatment during the final follow-up period.[16]

Gugliotta M, et al study stated that compared to conservative treatment, surgical treatment provided fast relief from back pain in patients with lumbar disc herniation, but did not show much benefit in long-term follow-up.[18]

Lequin concluded that after five years of follow-up, there was still no difference in pain, disability between patients of early surgery & prolonged conservative care.[19] Rehabilitation of patients at hospital and home - supervised by physiotherapists using standardized protocol. Patients were resumed to their regular jobs when they were able to do, depending on nature of their work. Treatment aimed mainly at enabling to resume their daily activities. If needed, pain medication was adjusted according to existing clinical situation. Surgical and conservative- both treatments shown long-term benefits on sciatica among patients. Compared with conservative treatment, surgical treatment relieved back pain faster, but after 3 months no difference noted. Surgical treatment is choice for patients with debilitating pain, in need of quick relief, & who did not find improvement with this conservative treatment.

Injam Ibrahim Sulaiman et al study concluded that early surgery for sciatica provides rapid leg pain relief but with close differences in clinical outcomes after one year in comparison with conservative treatment. However, early surgery is still a valid treatment option for well-informed sciatica patient.[20]In this study rapid recovery from pain was seen among patients treated with surgical modality. Patients who underwent surgery for prolapsed lumbar disc achieved better improvement in outcomes than nonoperatively treated patients.

Previous observational studies have also found the same. Rate of recurrence in disc herniation was 3 – 20%[21] and also major cause of failed back surgery syndrome. This shows, there are many factors that influences outcome -lumbar disc surgery. Therefore, emphasis is needed on proper patient selection. Nonetheless, surgical approach to disc hernias of more than six months, associated with degenerative discopathies that not responded to conservative treatment, continues to be great challenges.

V. CONCLUSION:

Surgical treatment shown benefit on recovery compared to conservative treatment statistically proven.
Patients who underwent surgery for prolapsed lumbar disc achieved better improvement in outcomes than nonoperatively treated patients. Surgery provides quicker relief, which may be translated into reduced economic cost.

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