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Research Article

Outcome of Surgical Management in Lumber Disc Prolapse: A Study in Dhaka Medical College Hospital, Dhaka, Bangladesh

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Abstract

A disc herniation is the term given to any uneven out-pouching or bulging of the posterior region (back region) of the intervertebral disc as seen on MRI. The bigger the lumbar/sacral disc herniation, the more likely it is to cause back and/or leg pain--the latter of which is called sciatica1. The aim of this study was to evaluate the surgical outcome in the treatment of Lumber Disc Prolapse (LDP). The prospective interventional study (Quasi experimental) was done in the Department of Orthopedics and Traumatology, Dhaka Medical College and Hospital during the period of June 2009 to July 2011(2 years). Due to time limitation and financial constraint only 35 cases were selected during study period but out of them 29 cases were feasible to be included in the study, remaining 6 cases were lost during follow up. Patients of both sexes aged between 18-70 years with prolapsed lumber intervertebral disc admitted in the Department of Orthopedics and Traumatology were included as purposive sampling. Data was entered, coded, cleaned, and analyzed by using Statistical Package for Social Science (IBM SPSS), version 20. In our study we found, Clinically 17(58.6%) of patients had weakness in extensor hallucis longus (EHL) and 3(10.3%) of patients had weakness in flexor hallucis longus (FHL). 14(48.3%) of patients had sensory deficit over the distribution of L5 nerve root and 6(20.7%) had S1 nerve root. In X-ray there were 6 transitional vertebra and loss of lumbar lordosis was in 20 patients. MRI shows 20(62.5%) of patients had posterolateral disc bulge and 12(37.5) had posterior disc bulge. In majority of patients (65.5%) of patients had disc prolapse at level L4-L5. 53.7% of patients had left sided disc prolapse. Peroperatively seen that 62.5% of the patients had posterolateral disc prolapse and 37.5% patients had central disc prolapse. There were only 10.3% of patients had complications. Among these 6.9% had per operative dural tear and 3.4% developed discitis. At the final follow up most of the patients were pain free. All patients had absence of muscle spasm. No patients had restriction of mobility. Most of the patients regaining their straight leg raising in between 60-90 degree. The overall result of surgery was encouraging. Relief of symptoms occurred in 28 (96.6%) of patients. Out of 35 patients 40% of patients returned to work within 3 weeks of operation and 46.6% patients returned to work within 6 weeks of operation but rest of the cases still did not return to their previous work due to pain.

Keywords: Outcome; Surgical Management; Lumber Disc Prolapse

1. Introduction

A disc herniation is the term given to any uneven out-pouching or bulging of the posterior region (back region) of the intervertebral disc as seen on MRI. The bigger the lumbar/sacral disc herniation, the more likely it is to cause back and/or leg pain--the later of which is called sciatica [1]. Though low back pain and sciatica had affected the human race since time immemorial, until the first quarter of previous century, little knowledge had been acquired about the ways in which the intervertebral disc might cause compression on intra-spinal neural structures. Disc prolapse occurs in the working age adult population as they are the ones most likely to be exposed to trauma due to mechanical stress and strain. The most

likely reason for the earlier age of onset of symptoms of low back pain in our studies is the young age at which our people are exposed to manual labour due to their poor socio-economic condition. Gradually, as medicine advanced as a science, the number of specific diagnosis capable of causing back and leg pain increased dramatically. A number of physical manoeuvres were devised to isolate the true problem in each patient. The most notable of these is the Lasegue sign, or straight leg raising test, described by Forst in 1881 but attributed to Lasegue, his teacher. This test was devised to distinguish between hip disease and sciatica [2]. Prolapsed lumbar intervert-ebral disc (PLID) is an important cause of low back pain and it is one of the frequent cause of disability. Its frequency and annual tool of suffering and disability has been a constant stimulus for investigation in developed countries. Furthermore in Bangladesh a large number of people of working age are suffering from low back pain due to prolapse lumbar intervertebral disc. When conservative management fails, surgery is the only way to treat these patients and different surgical procedures are there. Microdiscectomy, Endoscopic discetomy, Laser discectomy is the operation of developed countries. The prolapsed intervertebral disc is usually seen in fit adults between the ages of 20 and 45, but they can also occur below the age of 20 years and elderly. Males suffer more from interverebral disc prolapse than females.

Almost in 80% of cases, the protrusion is traumatic in origin and there is either a history of sudden severe strain due to heavy weight lifting or patients occupation is one in which flexion strain must be resisted, such as packer, fireman, porter, etc [3]. In 20% of cases the condition is degenerative in origin. There is also a history of minor trauma. The precipitating factor, therefore, is mainly injury immediately or shortly before the onset of a symptom. Since the mechanism demands the combination of stress and mobility, the disc herniations commonly occur at a site where a relatively rigid segment of the spine join a flexible segment, which are subjected to greater stress and mobility. Hence, in the lumbar region, the L4-L5 and L5-S1 discs are most often affected. The standard procedure for disc removal was total laminectomy followed by a transdural approach to the disc. In 1939, Semmes presented a new procedure to remove the ruptured intervertebral disc that included subtotal laminectomy and retraction of the dural sac to expose and remove the ruptured disc with the patient under local anaesthesia [4]. This procedure is now the classic approach for removal of the intervertebral disc. Finally through the anatomic dissections and clinical observations, spinal ageing and the development of pathologic process associated with or complication the process of ageing have evolved as a primary theory in disc disease [5]. To evaluate the surgical outcome in the treatment of Lumber Disc Prolapse (LDP).

2. Materials and Methods

The prospective interventional study (Quasi experimental) was done in the Department of Orthopaedics and Traumatology, Dhaka Medical College and Hospital during the period of June 2009 to July 2011(2 years). Due to time limitation and financial constraint only 35 cases were selected during study period but out of them 29 cases were feasible to be included in the study, remaining 6

cases were lost during follow up. Patients of both sexes aged between 18-70 years with prolapsed lumber intervertebral disc admitted in the Department of Orthopedics and Traumatology were included as purposive sampling.

Moreover, following variables were studied for clinical evaluation Level of involvement, side of involvement, X-ray of lumber spine, MRI of lumbar spine, Relief of rediculopathy, Gait, straight leg raising (SLR), muscle power, sensory deficit, Complications: Root injury, dural tear, discitis, Functional outcome variables: Pain status, relief of presenting symptoms, mobility of spine, return to work, level of activity.Data were collected, complied and tabulated according to key variables. The analysis of different variables was done according to standard statistical analysis by using SPSS. A total of 29 patients with prolapsed lumbar intervertebral disc were operated and followed up routinely. The main objective of the study was to evaluate the prognosis of management of prolapsed lumbar intervertebral disc by laminotomy and discectomy. The result of laminotomy and discectomy was evaluated by using Modified Macnab outcome criteria (Macnab, 1971).

Result	Criteria
Excellent	No pain, no restriction of mobility; return to work and level of activity.
Good	Occasional nonradicular pain; relief of presenting symptoms; able to return to modified work.
Fair	Some improved functional capacity; still handicapped and unemployed
Poor	Continued objective symptoms of root involvement: additional operative intervention needed at the index level irrespective of length of postoperative follow up.

2.1 Inclusion criteria

- Signs of root compression-Sensory, Motor, Reflex.
- Deteriorating signs and symptoms of patients of PLID where leg pain is dominant than
- back pain
- Restricted straight leg raising test with Positive MRI findings refractory to 2-3 weeks of conservative treatment.

2.2 Exclusion criteria

- PLID associated with other spinal pathology e.g. spinal tumor, infection, inflammation etc.
- Repeat lumbar disc surgery due to recurrence of symptoms
- PLID due to direct trauma with fracture-dislocation of vertebra.
- PLID with Cauda-equina Syndrome

3. Results

The mean age of the patients were 38.9 ± 14.0 years ranging from 20-67 years. The mean age of the male patients was 38.5 ± 13.5 years and a female patient was 39.8 ± 16.2 years. Though the mean age of the female patients a little bit higher than the male, but the mean difference was not statistically significant ($p>0.05$). Data indicated that maximum number of

the patients was in age group >40 years (41.4%) followed by 27.6% in the age group 21-30 years, 24.1% in the age group 31-40 years and 6.9% were in the age group <20 years. Clinical examination of the patients indicated that 14(48.3%) had sensory deficit at the level of L5 and 6(20.7%) of patients had sensory deficit at level S1. However, 9(31.0%) patients had intact sensory function. Out of 29 patients, 16(55.2%) had disc prolapse at level L4-L5, 10(35.5%) had at L5-S1, 2(6.9%) had L4-L5 and L5-S1 level and 1(3.4%) patient had disc herniation at L4-L5 and L3-L4.

29 patients had 32 disc prolapse, because 3 patients had two level disc prolapse. It was found that more than half of the disc 17(53.1%) was found on left side, 3(9.4%) on right side and 12(37.5% was found centrally. The mean pain score was 3.0 ± 0.0 preoperatively, 1.79 ± 0.62 during 1st visit, 1.07 ± 0.84 during 2nd visit and 0.24 ± 0.64 during 3rd visit. Repeated measure one way analysis of variance showing that pain significantly decreased from preoperative to 1st visit ($p<0.001$) and also decreased significantly from 1st visit to 2nd visit and subsequent visit ($p<0.005$) shown as marginal estimated mean score. It was found that all of patients had preoperative muscle spasm. However, at 1st visit muscle spasm decreased to 20.7% and at 2nd visit it was only 10.3%. However, only 1(3.4%) patient had muscle spasm at 3rd visit. Repeated measure analysis of variance indicated that muscle spasm significantly decreased from 1st to 2nd visit it was only 10.3%. However, no statistically significant difference of muscle spasm was found between 2nd and 3rd visit ($P>0.05$). Similar to muscle spasm it was found that all of the patients had restricted mobility of the spine. However, following 1st and subsequent visit, it significantly improved from 3.4% to 72.4% ($P<0.323$). At 3rd visit only 1(3.4%) patients had restricted mobility. All the patients were examined for straight leg raising (SLR) on supine position. Preoperatively, the SLR was 42.6 ± 6.3 degree. However, following operation the SLR significantly improved from baseline 89.3 ± 2.6 at 3rd visit. Subjective assessment of patients indicated that majority (72.4%) had excellent function outcome followed by 17.2% had good functional outcome and (6.9%) had fair outcome. However, (3.4%) of patients had poor functional outcome.

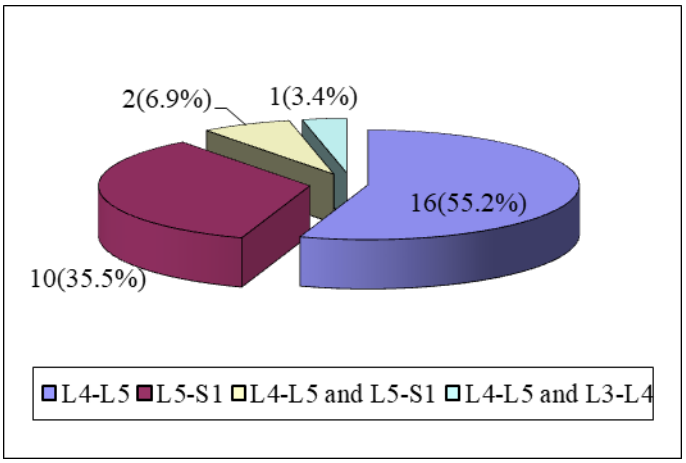

Figure 1: Pie diagram showing the level of disc herniation (n=29).

Stage	Pain score	Mean ± SD	P value
Pre-operative	Absent (0)	3.00 ± 0.0	
1st visit	Occasional (1)	1.79 ± 0.62	0.001[s]
2nd visit	Mild (2)	1.07 ± 0.84	0.001[s]
3rd visit	Moderate (3)	0.24 ± 0.64	0.001[s]

Table 1: Repeated measure of analysis of variance of pain score in different visits (n=29).

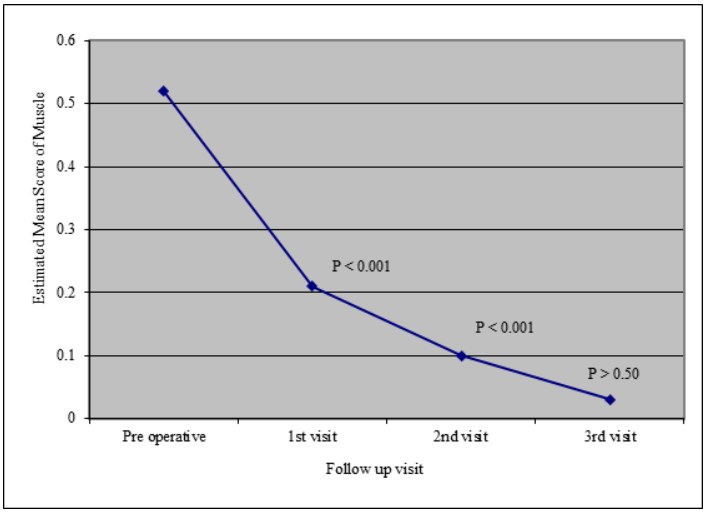

Figure 2: Repeated measure of analysis of variance of Muscle spasm in different visits (n=29).

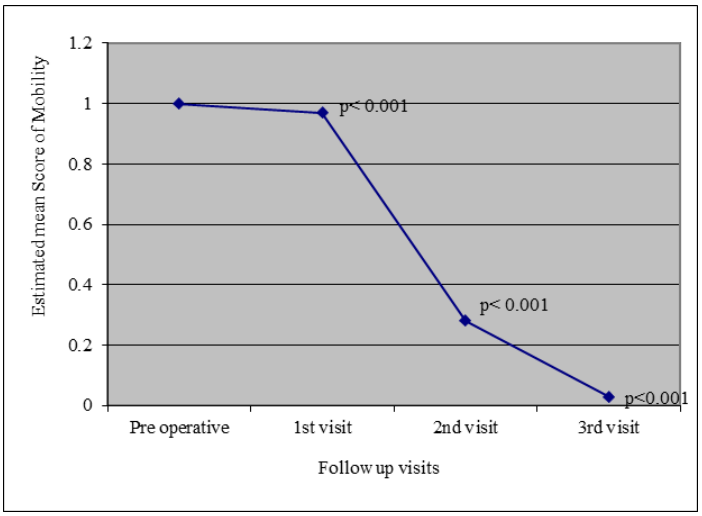

Figure 3: Line diagram showing estimated mean score of mobility in different visit.

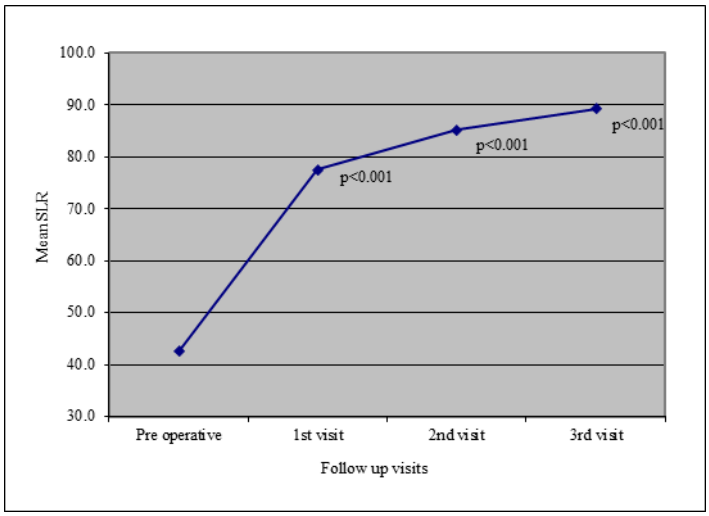

Figure 4: Line diagram showing mean distribution of SLR in different visit.

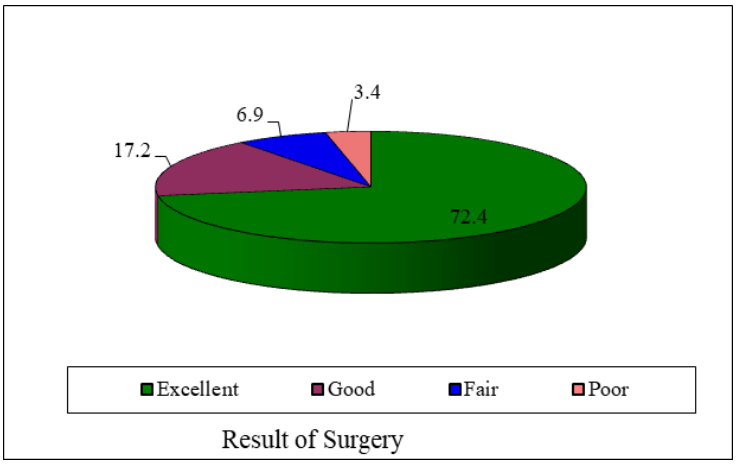

Figure 5: Pie diagram showing the distribution of the patients by subjective assessment of functional outcome (n=29).

4. Discussion

Low back pain commonly afflicts the adult population all over the world. It is of prime importance that the cause of low back pain is diagnosed in its early stage since not all cases are innocent [6]. The syndrome where the diagnosis is not in doubt is when root pain extends below the knee (radiculopathy) [7]. The commonest cause of radicular pain is lumbar disc prolapse. Prior to embarking on surgery for a lumbar disc prolapse it should be recalled that the long-term natural history for such a patient is likely to be good and that many radiologically proven discs may become or remain asymptomatic [8, 9, 10]. Moreover, the outcome of surgical therapy for lumbar disc prolapse was compared to conservative therapy, at six months there was no statistical difference between the two groups [11]. By seven years follow up the surgically treated group had faired better, only in that they had had less episodes of low back pain and had lost less time from work. In a similar study, it was found that at one year the surgical group had faired much better with 92% good results as compared with 60% in the non-surgical group [12]. However, at both four and ten year follow-up there was again no statistical difference between the two groups. It does seem, therefore, that many lumbar disc problems ameliorate by themselves eventually and that the role of surgery may serve only to hasten that final recovery. Although there is no such comparative study in our country, it can be safely assumed that with the improvement of imaging and surgical techniques, the diagnosis and treatment of lumbar disc prolapses around the world has become more uniform. The key to good results in disc surgery is appropriate patient selection. In this study of 45 cases, those patients were selected who fulfilled the criteria for surgical treatment as in other national and international series. Plain X-ray of the lumbar spine is not diagnostic of prolapsed disc. It is done to exclude other pathology like congenital anomaly, spondylolisthesis, tuberculosis and spinal tumours in some cases. Some studies

reported narrow disc space in 49% of patients at $L5/S_1$ level with positive operative findings of prolapsed disc at that level [13]. In 35% of cases there was narrow disc space at L4/5 level in X-ray but prolapse was found in only 14% of cases. Nabi et al (1982) observed narrow disc space 38.57% in their study [14]. In the present series more than one fourth (27.6%) of the cases showed diminished disc space. There was transitional vertebrae in 20.7% cases, loss of lumbar lordosis in 69.0% cases and 10.3% had marginal osteophytes. In MRI of lumbar spine showed 61.5% of patients had postero-lateral disc bulge and 37.5% had posterior disc bulge.

In various studies it was reported that 65.2% patients had prolapse at L4/5 level, 22.4% at $L5/S_1$ level and 12.4% at L3/4 level [15]. Khan et al. (1991) observed in their study that 57.25% patients had prolapse at L4/5 level, 34.78% at L4/5 level and 7.97% at L3/4 level [16]. In the present series it was found that among the 29 patients, there were in all 32 incidences of prolapsed disc. In other words, 3 patients had prolapses at two levels. 59.37% of the patients had prolapse at L4/5 level, 37.5% at $L5/S_1$ level and 3.12% at L3/4 level. Lumbar disc prolapse is common at L4/5 level in this current series and in other published series. The 1.5 vertebra articulates with the S_1 segment of the fixed sacrum. Therefore, most of the movement of the lumbar spine occurs at L4/5 disc level, which may be the cause of the high incidence of prolapse disc being found at L4/5 level. O'Connell et al. reported that 3.0% patients developed wound infection, haematoma formation 2.0%, pulmonary embolism 1% and operative pain in the back and groin 1.6% [17]. In another study of 954 operations on 905 cases as thrombophlebitis in 5 patients, lung abscess in 1 patient, wound infection in 7 patients, pulmonary embolus (non-fatal) in 2 patients were reported [13]. Brown and Pont reported in their series of 570 cases-2 post-operative deaths, 6 postoperative superficial infection and 5 other complications e.g., one each of pulmonary infection, thrombophlebitis and CSF leak and, two cases of wound disruption [15]. In the present series there was per-operative dural tear in 2 cases and post-operative disc space infection in one case. The infection might be due to sharing of operations in a common operation theatre due to the unavailability of a separate spinal surgery theatre. The two cases of dural tear was repaired by 4-0 vicryl and there were no postoperative CSF leakage. The case of discitis was managed conservatively by absolute bed rest, antibiotics and analgesics. But the patient is not pain free till now. Various retrospective studies and some prospective studies showed good results range from 46% to 97%. Several points considered in the analysis of the results of lumbar disc surgery [16]. Patient selection appear to be extremely important. Regarding the subjective assessment of current study patients it was observed that most (75.9%) of the patients had excellent functional outcome, 13.8% good, 6.9% fair and 3.4% had poor functional outcome according to modified Macnab criteria.

4.1 Limitations of the study

This was a cross-sectional single centered observatory study with a small sample size of sample. So, the findings of this study may not reflect the exact scenario of the whole nation.

5. Conclusion and Recommendations

From this study it reveals that management of prolapsed lumbar intervertebral disc by laminotomy and discectomy is an effective method of treatment and it reduces the complications and increase the chances of successful outcome. This study was done on 29 patients, follow up period was 6-12 months. So, further study with larger sample size, longer follow up period required to delineate the outcome.

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Conflict of Interest

None declared.

Ethical Approval

The study was approved by the Institutional Ethics Committee.

References

1. Ohtori S, Takahashi K, Chiba T, et al. Sensory innervation of the dorsal portion of the lumbar intervertebral discs in rats. Spine 26 (2001): 946-950.
2. Fairbank J C T, Couper J, Davies J B. The Oswestry low Back Pain Questionnaire. Physiotherapy 66 (1980): 271-273.
3. Farfan HF, Huberdeath RM, Dubow HI. Lumbar intervertebral disc-degeneration. The influence of geometrical features on the pattern of disc degeneration. A post-mortem study. J. Bone Joint Surg 54 (1972): 492.
4. Semmes RE. 'Diagnosis of ruptured intervertebral discs without contrast myelography and comment upon recent experience with modified hemilaminectomy for their removal'. Yale J. Biol. Med 11 (1989): 433.
5. Kirkaldy Willis WH, Hill RJ. A more precise diagnosis for low back pain. Spine 4 (1979): 102.
6. Raff J. Some observation regarding 905 patients operated upon for protruded lumbar intervertebral disc. Amer. J. Surg 97 (1959): 388.
7. Wiltse LL. History of lumbar spine surgery (1956).
8. Wiesel SW, Tsourmas N, Fiffer HL, et al. A study of computed assisted tomography: Part I: The incidence of positive CAT scans in an asymptomatic group of patients. Spine 9 (1984): 549.
9. Ohtori S. Sensory innervation of the dorsal portion of the lumbar intervertebral disc in rats. Spine 24 (1999): 2295-2299.
10. Bowden S, Davis D, Dina T, et al. The incidence of abnormal lumbar spine MRI scans in asymptomatic patients'. J. Neurosurg 41 (1989): 33.
11. Hakelius A. Progress in sciatica: a clinical follow up of surgical and non-surgical treatment. Acta Orthop. Secand 129 (1970): 1.
12. Weber H. Lumbar disc herniation: a controlled prospective study with ten yeares of observation. Spine 8 (1983): 131.
13. Hiselberger W, Witten R. Abnormal myelograms in asymptomatic patients. J.Neurosurg 28 (1967): 204.

14. Nabi N Iskander, Chowdhury AB. Laminectomy in prolapsed intervertebral disc (Lumbar). J. Bangladesh Orthop. Society 2 (1982): 6.
15. Brown HA, Pont E. Disease of lumbar disc. J.Neurosurg 20 (1963): 410.
16. Carragee EJ, Han MY, Yang B. Activity restrictions after posterior lumbar discectomy. A prospective study of outcomes in 152 cases with no postoperative restrictions. Spine 24 (1999): 2346-2351.
17. Khan, Rahman AAML, Ali MI, et al. Prolapsed intervertebral disc. Surgical management of 142 cases: Bangladesh. J. Neuroscience 7 (1991): 53.