



RESEARCH ARTICLE

LOWER HALF LAMINECTOMY FOR LUMBAR DISC HERNIATION A STUDY OF 350 CASES IN
LAST DECADE

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ABSTRACT

Background: Lumbar disc herniation is one of the most commonly encountered problems in daily neurosurgical practice. Microdiscectomy or open discectomy (MD/OD) are the standard procedures for symptomatic lumbar disc herniation and they involve removal of the offending intervertebral disc compressing the nerve root. Discectomies are done in several ways like laminectomy and discectomy, Microdiscectomy, Endoscopic discectomy etc. We are practicing lumbar discectomy without sophisticated instruments without the aid of headlight loupe or microscopic magnification.

Aim: To study the clinicoradiological profile of the patients who underwent the surgical management of the herniated lumbar disc without magnification under spinal anaesthesia and their outcome.

Material and Methods: This is a study conducted in department of neurosurgery, Nil Ratan Sircar medical college, Kolkata from January 2010- December 2017. 350 patients were operated for symptomatic lumbar disc herniation under spinal anaesthesia. Lower 1/3rd laminectomy of the upper vertebra, shaving of overhanging spinous process, trimming of upper margin of lower vertebra, removal of yellow ligament and discectomy was done. In L5S1 disc prolapsed only ligamentum flavum was removed, No laminectomy was performed. Exclusion criterias included patients with more than 2 level discectomies and high lumbar Disc Herniation.

Results: Of these 350 patients, 1220 patients were Male, 130 patients were Female. Most common age group was between 40 – 60 years. 250 patients had single level disc herniation. Out of 250 patients, In 126 patients L5 S1 discectomy was done, In 103 patients L4 L5 level, in rest 21 patients L3 L4 was intervened. In 100 patients Two level discectomy was done. The duration of surgery was less than 1 hr in 91% of cases. The most common complication was surgical site infection. In accordance to Odom’s criteria the results were ranging from excellent to good recovery in 90 % of patients during discharge. No listhesis was detected radiologically in the post operative period.

Conclusion: All cases were done in spinal anaesthesia. Due to minimal laminectomy, less chances of listhesis post operatively. Adequate exposure is obtained. The duration of stay in hospital is less. The learning curve is less as compared to microscopic or endoscopic procedures. This procedure can be done with minimal requirement of instruments During discectomy the thickened ligamentum flavum (causing canal stenosis/narrowing) can also be delt in single Procedure. Hence, This procedure is also equally effective as other procedures carried out for lumbar discectomy.

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INTRODUCTION

Elective lumbar discectomy is regarded as a good treatment option for lumbar disc herniation if sciatica or, neurological

therapy (Deyo, 2007; Gibson and Wadell, 2007; Peul et al., 2007). Mixer and Barr first described partial laminectomy and partial removal of disc as a treatment for symptomatic herniated Lumbar Disc in 1934 (Mixer and Barr, 1934). In the

late 70s Yasargil (1977), Casper (1991), Williams (1978) independently reported microsurgical techniques for treatment of lumbar disc herniation which provided excellent lighting and magnification of the operative field, which in turn enabled the use of a smaller incision and facilitated a less traumatic procedure. Since then, different studies (Casper *et al.*, 1991; William, 1978; Andrewa and Lavyne, 1990; Nystrom, 1987; Katayana *et al.*, 2006) comparing microdiscectomy and standard (open) discectomy techniques report conflicting results regarding the relative merits of the two procedures; however the general consensus appears to be that they yield broadly comparable outcomes (Gibson, 2007; Culloch, 1996). In last 10 years, we have operated over 350 cases of lumbar disc herniation with or without canal stenosis under spinal anesthesia where Macrodiscectomy were performed following removal of lower half of both the upper laminae. Ligamentum flavum was removed in every case irrespective of their thickness and in few cases medial facetectomy and or foraminotomy was performed to achieve adequate root decompression. In L5-S1 disc herniation only the ligamentum flavum was removed without any laminar excision. In all the cases, the disc spaces itself were entered and all available disc materials were removed.

MATERIALS AND METHODS

This was a prospective observational study conducted at the Department of Neurosurgery, N. R. S. Medical College, Kolkata (a tertiary referral hospital) from 2007 to 2017. All the cases were operated in prone position and under spinal anesthesia with Bupivacain / Fentanyl mixture. Prophylactic antibiotics were given for 8 days including pre and post operative periods in all the cases.

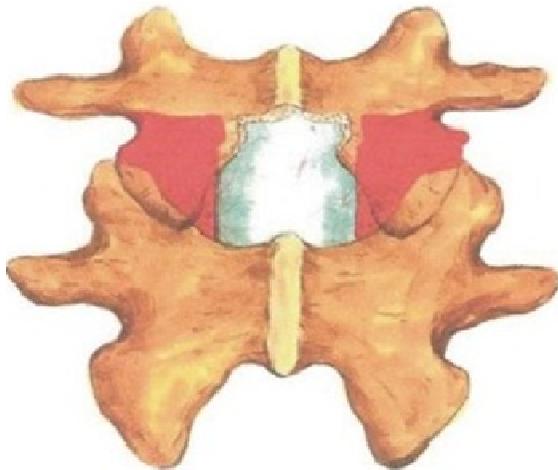


Figure 1. Graphical picture showing removal of lower half of both lamina to expose the thecal sac

Exclusion criteria: Patients having severe canal stenosis with facet arthropathy or, any radiologic evidence of subluxation and more than 3 levels involvement were not included in this study. The patients were assessed clinically along with MRI and Dynamic X-Ray of Lumbosacral spine before any operative intervention. Postoperative evaluation was performed according to Odom's criteria (Culloch, 1996). Details of operative procedure: The patients were kept prone following spinal anesthesia. A midline incision was made one level above and below centering the involved segment. In few cases

sacralizaion / lumbarization was detected in preoperative imaging. The spine and laminae were exposed centering the involved disc space. Part of spinous process and intraspinous ligament was removed. The lower half of both the laminae were removed till the epidural fat peeps through the ligamentum flavum in the midline. Ligamentum flavum was removed bilaterally and in few cases over hanging part of the hypertrophied medial facets needed removal with carrison's punch. Discectomy then performed by standard technique till all available disc materials were removed macroscopically. Bilateral roots were checked for any further compressin element till they enter into the respective foramens. In case of L5S1 disc prolapse, only the ligament flavectomy was performed without any laminectomy to achieve desired discectomy. Wounds were closed in layers following proper hemostasis. All the patients were allowed to sit up as soon as the pain is tolerable. External orthosis (LS brace) was advised where two level surgery was performed or, where medial facetectomy was done.

Follow up: Post operative Clinical assessment has been done in the next day and at discharge according to Odom's Criteria.

Odom's Criteria:

- **Excellent:** All preoperative symptoms relieved; abnormal findings improved.
- **Good:** Minimal persistence of preoperative symptoms; abnormal findings improved or unchanged.
- **Fair:** Definite relief of some preoperative symptoms; other symptoms slightly improved or, unchanged.
- **Poor:** Preoperative symptoms and signs are unchanged or, exacerbated.

RESULTS

Total No. patient: 350.

Period of study: 10 Yrs (2007 October – 2017 September).

Place of study: Department of Neurosurgery, N. R. S. Medical College, Kolkata.

Table 1. Age distribution

Age group in years	Total number of patients
0-20	14
20-40	98
40-60	168
>60	20

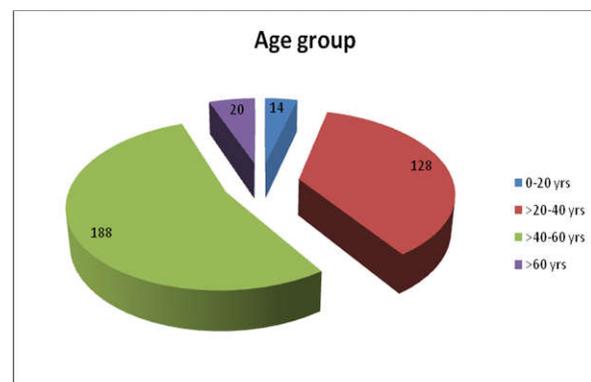


Table 2. Sex distribution

Male	220
Female	130
Total	350

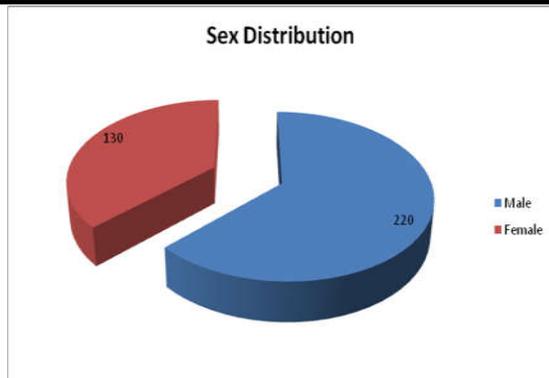


Figure 3. Sex distribution

Table 3. Clinical features

Clinical features	Number
Localized pain	50
Radicular pain	280
Sensory deficit	90
Motor deficit	110
Sphincter involvement	50

Table 4a. Level of involvement: 250 patients had single level involvement

Level	Number
L5-S1	126
L4-L5	103
L3-L4	21
Total	250

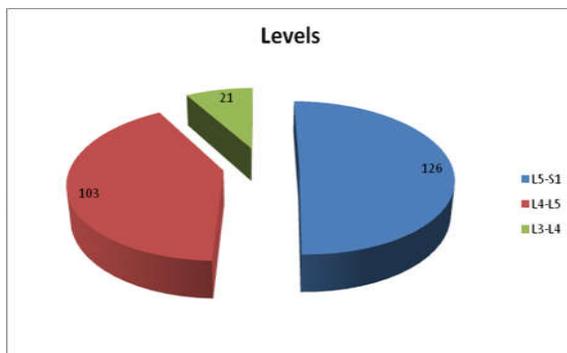


Figure 4. Level of involvement

Table 4b. Level of involvement: 100 patients had two level involvement

Levels	Number
L4-L5 and L5-S1	75
L3-L4 and L4-L5	25
Total	100

Table 5. Duration of surgery

Duration of surgery	Total number of surgeries
<1 hour	318

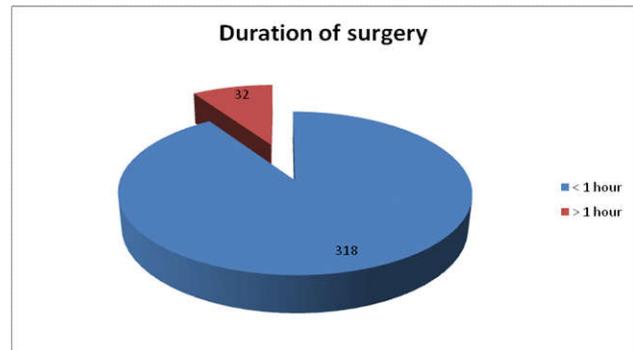


Figure 5. Duration of surgery

Table 6a. Post operative recovery at discharge: Post operative recovery and follow up done by Odom's criteria

Status of patient	Number of patients
Excellent	212
Good	105
Fair	33
Poor	00
Total	350

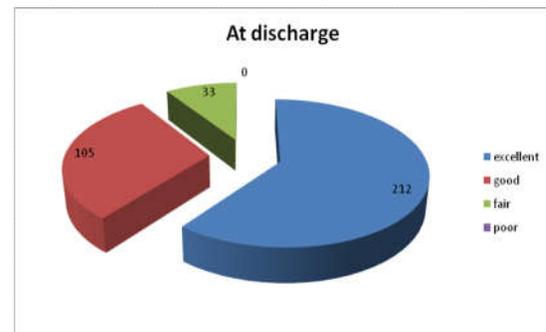


Figure 6a. Post operative recovery at discharge

Table 6b. Follow up

Follow up at	Excellent	Good	Fair	Poor
6 weeks	215	102	33	00
3 months	220	100	30	00
6 months	230	95	25	00
1 year	250	85	15	00

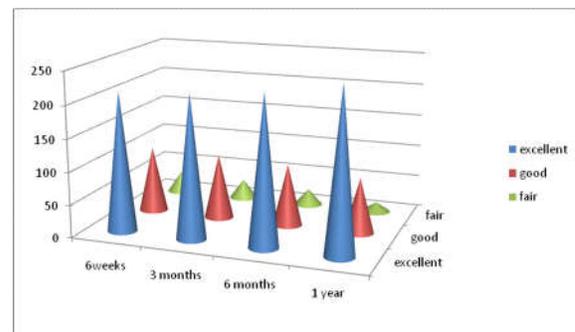


Figure 6b: Follow up

Complications	Number of patients
Surgical site infections	13
Dural tear	08
New onset limb radiculopathy	08
Discitis	04
General complications	00

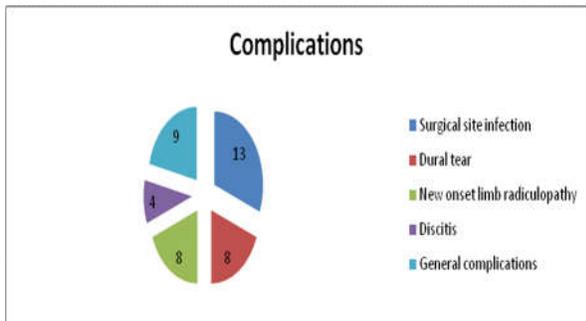


Figure 7. Complications

Table 8. Hospital stay

Hospital stay	Number of patients
<7 days	308
>7 days	42

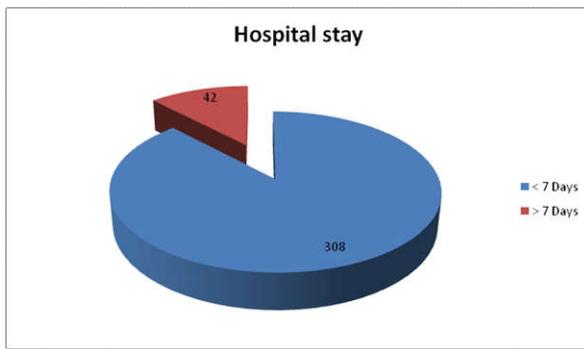


Figure 8. Hospital stay



Figure 9. Lumbo-sacral spine AP and Lateral view showing L5 Laminectomy defect

DISCUSSION

Lumbar disc herniations causing significant or new neurological deficit, cauda equina syndrome, or those refractory to conservative treatment are dealt surgically (Foley and Smith, 1997). A proper technique should lead to satisfactory outcomes, minimal morbidity and good cosmesis. It should be cost effective, able to adjust to patient factors like

The percutaneous systems such as chemonucleolysis (Smith and Brown, 1967), percutaneous lumbar discectomy (manual (Hijikata, 1989) and automated (Onik *et al.*, 1985)), nucleoplasty and percutaneous laser-assisted discectomy (Choy *et al.*, 1992) cannot deal with disc fragment extrusions and associated bony and ligamentous compression. The results of these procedures have been very variable and speculative ranging from 29% to 92% success rate (Hussain *et al.*, 2005). Open discectomy (OD) and microdiscectomy remain the current standard of surgical treatment (Tait *et al.*, 2009). Several recent prospective RCTs have compared OD to tubular retractor-based MED (Arts *et al.*, 2011) and success rates have been found to be similar. In our series, there was 13 wound infection at a rate of 3.71%, discitis rate of 1.14% and a durotomy rate of 2.28%. These rates compared favorably with those reported by Ebling *et al.*, (1986) (3.3%, 0.8% and 3.9%, respectively), Caspar *et al.*, (1991) (0.7, 0.7 and 6.7% respectively),

Williams *et al.*, (2009) (0, 0 and 0% respectively) and Pappas *et al.*, (1992) (7.2, 0.5 and 1%, respectively). Yoshito Katayama *et al.* (2006) demonstrated in their study in 2006 that there were no significant differences between the macro and micro discectomy procedures in the frequency of use of an analgesic agent after surgery, but significant differences were observed in the operation time, amount of bleeding, duration of

have been clinically significant. In our study also showed similar results. Microdiscectomy or endoscopic discectomy having following limitations like it requires costly instruments, specialized centre and expertise, large Central discs, ligamentum hypertrophy cannot be dealt with microscopic or endoscopic techniques, Canal pathologies other than discs difficult to treat and having increased recurrence rate than the open technique (Arvind *et al.*, 2014). Microdiscectomy and endoscopic discectomy having minimal exposure while limited laminectomy as in our study showed adequate exposure of the disease segment with very less chance of residual disc or delayed instability also can be done without specialised instruments, easy to learn and master.

Conclusion: The method we used was

- Cost effective
- No need of general anesthesia
- Early mobilization
- No special high cost sophisticated instruments
- Results comparable to micro discectomy/ endoscopic surgery
- Less chance of residual disc materials
- Can be done in any hospital, has a smaller learning curve.
- During discectomy the thickened ligamentum flavum (causing canal stenosis/narrowing) can also be dealt in single Procedure.

Although newer modalities of treatment of lumbar disc disease are evolving but open limited laminectomy remain a good treatment option with comparable results. That procedure can also be done in a setup with limited facilities.

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