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Functional outcome of lumbar discectomy based on the duration of sciatica in South Indian population

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Abstract

Background: Lumbar disc herniation is a common orthopedic challenge warranting surgery in special situations. Lumbar discectomy is said to provide considerable relief when performed in early stages of the disease. The present study was carried out to evaluate the outcomes of lumbar discectomy based on duration of sciatica in a single institution setting among south Indian population.

Methods: In this prospective study, 50 patients with lumbar herniation were divided into 3 sub cohorts accordingly to the duration of sciatica. All these 50 patients were analysed clinically and the diagnosis confirmed with MRI and underwent laminectomy and discectomy. They were scored with ODI questionnaire preoperatively and postoperatively on 10th day, 3rd month, 6th month and 1 year.

Results: Patients in all the sub cohorts showed improvement following the surgery but patients with duration of sciatica less than 12 months showed significant improvement than patients with duration of sciatica more than 12 months. As the duration of sciatica increases the functional outcome of the surgery reduces.

Conclusion: The duration of sciatica has a significant predictive value on the functional outcome of laminectomy and discectomy. If the duration of sciatica increases the surgical outcome is poor. There are complications associated with surgical intervention which has to be emphasised while selecting the patient for the same. In view of the favourable natural course of herniation of lumbar disc and possible complications associated with surgery, most authors recommend a minimum period of conservative management for 2 months. We recommend not to exceed 12 months of conservative management as the risk of poor functional outcome increases significantly after that.

Keywords: Lumbar discectomy, intervertebral disc prolapse, laminectomy

Introduction

Lumbar disc herniation is a common disease encountered in the orthopedic practice. It is clinically manifested as sciatica, with prolonged duration of pain and other associated symptoms. Whenever patients present with sciatica or with features suggestive of neural root compression and cases refractory to non-operative treatment surgical options have been exercised. There is growing interest in understanding the best surgical mode of intervention and the best time to intervene surgically. Weber, Holme and Amlie^[1] reported that 70% of patients with sciatica have a considerable reduction in pain within four weeks? However, surgery is necessary in only 10% of patients who have incomplete resolution of symptoms^[2, 3]. It has been suggested that the probability of symptoms resolving with conservative treatment decreases progressively with time^[4]. In many studies prolonged morbidity has been regarded as a negative predictor^[5-11]. However some have contradicted this impression^[12, 13]. In a controlled, prospective, long-term study, Weber^[14] randomized 126 patients between surgical and nonsurgical treatments. At 1 year, those in the surgical group had fewer complaints related to pain. At 4 years, there was no statistically significant difference between the two groups. One can conclude that surgical intervention should be limited to patients with a significant neurological deficit or to those patients who are unable to engage in the lifestyle they desire because of sciatica. Weber^[14] also demonstrated that less than 2% of the patients in both groups remained symptomatic at the end of 10 years.

It is clearly a mistake and potentially dangerous to carry out conservative treatment in all patients with herniated discs, especially because many reports indicate that patients with long standing pre-operative symptoms have fewer chances of obtaining satisfactory results from

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surgery than those whose symptoms are of short duration [6, 15, 16]. With this background, the present study was carried out to analyse if there is any association between the duration of sciatica over the functional outcome of lumbar discectomy, the ideal time to operate upon to achieve the best result and the post-operative complications.

Methodology

Study setting and participants

The present study was carried out as a prospective study among patients presenting with sciatica in the outpatient department of Orthopedics of our tertiary teaching institution for a period of one year. A total of 50 patients diagnosed with lumbar disc herniation were taken up for the study.

Inclusion criteria

All skeletally mature patients with sciatica with disc herniation and compression of the exiting nerve root confirmed by Magnetic resonance imaging and treated by Primary Lumbar Discectomy are included in this study.

Exclusion criteria

- Failed back syndrome
- Double level disc prolapse
- High lumbar disc prolapse
- Spinal Canal Stenosis
- Metastasis
- Associated with other pathological conditions

Ethical approval and informed consent

Approval was obtained from the Institutional Ethics Committee prior to the commencement of the study. Each participant was explained in detail about the study and informed consent was obtained prior to the data collection.

Data collection

All the participants were evaluated clinically and analysed with Magnetic Resonance Imaging of the Lumbo-sacral spine. (Figure 1) The participants were divided into three sub cohorts depending on their duration of the sciatica < 6 months as Sub cohort A, 6-12 months as Sub cohort B, > 12 months

as Sub cohort C. After obtaining consent, the participants underwent standard laminectomy and discectomy. (Figure 2, 3, 4) All the patients were operated under general anaesthesia under all sterile precautions with second generation cephalosporins used for, surgical prophylaxis. ODI questionnaire was used to assess the disability preoperatively and post operatively on 10th day, 3rd month, 6th month and 1st year respectively and the absolute ODI score was calculated.

Data analysis

The functional outcome of surgery was analysed in terms of change in mean ODI score and results were interpreted by SPSS syntax software Post-hoc test (Multiple Comparisons Bonferroni) and Spearman's rho Correlation Coefficient.

Results

The mean age of the study participants was 36 years and majority of the participants were males. Pain and deficits is the common indication of surgery when compared to that of only pain in all the sub cohorts. (Table 1) There were no post-operative complication in sub cohort A and B whereas in sub cohort C there was one with incidence of 6.67 %. (Table 2) On analyzing the change of ODI score of the entire cohort with respect to duration of sciatica spearman's correlation coefficient was found be - 7.18 with p value <0.0005(significant), which signifies a high inverse correlation .ie: as the duration of sciatica increases the change in ODI score reduces. (Figure 5)

On comparing the preoperative ODI score with 10th post op day, 3rd month, 6th month and 1 yr within the same cohort it was found that all groups had significant improvements which is shown by low ODI score during the various post op follow up. The ODI scores of patients with pain was compared with patients having pain and deficit within the individual sub cohorts at various post op follow up and it was found that the p value is statistically not significant. The Indication of surgery has no significant influence on the functional outcome. (Table 3)

The change in mean ODI score is highest in the sub cohort A and least in the sub cohort C. (Table 4)

Table 1: Indication for surgery among the study participants

Sub cohort	N	Indication for surgery	Frequency	Percentage
A(< 6 months)	19	Pain	2	10.52
		Pain and deficits	17	89.48
B(6-12 months)	16	Pain	2	12.5
		Pain and deficits	14	87.5
C(>12 months)	15	Pain	3	20
		Pain and deficits	12	80

Table 2: Post-operative complications among the study participants

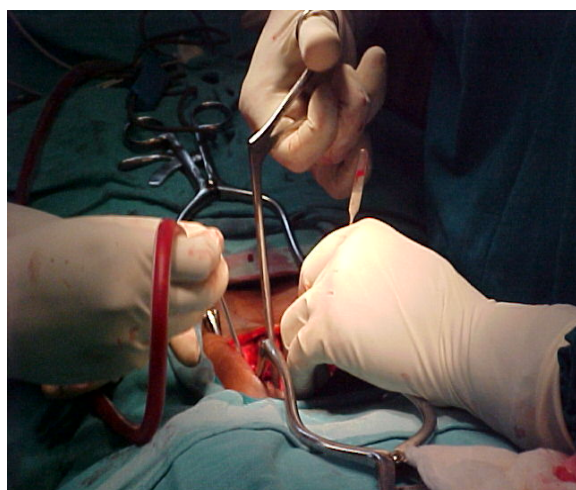
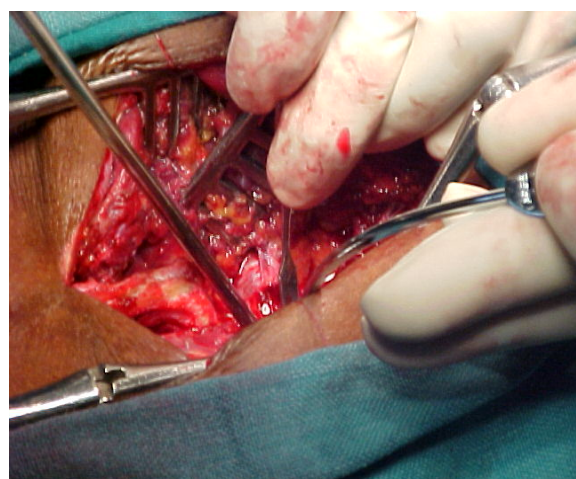
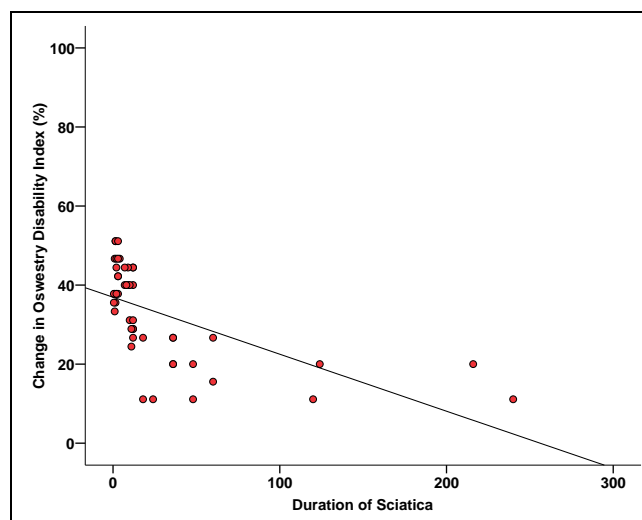
Sub cohort	N	Frequency of complications	Percentage of complications
A(<6 months)	19	0	0
B(6-12 months)	16	0	0
C(>12 months)	15	1	6.67

Table 3: Comparison of pre and postoperative ODI scores:

Sub cohort	Indication for surgery	Pre-op mean ODI	Post-op 10 th day Mean ODI	Post-op 3 rd month Mean ODI	Post-op 6 th month Mean ODI	Post-op 1yr Mean ODI
A(< 6 months)	Pain	63.33	37.78	26.67	26.67	26.67
	Pain, deficits	65.30	39.86	26.29	24.19	23.45
B(6-12 months)	Pain	61.11	40	27.77	26.66	26.66
	Pain, deficits	61.26	39.52	25.55	24.91	24.91
C(>12 months)	Pain	48.14	37.04	31.11	31.11	31.11
	Pain , deficits	52.59	42.22	35.92	35.18	33.7

Table 4: Comparison of mean change in the ODI between the duration of symptoms

Sub cohort	Pre op Mean ODI	Post op 1 year Mean ODI	Mean change in ODI from Pre-op to 1 yr Post- op
A(<6 months)	65.4963	23.3916	42.1047
B(6-12 months)	61.2481	25.1356	36.1125
C(>12 months)	51.7020	33.1827	18.5193

**Fig 1:** Showing T2 axial L5S1 Right Para median herniation compressing Right S1 nerve root**Fig 2:** Laminae are excised using an angulated Kerrison rongeur.**Fig 3:** Cord after removal of disc fragments. The bulge has been decompressed**Fig 4:** Excised disc after surgery**Fig 5:** Correlation between duration of sciatica and change in the post operative ODI score

Discussion

The study showed a significant improvement in the Preoperative ODI to the post operative ODI score within the sub cohort. When the sub cohorts were compared with each other by using the ODI score it was found that there was an increased risk of poor results if the duration of sciatica exceeded 12 months, which is comparable and similar to a study conducted by L.C.L. Ng, P. Sell^[17]. Also there was no difference between patients who were operated upon various intervals within 12 months of onset of sciatica.

The reported threshold of the duration of sciatica which is associated with poor outcomes is variable in literature. Hurme and Alaranta^[4] found the results to be better in those patients in whom the duration of sciatica did not exceed 2 months. Dvorak et al.^[3] concluded that patients with sciatica less than 6 months duration had better long term operative results. The most recent prospective cohort study of Nygaard et al.^[7] suggested that the duration of sciatica was 8 months. This study shows that there is only marginal improvement in the ODI score on post op 10th day which gradually improves and attains maximum at around post-op 3rd month and virtually remains same. In this study the change of ODI score of the

entire cohort with respect to duration of sciatica shows a high inverse correlation. ie: as the duration of sciatica increases the change in ODI score reduces, and the change in ODI score is maximum for the sub cohort A compared to sub cohort B and C. These results are comparable to a study conducted by L.C.L. Ng, P.Sell^[17].

Conclusion

The duration of sciatica has a significant predictive value on the functional outcome of laminectomy and discectomy. If the duration of sciatica increases the surgical outcome is poor. There are complications associated with surgical intervention which has to be emphasised while selecting the patient for the same. The level of disc involvement is equal in all the sub cohorts and L4-L5 disc is more commonly involved than L5/S1 disc. There is no influence of indication of surgery on the outcome of laminectomy and discectomy. In view of the favorable natural course of herniation of lumbar disc and possible complications associated with surgery, most authors recommend a minimum period of conservative management for 2 months. We recommend not to exceed 12 months of conservative management as the risk of poor functional outcome increases significantly after that.

Declaration

Conflict of interest: Nil

Funding: Nil

Ethical approval: Obtained

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