

A Prospective Study Of Health Related Quality Of Life Before And After Lumbar Disc Surgery For Herniated Lumbar Disc At A Tertiary Care Centre Of Bihar

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Abstract

Introduction: Low back pain (LBP) is one of the most common health problems worldwide and a major cause of disability that affects performance at work and general well-being. LBP has an incidence of 15% amongst adults and a point prevalence of 30%. It is the leading cause of limitation in activity and absenteeism from work. Hence, this study was undertaken to address this lacunae in the literature. **Methodology:** A prospective study was conducted by the Department of neurosurgery of the Patna Medical College & Hospital, Patna, and Bihar. The current study was conducted over a period of 6 months that was from January 2021 to June 2021. Prior approval was obtained from the Institutional ethics Committee. All the patients admitted for elective discectomy for single level lumbar PIVD were selected for the study, after obtaining informed written consent from the patients or their next of kin. Statistical Package for Social Sciences (SPSS Inc released 2009), version 16.0 (Chicago, IL) was used to analyze the data. **Results:** The most common level of disc herniation was at L4-L5 level as proven by MRI of the lumbar spine (76%) which was followed by L5-S1. In more than half of patients, Low Back Pain (LBP) with Radiculopathy was the most common presenting complaint followed by Radiculopathy and paresthesia. **Conclusion:** Depression and anxiety are known to affect the outcome of the procedure. Therefore, assessment of depressive symptoms and its treatment should be a part of assessment of all patients in the preoperative as well as in the postoperative period.

Key Words: health related quality of life, lumbar disc surgery

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Introduction

Low back pain (LBP) is one of the most common health problems worldwide and a major cause of disability that affects performance at work and general well-being[1-4]. LBP has an incidence of 15% amongst adults and a point prevalence of 30%[5, 6]. It is the leading cause of limitation in activity and absenteeism from work[5-8]. Disc herniation is one of the important causes of LBP with L4/5 and L5/S1 being the most common levels[9, 10]. Herniated lumbar disc is displacement of disc material (nucleus pulposus or annulus fibrosus) beyond the intervertebral disc space[11]. It has highest prevalence among population aged 30 to 50 years with a male preponderance. In people belonging to the younger age group (25-55 years), about 95% cases occur at the lower lumbar spine (L4/5 and L5/S1 level) whereas prolapse above this level is more common in older age group[12]. Medical treatment or epidural injections of corticosteroids have not been found to be gratifying[11, 13]. About 10% of people have sufficient pain after 6 weeks of conservative treatment for surgery to become inevitable[13]. Therefore open discectomy or microdiscectomy is recommended when conservative treatment fails and 70% to 90% respond to these surgical interventions[14]. Moderate to severe clinical evidence of nerve root compression have been considered as the indications for surgery[15]. Open Discectomy and microdiscectomy for single level disc herniation have been shown to give the maximum gratifying outcomes post-surgery when assessed on EQ-5D[16].

Health-related quality of life (HRQoL) is a multidimensional concept that includes domains related to physical, mental emotional and social functioning that may be affected by a disorder and its interventions.

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EuroQol-5 Dimension (EQ-5D)[17, 18] and the 36-item Short Form Health Survey (SF-36) are the most commonly used HRQoL scales[19, 20]. Patient's satisfaction with treatment[21], and HRQoL have increasingly been used in spinal surgery research of late[22-24]. Visual analogue scale (VAS) score is one of the most common scales used to assess pain symptoms (constant leg pain, backache, and severe episodic leg pain) in patients with symptomatic lumbar disc herniation[25]. VAS Leg Pain-Severe was found to be the most responsive VAS measure when evaluating the results of discectomy surgery for sciatica[25]. The 15-point Japanese Orthopedic Association (JOA) low back pain score is widely used in assessment of sciatica patients which has both subjective and clinician rated (objective) sub scales[26].

Depression and anxiety scores of spinal surgery patients have been shown to improve in postoperative period[27]. Predictors of poor response to surgical treatment was found to be preoperative high scores on depression, anxiety, somatization and poor coping in a systematic review[28-31]. It has been concluded by many of the previous researchers that depression and anxiety were found to have a great impact on the postoperative outcome of surgery. There is a dearth of literature from the Indian subcontinent on depression and anxiety in patients undergoing surgery for single level herniated discs. Hence, this study was undertaken to address this lacunae in the literature.

Methodology

A prospective study was conducted by the Department of neurosurgery of the Patna Medical College & Hospital, Patna, and Bihar. The current study was conducted over a period of 6 months that was from January 2021 to June 2021. Prior approval was obtained from the Institutional ethics Committee. All the patients admitted for elective discectomy for single level lumbar PIVD were selected for the study, after obtaining informed written consent from the patients or their next of kin. The exclusion criteria considered

were patients with prior history of spinal surgery, history of other spinal pathologies, presence of chronic medical illnesses, history of severe mental disorders, presence of substance abuse (except nicotine) and those in whom disc herniation was not proven radiologically. After assessing for all the criteria, a total of 50 patients were recruited for the study by purposive sampling method.

The primary objectives of this present study were a descriptive and correlation analysis of socio demographic, clinical profile, subjective pain symptoms, subjective and health-related quality of life in these patients. The other objectives were to find out the predictors of good and poor surgical outcomes. Widely used and well validated scales such as SF-36 Health Survey for assessing HRQoL, VAS for assessing pain symptoms and JOA to assess low back pain, subjective and clinician rated objective QOL assessment in sciatica patients were used.

Statistical Package for Social Sciences (SPSS Inc released 2009), version 16.0 (Chicago, IL) was used to analyze the data. Appropriate parametric and nonparametric statistical analysis was done to find the frequency tables and means. One-way ANOVA was used to compare the HRQoL Scores, JOA scores and VAS scores across the various follow-up time points as mentioned above. Pearson's correlation coefficient was used to find a correlation between two continuous variables and Spearman's rho was used to find a correlation between two discrete variables. Regression Univariate analysis was used to find the predictors of the outcome of disc surgery.

Results

The age of the participating patients ranged from 20 to 63 years with a mean age of 41.2 ± 7.1 years. The sample had a male preponderance with more than 50% of the patients being male. Three-fourth of the patients belonged to rural backgrounds. The range of SLRT (Straight Leg Raising Test) was positive (between 60-80 degrees) in all

patients. The most common level of disc herniation was at L4-L5 level as proven by MRI of the lumbar spine (76%) which was followed by L5-S1. In more than half of patients, Low Back Pain (LBP) with Radiculopathy was the most common presenting complaint followed by Radiculopathy and paresthesia.

Leg Pain was assessed using VAS scale on a Likert scale of 0-10 with 0 being no pain and 10 being the worst possible pain. In our study group, patients had highest scores before surgery which decreased significantly at all the 3 follow-ups. Table 1 illustrates the scores of 2 subscales of the Japanese Orthopedic Association (JOA) for patients with Lumbar Disc Herniation. The 2 subscales were subjective pain and QoL (9 points) and clinician rated QoL (6 points). On the JOA scale, more the score, lesser is the severity of clinical symptoms and better is the QoL. The scores of clinical signs (objective) subscale were lower before surgery in our patients and showed a significant increase in scores at subsequent follow-ups. However, the subjective QoL subscale improved significantly only at 3rd and 6th months. Table 2 shows of various components of sub-scales of SF 36 scoring at various time of follow-up.

Correlation was observed for baseline factors like age, gender, presenting complaints, duration of symptoms, and level of disc herniation with the sub-scales of SF-36 at baseline and at 6 months, using spearman's test of correlation. We found that age, type of presenting complaint and level of disc herniation did not have any significant correlation with any of the outcome variables. Gender had significant correlation in terms of Physical Functioning at 6 months, General Health at baseline, Role Emotion at baseline and Mental Health at baseline with females having higher scores on all these subscales in comparison to males. Duration of symptoms had significant negative correlation with Social Functioning at baseline suggesting that those with duration of symptoms less than 6 months had higher scores on SF at baseline.

Table 1: Comparison of VAS, JOA Subjective and JOA Objective at post-operative follow-up

Scale	Before surgery (So)	1 st month post-operative (S1)	3 rd month post-operative (S3)	6 th month post-operative (S6)
VAS	7.3 ± 1.4	6.2 ± 0.62	7.8 ± 0.51	2.3 ± 0.1
JOA subjective	-	4.2 ± 0.98	7.1 ± 0.87	7.9 ± 0.61
JOA objective	3.9 ± 0.54	4.9 ± 0.61	5.4 ± 1.1	7.2 ± 0.54

Table 2: Various sub-scales of SF 36 on preoperative and various post-operative duration

Sub-scale	Before surgery (So)	1 st month post-operative (S1)	3 rd month post-operative (S3)	6 th month post-operative (S6)
Physical functioning	63.6 ± 4.6	81.3 ± 2.2	93.5 ± 6.4	95.3 ± 4.1
Physical role	55.6 ± 14.2	76.2 ± 10.2	79.8 ± 12.2	86.2 ± 10.1
Bodily pain	34.5 ± 6.8	77.6 ± 4.9	91.4 ± 11.3	97.5 ± 9.8
General health	41.2 ± 8.1	66.2 ± 7.2	76.4 ± 11.4	84.5 ± 3.1
Vitality	65.4 ± 8.7	66.3 ± 4.5	67.3 ± 6.2	73.6 ± 8.1
Social functioning	60.2 ± 2.1	61.3 ± 4.3	63.3 ± 6.6	87.6 ± 5.3
Emotional role	61.6 ± 3.2	67.8 ± 5.4	73.5 ± 3.2	85.4 ± 4.3
Mental health	59.4 ± 5.3	77.5 ± 3.2	79.4 ± 5.4	81.4 ± 1.3

Discussion

This study is one of the few studies where patients of single level PIVD were recruited and assessed at baseline i.e. before surgery and thereafter they were prospectively assessed at 1 month, 3 months and 6 months postoperative. This study also attempts to find the clinical correlates and predictors of surgical outcome. The socio demographic profile of patients in our study matched previous research from Western countries[16, 21, 24, 32-35]. The mean age was 41 years and this was similar to studies from Asian countries on PIVD at a single level[34, 35]. The strenuous labor-intensive jobs in India could have led to the male preponderance seen in our study population. Since ours is a premier referral tertiary care institute and has a vast rural catchment area hence this could explain the fact that majority had a rural background. Disc herniation at L4-L5 was the most common level of herniation and more than half of them presented with LBP with Radiculopathy. These findings were similar to those found by Kagaya and coworkers[24]. In terms of pain symptom status, our

subjects had highest scores on Visual Analogue Scale scores before surgery which decreased significantly at all the 3 follow ups suggesting pain relief following surgery. This is also supported by other studies of spine surgery patients that examined pain relief[34, 35]. In our study both subjective and clinician rated objective subscales of JOA showed significant improvement at all the levels of follow-up except for the 1st month score of subjective symptoms subscale. These results are supported by other studies which also utilized JOA for assessment of pain symptoms and HRQOL[24].

With exception of vitality and role emotional sub-scale all the other subscales of SF-36 showed significant improvement from the 1st month after surgery suggesting reasonably quick improvement in HRQoL after surgery. Similar findings have been seen in patients undergoing lumbar laminectomy for radiculopathy[32]. Vitality and role emotional subscales started showing improvements only after the 3rd month and continued to improve till the end of the study period.

We correlated socio demographic and clinical variables like age, gender, duration of symptoms, level of disc herniation with outcome in terms of VAS scores before surgery and subscales of SF-36 at baseline and at 6 months. VAS scores were considered because it is the single most accurate measure of intensity of pain. The subjective symptom scale of JOA also measures pain along with QOL. Outcome studies in disc surgery for PIVD have utilized the above factors as predictors or baseline factors[24]. Outcome variables in the form of all sub-scales of SF-36 at baseline (S0) and at 6 months (S3) were considered as primary and secondary outcome variables. We found that age, type of presenting complaint and level of disc herniation did not have significant correlation with any of the outcome variables. This finding is supported by another study where age did not have any correlation with EQ-5D values at any of the follow-ups[36]. In contrast to our findings the study by Kagaya et al[24] found age to be a significant predictor with age > 50 having a better outcome. In our study duration of symptoms had significant negative correlation with Social Functioning (SF) at baseline suggesting that those with duration of symptoms less than 6 months had higher scores on SF at baseline and therefore better social functioning. This finding is similar to a previous study where lesser the duration of symptoms (less than 6 months) better was the HRQoL[23]. Gender had significant correlation in terms of Physical Functioning (PF) at 6 months, General Health (GH) at baseline, Role Emotion (RE) and Mental Health (MH) at baseline with females having higher scores on all these subscales in comparison to males. This can be attributed to the lesser intensity of physical functions and better coping skills in females. However, in a study by Silverplats et al[36] gender had no role in predicting the outcome.

Conclusion

The concerned procedure is known to lead to significant improvement in baseline subjective pain symptoms and hence, improvements in subjective quality of life, physical functioning, social functioning, general health and overall quality of life in the postoperative period. Depression and anxiety are known to affect the outcome of the procedure. Therefore, assessment of depressive symptoms and its treatment should be a part of assessment of all patients in the preoperative as well as in the postoperative period.

Conflict of interest

None declared by any of the authors

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