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Panacea Journal of Medical Sciences

Journal homepage: www.ipinnovative.com

Original Research Article

Effect of surgery on the relief of pain in patients of degenerative lumbar spine disease

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ARTICLE INFO

Article history:
Received 29-06-2020
Accepted 26-07-2020
Available online 26-08-2020

Keywords:
Degenerative lumbar spine disease
Pain relief
Numeric pain rating scale
Outcome measure

ABSTRACT

Background: Lumbar degenerative spine conditions cause mobility dysfunction and can result in alterations in physical functioning and variable levels of pain. The best measurement of treatment quality in these diseases should be the patient's opinion of the results using patient-reported outcome instruments.
Aims: To do comparative evaluation of pain intensity in lumbar degenerative spine patients in preoperative and postoperative period.
Settings and Design: Pain intensity of all selected patients was measured at admission and postoperatively using Numeric pain rating scale (NPRS).
Materials and Methods: Effect of surgery on pain relief in 60 patients of degenerative lumbar spine disease was studied.
Statistical Analysis used: Paired 't' test was performed to find out the differences in the variables between pre-operative and post-operative stages among the study population.
Results: Preoperative NPRS values (mean=7.88) improved at discharge (mean=4.8) and throughout the follow up period at 1month (mean=3.46), at 6 months (mean=2) and 1 year (mean=1.11).
Conclusions: All the patients showed improvement in their NPRS scores throughout the follow up period. The use of NPRS outcome instrument gives us a platform to predict a positive and accurate outcome after surgery in the long term.

1. Introduction

Low back pain is a highly prevalent health condition globally. The mean global one-year point prevalence of low back pain is estimated to be 38.0% (±19.4).[1]

Lumbar degenerative spine disease encompasses degenerative disc disease, spinal stenosis, degenerative spondylolisthesis, degeneration of facet joints and degenerative scoliosis.[2] These conditions can lead to mobility dysfunction and variable levels of pain.

Surgical treatment is indicated for patients who do not respond to clinical therapy.

In the past, surgical outcomes were commonly assessed based on surgeon's subjective views. However, surgeon's perspectives frequently do not correlate with patient satisfaction.[3]

The patient-reported outcome measures provide a powerful, quantifiable and standardised research tool against which the effectiveness of healthcare interventions can be judged.[4]

We did a study to analyse the effect of surgery on pain relief in patients of degenerative lumbar spine disease

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https://doi.org/10.18231/j.pjms.2020.020

2. Materials and Methods

This study was done on sixty patients of lumbar degenerative spine disease.

2.1. Inclusion criteria

Patients of Lumbar degenerative spine disease having symptoms of low back pain, neurogenic claudication, difficulty in walking not responding to conservative treatment and willing to undergo surgical treatment.

Patient aged more than 45 years.

2.2. Exclusion criteria

Patients having spine pathology due to infection, malignancy or trauma.

Patients undergoing repeat surgery for lumbar degenerative spine disease.

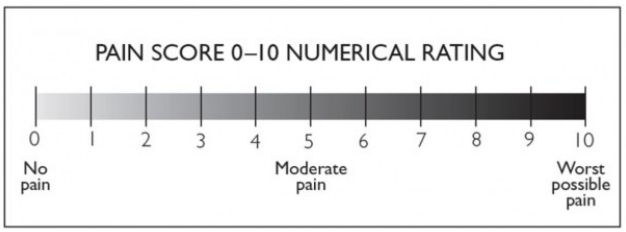
3. Methodology

Patients having symptoms of lumbar degenerative spine disease were admitted in Neurosurgery Department. A detailed history and clinical examination was done and diagnosis of lumbar degenerative spine disease by various radiological tests like X-ray, MRI and CT scan if required was done. After doing routine and specific investigations and after taking informed consent, patients were posted for surgery. Ethical clearance was taken.

The intensity of pain was assessed in the pre-operative period and post-operatively at the time of discharge, at 1 month, 6 months and 1year interval by making use of the Numeric pain rating scale (NPRS).

3.1. Numeric pain rating scale (NPRS)

It is used to assess degree of back pain. The NPRS is a 0-10 point scale in which 0 is considered no pain and 10 is the worst pain possible. The NPRS can be administered verbally (therefore also by telephone) or graphically for self-completion.



3.2. Stastistical evaluation

Descriptive analysis was carried out. Parametric data was expressed as mean ± standard deviation. Paired 't' test was performed to find out the differences in the variables between pre-operative and post-operative stages among the study population. Statistical significance was assumed at a value of P <0.05. Findings were statistically analyzed by using Statistical Package for Social Sciences (SPSS) software for windows.

4. Results

In our study most of the patients were in the age group of 58-70 (56.6%) and total males patients in the study were 32(53.3%) & total females patients in the study were 28(46.7%).

Most of the patients (58.3%) had duration of symptoms between 1-5 years [Table 1].

Table 1: Duration of symptoms

Duration of symptoms	No of cases	Percentage (%)
< 1 year	17	28.3
1-5years	35	58.3
> 5 years	8	13.3

Most of the patients were having preoperative NPRS value of 8(40%) [Figure 1]

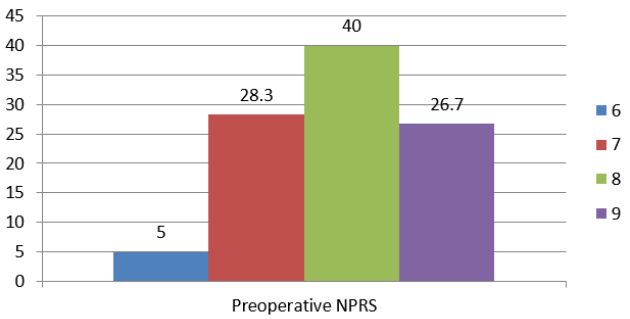


Fig. 1: Preoperative NPRS values

On comparison of mean preoperative NPRS value with postoperative values at discharge, 1 month, 6 months & 1 year, there was statistically significant improvement in the postoperative NPRS values as compared to the preoperative values [Table 2].

5. Discussion

Persons affected by lumbar degenerative spine conditions are at risk for physical functioning limitations, pain, disability and possible neurologic deficit.

We assessed the intensity of pain in patients in the preoperative period and following surgical treatment by using Numeric Pain Rating Scale (NPRS).

The mean age was 59 years in our study. Jansson KA et al noted that mean age of patients was 66 years in their study.[5] With an increase in number of elderly population, it is

Table 2: Comparison of preoperative NPRS values with postoperative values

Comparison of different groups		Mean	Number of cases	Standard Deviation	Standard error mean	P-value
Group 1	Preoperative-NPRS	7.88	60	0.865	0.111	<0.001
	Discharge-NPRS	4.8	60	0.776	0.100	
Group 2	Preoperative-NPRS	7.88	60	0.865	0.111	<0.001
	1month-NPRS	3.46	60	0.832	0.107	
Group 3	Preoperative-NPRS	7.88	60	0.865	0.111	<0.001
	6months-NPRS	2	60	0.552	0.071	
Group 4	Preoperative-NPRS	7.88	60	0.865	0.111	<0.001
	1year-NPRS	1.11	60	0.323	0.041	

expected that there will be an increased incidence of patients with degenerative spine disease (Miyamoto H, 2008).[6]

Hence, it is important to know whether surgical treatment is as useful for elderly people as for younger. In our study, there was no statistically significant effect of age on the outcome following surgery. Some studies have found that increasing age is associated with less favourable outcome (Yamashita K, 2006).[7]

Other studies have found that increasing age had no effect on the outcome (Sigmundsson et aland Arinzon et al).[8,9]

In our study, there was no statistically significant effect of gender on the outcome following surgery. These findings are in accordance with the findings of Thornes E et al, 2011.[10]

Sigmundsson et alin their study of 109 patients with central spinal stenosis also found that there were no statistically significant differences in outcome parameters between males and females.[8] But several studies have shown that female gender has less satisfaction with the procedure (Mariconda M et al , 2000 & Shabat S et al , 2005).[11,12]

Total males in our study were 32(53.3%) & total females in the study were 28(46.7%). In a study of 109 patients with central spinal stenosis in the Swedish Spine Register by Sigmundsson et al, there were 56(51.3%) males & 53(48.6%) females.[8]

In our study, 58.3% of patients have duration of symptoms between 1-5 years, indicating the chronic nature of the lumbar degenerative spine conditions.

There was no statistically significant effect of duration of symptoms on outcome in our analysis. Amundsen T et al (2000) also did not find that duration of symptoms had any influence on outcome after a 10-year follow-up.[13] Two meta-analyses exploring prognostic factors in spinal stenosis surgery also found that duration of symptoms was not a significant factor influencing the outcome (Aalto TJ et al. 2006).[14]

Most (40%) of patients in our study were having preoperative NPRS value of 8. So, most of the patients were having severe pain at presentation. Mean NPRS value in the preoperative assessment in our study was 7.88 (SD = 0.865).

In a prospective study of 326 patients who underwent lumbar spine surgery for degenerative disorders by Solberg T et al, mean NPRS value was 6 in the preoperative period.[15]

Mean postoperative NPRS value at the time of discharge in our study was 4.8 (SD =0.776). Comparing preoperative NPRS value in our study with postoperative follow up value at discharge, the difference was found to be statistically significant ($p < 0.001$).

Mean postoperative NPRS value at the time of one month follow up in our study was 3.46 (SD =0.832) and the difference on comparing with the preoperative value was found to be statistically significant ($p < 0.001$).

Mean postoperative NPRS value at the time of six months follow up in our study was 2 (SD =0.552) and the difference on comparing with the preoperative value was found to be statistically significant ($p < 0.001$).

Mean postoperative NPRS value at the time of one year follow up in our study was 1.11 (SD =0.323) and the difference on comparing with the preoperative value was found to be statistically significant ($p < 0.001$).

This indicates the reduction of the pain throughout the follow up period and the benefit and success of surgery.

Our findings are in accordance with the findings in the prospective study of 326 patients who underwent lumbar spine surgery for degenerative disorders by Solberg T et alin which they described the criteria for success for NPRS by defining the optimal cut off point and they found that the cut off value for success for the mean change score was 2.5.[15]

Werner DAT et al did a study with an aim to identify dichotomous cut offs for failure and worsening. They described "Failure" after 12 months for NPRS, as an insufficient improvement from baseline, with NPRS final raw score > 5.5. In our study mean NPRS value was 1.11at one year follow up, hence there was no “Failure”.[16]

In our study we found that there was large improvement in pain intensity postoperatively. This indicates the benefit of surgical intervention in patients suffering from lumbar degenerative spine disease.

6. Conclusions

Preoperative NPRS values (mean=7.88) improved at discharge (mean=4.8) and throughout the follow up period at 1month (mean=3.46), at 6 months (mean=2) and 1 year

(mean=1.11).

So, all the patients showed improvement in their NPRS values throughout the follow up period, indicating the benefit of surgical intervention.

This study confirms that NPRS is an important tool to assess the intensity of pain in patients with lumbar degenerative spine disease undergoing surgical treatment.

The use of this index helps to predict the outcome after surgery in the long term.

The results obtained after using this outcome instrument will be useful as more accurate information could be provided to the patients in future.

This indicator could also be used by the surgeon to self audit his work.

7. Source of Funding

None.

8. Conflict of Interest

None.

9. Acknowledgement

The authors acknowledge the support of their family members. The authors would like to thank all the patients as well.

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Cite this article: Kapoor B, Kapoor M, Vaid P, Kapoor BB, Kapoor S. Effect of surgery on the relief of pain in patients of degenerative lumbar spine disease. *Panacea J Med Sci* 2020;10(2):79-82.