

Clinical outcomes in elderly population undergoing decompressive laminectomy for lumbar canal stenosis

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Abstract

Introduction: Lumbar canal stenosis is the most frequent indication for spinal surgery in the elderly population. The most commonly used procedure is decompressive laminectomy for the same. The patient's assessment of the findings should be used as the best indicator of the procedure's success and post-operative quality of life. We have operated and followed up 84 cases of elderly patients with lumbar canal stenosis following decompressive laminectomy and reviewed at 3 and 12 months.

Aims and objectives: To assess clinical outcome in elderly patients with lumbar canal stenosis after decompressive laminectomy.

Methods: 84 patients were operated between January 1st 2021 upto May 31st, 2021. Patients were reassessed at 3 months and 12 months interval by use of EuroQol-5D(EQ-5D) changes in Oswestry disability index (ODI).

Results: The mean EQ-5D score preoperatively at 3 months and 12 months were 0.31, 0.60 and 0.67 respectively. Mean ODI score preoperatively was 44.2, at 3 months 25.2 and at 12 months 24.8. All of the patients showed improvement in their EQ-5D score and ODI scores.

Conclusions: Properly selected elderly patients of 60 years and above can expect an improvement of pain and quality of life following decompressive laminectomy.

Keywords: Lumbar canal stenosis, decompressive laminectomy, Euroqol-5D, Outcome measure

Introduction

The most frequent indication for spinal surgery in elderly is lumbar canal stenosis^{1,2}. The most commonly used surgical procedure is decompressive laminectomy, but the surgical risk is higher in the elderly population due to higher co-morbidity. Main treatment goals include improvement in pain, functional status and quality of life. An expectant or non-surgical approach is

a good option for patient with moderate symptoms and sparse motivation or when the risk of treatment outweighs potential benefits^{3,4,5}. The aim of this study was to find out the benefits of lumbar spinal surgery in an aging group of population in a tertiary care hospital in North East India.

Materials and Method

This study was carried out in Department of Neurosurgery, Gauhati Medical College & Hospital, Guwahati, Assam between January 1st, 2021 and May 31st, 2021. All patients above 60 years with isolated lumbar canal stenosis treated by decompressive laminectomy were included. Patients with spondylolisthesis requiring fusion procedures were excluded from the study. 2 patients underwent fusion procedures. Follow up time was 3 months and 12 months. Data was filled up according to a standard questionnaire. Identical questionnaires were filled up by preoperatively and at follow up. Primary outcome was changes in EuroQol-5D. Secondary outcome was gauged by Oswestry Disability Index (ODI). We usually perform 2 level laminectomy in our institute. All cases were performed by a single surgeon.

EUROQOL-5D: A generic and performance weighted measure of health related quality of life. It evaluates five dimensions- mobility, self-care, activities of daily life, pain and anxiety or depression. Total score range is from -0.594 to 1, where 1 corresponds to perfect health and 0 death. Negative values are considered to be worse than death.^{6,7}.

Oswestry Disability Index

A scale from 0 to 100 where higher number indicates more severe symptoms. The questionnaire focuses on how patients relate to 10 common activities where different statements about functional level are given.⁸

Walking capability: To assess walking capability, participants were asked about the distance they can walk without pain-(0-5) were: no limitations (0), able to walk up to 1.5 kilometers (1), up to 750 meters (2), up to 100 meters (3), dependent on crutches (4) or bedridden (5).

Statistical Evaluation

Descriptive analysis was carried out. Statistical significance was set to ≤ 0.005 . Comparison of means was analyzed with paired t-test. Findings were statistically analyzed by using statistical package for social sciences (SPSS) software for windows.

Table 1: Patients' characteristics

Categories	Total(%)	Mean \pm SD
Age		64.2 \pm 3.9
Less Than 65 years	47(55.9%)	
More than 65 years	37(44.1%)	
Sex		
Male	43(51.1%)	
Female	41(48.9%)	
Duration of back pain*	96 weeks	96 \pm 40
Duration of leg pain*	92 weeks	92 \pm 53
Smoking		
Yes	11(13.09%)	
No	73(86.9%)	
Hospital stay (days)*	8 \pm 4 days	
Levels of laminectomy		
2 level	61(72.61%)	
>2 level	23(27.38%)	
Indication for surgery		
Central spinal stenosis	65(77.3%)	
Lateral spinal stenosis	5(5.9%)	
Combination of above	14(16.66%)	
Previous back surgery		
Yes	4(4.76%)	
No	80(95.23%)	

*Central tendency presented as median; SD= Standard deviation

Results

In our study, patients were of the age group 61-74 years. Total male patients in the study were 43(51.1%) & females were 41(48.9%). Most of the patients had duration of symptoms between 1-2 years.

Mean EuroQol-5D score preoperatively was 0.31 (0.25-0.37). On comparison with follow up scores at 3 months and 12 months, there was a statistically significant improvement in the postoperative EuroQol-5D score as compared to the previous value. The mean EuroQol-5D score at 3 months and 12 months interval were found to be 0.60 and 0.67 respectively.

Mean ODI score preoperatively was found to be 44.2. On follow up at 3 months it was found to be 25.2 and at 12 months ODI score was 24.8, indicating statistically significant (P<0.001) improvement after surgery.

The walking capability also improved for the participants in the study. Preoperatively the median walking capability was 3(able to walk up to 100 meters) & at 3 and 12 months interval the median was 1 (able to walk up to 1.5km).

Table 2: Outcome variables at baseline, 3 months and 12 months after surgery

Outcome variable	Baseline Mean (95% CI)§	3 months Mean (95% CI)§	12 months Mean (95% CI)§	P value*
EQ-5DØ, total score	0.31(0.25-0.37)	0.60(0.55-0.64)	0.67(0.61-0.72)	< 0.001
Oswestry Disability Index	44.2(40.6 - 47.4)	25.2(21.9 - 29.3)	24.8(20.8-28.6)	< 0.001

*P values for all outcome variables at both time intervals were P < 0.001. §CI; confidence interval. EQ-5DØ; EuroQol-5 D, instrument for assessing health related quality of life

Discussion

The mean age in our study was 64 years. Jansson KA et al noted that the mean age of patients was 66 years in their study⁹. It is expected that there will be an increase in the incidence of patients with degenerative spine diseases with an increase in the number of elderly population (Miyamoto H, 2005)¹⁰.

In our study the results demonstrate that laminectomy without fusion is a safe treatment for lumbar canal stenosis in the elderly population comprising 60 years and above. Fredman et al and Ragab et al stated that within an elderly population increased age is not a predictor of worse outcome and our study supports the same^{11,12}. Similar result is supported by Sigmundsson et al¹³.

In our study patients had back pain for more than 1 year indicating chronicity of disease. Duration of symptoms didn't seem to have any changes on the outcome. This is in accordance with Amundsen T et al (2000) who also concluded that duration of symptoms did not appear to have any influence on outcome after follow up for 10 years¹⁴. Turner JA et al. 1992, Aalto TJ et al. 2006 also came to the same conclusion regarding the duration of symptoms¹⁵⁻¹⁶.

Mean EuroQol-5D score was found to be 0.31 preoperatively. Solberg T et al. in a prospective study of 326 patients, who underwent lumbar spine surgery for degenerative disorders, found that mean EuroQol-5D value was 0.26 in the preoperative period¹⁷. Robinson Y et al. found that mean EuroQol-5D value was 0.31 in the preoperative period in their study¹⁸. Sigmundsson et al. in their study of 109 patients with found that mean EuroQol-5D value was 0.41 in the preoperative period¹³.

In our study, the mean EuroQol-5D score at 3 months and 12 months interval were found to be 0.60 and 0.67 respectively. Jansson KA et al in their study found that the meanEuroQol-5Dvalue improved from 0.36 to 0.64, and the quality of life improved in 184 (80%) of the patients⁹. Robinson Y et al.also noted that mean EQ-5D values improved in the follow-up period¹⁸. Sigmundsson et al in their study also found that the meanEuroQol-5D value improved from 0.41 in the preoperative period to 0.60 at one year follow up¹³.

Mean ODI score in our study was 44.32 preoperatively which improved to 25.2 at 3 months postoperatively and 24.8 at 12 months interval. Similar results were obtained by Rosen SD et al in their study of 50 patients above 75 years where mean ODI preoperatively was 48 and at 7 months follow up was 27¹⁹.

In this study, we discovered that many areas of quality of life, including symptoms, had significantly improved.

Conclusion

Properly selected patients of 60 years and older can expect a clinically meaningful improvement in quality of life, functional status and pain after decompressive laminectomy.

References

1. Ciol MA, Deyo RA, Howell E, Kreif S: An assessment of surgery for spinal stenosis: time trends, geographic variations, complications, and reoperations. *J Am Geriatr Soc* 1996, 44:285-290.
2. Gunzburg R, Szpalski M: The conservative surgical treatment of lumbar spinal stenosis in the elderly. *Eur Spine J* 2003, S(Suppl 2):176-180.
3. Amundsen T, Weber H, Nordal HJ, Magnaes B, Abdelnoor M, Lilleås F: Lumbar spinal stenosis: conservative or surgical management?: A

- prospective 10-year study. *Spine* 2000, 25:1424-1435.
4. Atlas SJ, Keller RB, Wu YA, Deyo RA, Singer DE: Long-term outcomes of surgical and nonsurgical management of lumbar spinal stenosis: 8 to 10 year results from the Maine Lumbar Spine Study. *Spine* 2005, 30:936-943.
5. Herno A, Airaksinen O, Saari T, Sihvonen T, Luukkonen M: The effect of prior back surgery on surgical outcome in patients operated on for lumbar spinal stenosis. A matched-pair study. *Acta Neurochir (Wien)* 1996, 138:357-363.
6. Solberg TK, Olsen JA, Ingebrigtsen T, Hofoss D, Nygaard OP: Health-related quality of life assessment by the EuroQol-5 D can provide cost-utility data in the field of low-back surgery. *Eur Spine J* 2005, 14:1000-1007.
7. The EuroQol Group: EuroQol—a new facility for the measurement of health-related quality of life. *Health Policy* 1990, 16:199-208.
8. Fairbank JC, Couper J, Davies JB, O'Brien JP: The Oswestry low back pain disability questionnaire. *Physiotherapy* 1980, 66:271-273.
9. Jansson KA, Németh G, Granath F. Health-related quality of life in patients before and after surgery for a herniated lumbar disc. *J Bone Joint Surg Br.* 2005;87(7):959-64.
10. Miyamoto H, Sumi M, Uno K. Clinical outcome of nonoperative treatment for lumbar spinal stenosis and predictive factors relating to prognosis, in a 5 year minimum followup. *J Spinal Disord Tech.* 2008;21(8):563-8.
11. Fredman B, Arinzon Z, Zohar E, Shabat S, Jedeikin R, Fidelman ZG, Gepstein R: Observations on the safety and efficacy of surgical decompression for

- lumbar spinal stenosis in geriatric patients. *Eur Spine J* 2002, 11:571-574.
12. Ragab AA, Fye MA, Bohlman HH: Surgery of the lumbar spine for spinal stenosis in 118 patients 70 years of age or older. *Spine* 2003, 28:348-353.
 13. Sigmundsson FG, Kang XP, Jonsson B. Prognostic factors in lumbar spinal stenosis surgery. *Acta Orthop.* 2012;83(5):536-42.
 14. Amundsen T, Weber H, Nordal H J. Lumbar spinal stenosis: Conservative or surgical management? A prospective 10-year study. *Spine (Phila Pa 1976).* 2000;25 (11):1424-36.
 15. Turner J A, Ersek M, Herron L. Surgery for lumbar spinal stenosis. Attempted meta-analysis of the literature. *Spine(Phila Pa 1976).* 1992;17(1):1-8.
 16. Aalto T J, Malmivaara A, Kovacs F. Preoperative predictors for postoperative clinical outcome in lumbar spinal stenosis. *Spine (Phila Pa 1976).* 2006;31(18):E648-63.
 17. Solberg TK, Johnsen LG, Nygaard OP. Can we define success criteria for lumbar disc surgery? Estimates for a substantial amount of improvement in core outcome measures. *Acta Orthop.* 2013;84(2):196-201.
 18. Robinson Y, Michaelsson K, Sanden B. Instrumentation in lumbar fusion improves back pain but not quality of life 2 years after surgery. A study of 1,310 patients with degenerative disc disease from the Swedish Spine Register SWESPINE. *Acta Orthop.* 2013;84(1):7-11.
 19. Rosen DS, O'Toole JE, Eichholz KM, Hrubes M, Huo D, Sandhu FA, Fessler RG: Minimally invasive lumbar spinal decompression in the elderly: outcomes of 50 patients aged 75 years and older. *Neurosurgery* 2007, 60:503-509.