

## Health-related quality of life after surgery for lumbar spinal stenosis: A follow-up study in China

Yongqiang Hou<sup>1</sup>, Jinbiao Liu<sup>2</sup>, Xinzheng Wang<sup>3</sup>, Hong Lu<sup>4</sup>

### ABSTRACT

**Objective:** Lumbar spinal stenosis (LSS) is a usual condition for spinal surgeries among adults over 65 years old. We conducted the present study to evaluate the health-related quality of life (HRQoL) after LSS in a group of Chinese patients.

**Methodology:** We followed up 79 patients who received surgeries for LSS for one year. The HRQoL before treatment and one year after treatment was evaluated with the Medical Outcome Short Form 36 (SF-36).

**Results:** The HRQoL of patients after LSS significantly improved in three mental health domains (social function, vitality and mental health) and all four physical health domains one year after surgical treatments. However, patients with TBI still had significant lower scores in every domain than the reference group even one year after discharge.

**Conclusion:** The HRQoL had lower scores at discharge greatly improved one year after the treatment. This study also highlighted the usefulness of the HRQoL assessment for prognosis evaluation in patients after surgical treatment for LSS.

**KEY WORDS:** Health-related quality of life, Lumbar spinal stenosis, Surgery, SF-36, Follow-up.

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### INTRODUCTION

Lumbar spinal stenosis (LSS) is a usual condition for surgical treatment among old adults aged 65 years or more. LSS can lead to functional impairment and severe symptoms at lower limbs.<sup>1</sup> Although

the widely accepted first choice for the treatment of LSS is the non-operative practice, some patients still need to receive surgery because of the failure in nonoperative treatments. Assessment of outcomes after surgical treatment of LSS has generally focused on clinical examinations or measures.<sup>2-5</sup>

Recently, the application of health-related quality of life (HRQoL) in prognosis assessment in patients after surgical treatments, including those for LSS<sup>6,7</sup>, has raised much concern. Previous studies showed that the HRQoL of patients after surgeries for LSS improved compared with preoperative measurements but was still impaired in physical aspects compared with the reference population.<sup>6</sup> However, further evidences from different settings and populations are still warranted to draw more convincing conclusions.

To our knowledge, there was no previous study assessing HRQoL after surgical treatment for LSS in a Chinese population. Since evidences in

1. Yongqiang Hou,
  2. Jinbiao Liu,
  3. Xinzheng Wang,
  4. Hong Lu,
- Microsurgical Ward Section,  
1-3: General Surgical Ward Section 3,  
1-4: The First Affiliated Hospital of Henan University of  
Science and Technology, Luoyang, Henan, P.R. China.

Correspondence:

Jinbiao Liu,  
General Surgical Ward Section 3,  
The First Affiliated Hospital of Henan University of  
Science and Technology, Luoyang,  
Henan, 471003, P.R. China.  
E-mail: liujbly@163.com

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Chinese populations are still lacking, we performed this follow-up study to evaluate the HRQoL in patients who received surgical treatment for LSS who received their treatments in a large teaching hospital in Luoyang, a city in Central China.

## METHODOLOGY

**Participants and procedures:** The study was performed in a large teaching hospital which houses one of the largest trauma centers in Luoyang, China. Eligible subjects were adult patients who were admitted to this hospital with LSS during May to December 2010. We totally invited 86 patients to participate when they were admitted to the hospital and 79 (92%) agreed to participate. The present study was conducted after the protocol reviewing and approval by the university's clinical research ethics committee. In addition, informed consents were signed by participants before each interview.

A reference sample was recruited from people who requested general health examinations in the same hospital during the same period. The reference group was required to be without LSS and frequency matched to patients with LSS by age (within 5 years) and sex. Face-to-face interviews were conducted to collect information on demographic characteristics and HRQoL from the reference group. A total of 80 people were invited, among which 72 (91.3%) completed the interviews.

**Surgical treatment:** Segmental decompression and an undercutting facetectomy of the affected area were performed for participants. We determined indications and levels of surgeries based on clinical manifestations, results from medical imaging (CT / MRI scan), as well as neuro-physiologic examinations. After surgeries, we allowed patients to stay in wards for 5 days and to be with thoracolumbar brace for two weeks. In addition, we recommended restricted activity for at least one month after their discharge.

**Health-related quality of life:** We used the Medical Outcome Short Form 36 (SF-36) was to evaluate HRQoL. This questionnaire is a generic measuring toll for HRQoL which has been validated.<sup>8,9</sup> The SF-36 questionnaire includes a total of 8 domains which consists of 2 summary scores: the mental component summary (MCS) and the physical component summary (PCS). The SF-36 was administrated twice for each participant, on year apart. On the day of admission, face-to-face interviews were conducted to evaluate the HRQoL of participants. One year after discharge, the participants finished follow-up assessments of HRQoL via telephone interview.

**Statistical analysis:** The SPSS version 13.0 software (SPSS Inc., Chicago, IL) was used for statistical analyses. A two-sided P value < 0.05 was determined as statistically significant. We used Wilcoxon's rank sum tests in comparing HRQoL measurements before and after surgical treatment. Non-conditional logistic regression was also performed to estimate odds ratios (ORs) and 95% confidence intervals (CIs) of risk factors for low HRQoL one year after treatment. We chose the medians HRQoL measurement values as cutting points. The inclusion of variables into the model was determined according to both statistical and biological considerations. If the potential confounding factors altered the effect estimates by more than 10%, they were included in the multi-variate models. The final model included the following variables: age at admission ( $\leq 60$ ,  $> 60$  years), sex, education level (less than high school, higher school or above), and pre-operation Roland-Morris (RM) score. The results remained not substantially changed after including additional variables.

## RESULTS

Seven patients were lost from the original cohort mainly because of change of telephone number or refusal. The baseline characteristics of the remaining 72 participants are presented in Table-I. There were 45 (62.5%) males and 27 (37.5%) female among these participants. The mean age of patients who were followed up at admission was 63.1 (10.2) years.

Table-I: Baseline demographic and clinical characteristics of patients with lumbar spinal stenosis (LSS) and the reference group.

Variables	Patients with LSS (n = 72)	Reference group (n = 73)
Sex, n (%)		
Male	45 (62.5)	46 (63.0)
Female	27 (37.5)	27 (37.0)
Age at admission, years		
Mean (SD)	63.1 (10.2)	62.9 (9.7)
Education, n (%)		
Less than high school	51 (70.8)	57 (75.3)
High school or above	21 (29.2)	16 (24.7)
Marital status, n (%)		
Married or cohabitant	65 (90.3)	68 (93.2)
Single or divorced	7 (9.7)	99 (6.8)
Roland-Morris score		
Mean (SD)	16.3 (11.7)	

Table-II: Health-related quality of life among patients with lumbar spinal stenosis (LSS) and the reference group.

Dimensions	Patients with LSS (n = 72 )		Reference group (n = 73)
	Before treatment	1 year after treatment	
Physical function	55.6 (24.7)	63.2 (26.9)*	71.7 (21.5)
Role physical	51.3 (26.1)	57.4 (22.8)*	70.4 (26.3)
Bodily pain	53.3 (26.8)	63.0(28.1)*	72.1 (21.7)
General health	47.9 (24.5)	51.7 (22.4)*	70.4 (22.8)
Vitality	40.1 (21.4)	47.2 (22.5)*	57.9 (20.6)
Social function	54.4 (23.7)	63.8 (26.3)*	71.5 (24.8)
Role emotion	59.8 (26.0)	64.2 (21.8)	69.6 (21.4)
Mental health	50.7 (22.1)	57.4 (21.6)*	63.7 (20.5)

Data are presented as means and standard deviation (SD)  
 \* P<0.05 under Wilcoxon's rank sum test compared with measurements before treatment.

Results of HRQoL assessments before and one year after surgical treatments are listed in Table-II. The HRQoL of patients after LSS significantly improved in three mental health domains (social function, vitality and mental health) and all four physical health domains one year after surgical treatments. However, patients with TBI still had significant lower scores in every domain than the reference group even two years after discharge.

ORs with CIs from logistic regressions for low HRQoL after surgeries are presented in Table-III for different summary scores. We observed that females had lower scores in MCS than male patients (OR = 1.9, 95% CI: 1.1 - 3.3). Older patients aged 60 or more were found to be with lower scores in PCS (OR = 1.8, 95%CI: 1.1-2.9). Patients who had more severe disability (higher RM score) had lower scores in both PCS (OR = 1.9, 95% CI: 1.2 -3.1) and MCS (OR = 1.6, 95% CI: 1.1 -2.3).

## DISCUSSION

Our study was the first longitudinal cohort study to investigate the HRQoL among patients with LSS after surgeries in a Chinese population using SF-36 as the measuring tool. Our study found the HRQoL of patients with LSS improved one year after treatment, which was in line with previous studies.<sup>6,7</sup> Nevertheless, even one year after treatment, patients with LSS still suffered from impaired HRQoL compared with the general population, which was consistent with previous studies.<sup>6</sup>

Table-III: Logistic regression for low health-related quality of life one year after treatment 72 patients with lumbar spinal stenosis.

Variables	PCS <sup>a</sup> Odds Ratio (95% CI) <sup>c</sup>	MCS <sup>b</sup> Odds Ratio (95% CI) <sup>c</sup>
Sex		
Male	1.0 (referent)	1.0 (referent)
Female	1.4 (0.5 - 3.9)	1.9 (1.1 - 3.3) *
Age at admission, years		
≤ 30	1.0 (referent)	1.0 (referent)
> 30	1.8 (1.1 - 2.9) *	1.3 (0.5 - 3.4)
Education		
Less than high school	1.0 (referent)	1.0 (referent)
High school or above	1.1 (0.5 - 2.4)	0.8 (0.3 - 2.1)
RM score		
≤ 16	1.0 (referent)	1.0 (referent)
> 16	1.9 (1.2 - 3.1) *	1.6 (1.1 - 2.3) *

PCS = Physical Component Summary;

MCS = Mental Component Summary;

GCS = Glasgow Coma Scale; RM: Roland-Morris.

a Cut-point: 44.7 (median); b Cut-point: 46.2 (median);

c Adjusted for all the listed variables; \* P < 0.05.

A difference in HRQoL of MCS between the males and females was observed in this study, suggesting the mental health status of female patients with LSS after surgeries may be poorer than male patients. In the present study, we also observed older patients had lower scores in physical health components one year after treatment. It is possibly explained by the fact that older patients generally recover more slowly. Nevertheless, since even in the general population lower HRQoL scores were also observed among older people<sup>10</sup>, lower scores in HRQoL among older patients with LSS after surgical treatment may not be directly related to LSS and the treatment. We also found that low HRQoL was significantly correlated with disability severity before treatment on both physical and mental health, which was in line with our expectations.

**Limitations of the Study:** Several limitations of this study need to be discussed. First, the patients recruited in this study might not represent for all LSS patients in our city and the findings from this study may not apply for the whole population in our city or other Chinese populations because it was conducted in a single setting. Second, because of practical difficulties, the follow up was only 1 year and was not long enough to assess long-term HRQoL of patients with TBI after discharge. Third,

the sample size was limited and may not have adequate statistical power.

In conclusion, in the present study, we found that Chinese patients with LSS had improved HRQoL one year after surgical treatment. Age, sex, and pre-operation RM score were associated with HRQoL after treatment in the mental or physical domains. More studies from Chinese populations are still needed.

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