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Clinical Study

Depressive burden is associated with a poorer surgical outcome among lumbar spinal stenosis patients: a 5-year follow-up study

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Abstract

BACKGROUND CONTEXT: In lumbar spinal stenosis (LSS), conservative treatment is usually the first choice of treatment. If conservative treatment fails, surgery is indicated. Psychological factors such as depression and anxiety are known to affect the outcome of surgery. Previous studies on depression and surgery outcome using long follow-up times are scarce.
PURPOSE: The purpose of this study was to investigate the effect of depressive symptoms on the surgical outcome during a 5-year follow-up among patients with LSS.
STUDY DESIGN: A prospective observational study.
PATIENT SAMPLE: Patient sample included 102 LSS patients who needed surgical treatment.
OUTCOME MEASURES: The outcome of surgery was evaluated with the Oswestry Disability Index (ODI), visual analog scale pain assessment, and self-reported walking capacity.
METHODS: The patients completed a set of questionnaires preoperatively and 3 and 6 months, as well as 1, 2, and 5 years after the surgery. Depressive symptoms were assessed with the Beck Depression Inventory. The depressive burden was estimated by summing all individual Beck Depression Inventory scores. Statistical analyses included cross-sectional group comparisons and linear regression analyses. No conflicts of interest.
RESULTS: On 5-year follow-up, a high depressive burden associated with a poorer outcome of surgery when assessed with the ODI. In linear regression analysis, a high depressive burden associated with higher ODI score.
CONCLUSIONS: Even slightly elevated long-term depressive symptoms in LSS patients are associated with an increased risk of a poorer functional ability after decompressive surgery.

Keywords: Depression; Lumbar spinal stenosis; Surgery outcome; Mental health; Disability; Depressive symptoms

Introduction

Lumbar spinal stenosis (LSS) is a common condition, especially among the elderly population [1], and conservative treatment is commonly accepted as the first choice [2]. In cases where conservative treatment fails, surgery is indicated [3]. The patients requiring surgery are increasing in number [4]. However, up to 40% of these patients do not sufficiently improve after surgery (eg, [3,5]).

Psychosocial factors affect the outcome of spinal surgery (eg, [6,7]). A review by Celestin et al. [8] suggested that depression, anxiety, and poor coping predict a poorer outcome after spinal surgery. However, in previous research on the association between depression and surgery, the follow-up times have only been up to 2 years [9–12]. Earlier studies by Sinikallio et al. [12,13] also examined factors related to the rehabilitation period after surgery and

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The authors MP and SV have contributed equally to this work.

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demonstrated that depressive symptoms in the preoperative and early recovery phase were strong predictors of the outcome of surgery on 1- and 2-year follow-ups.

The effects of surgery appear to decline with time, but surgery is nevertheless considered to be more beneficial than conservative treatment for up to 3 to 4 years and possibly even 10 years [14–17]. However, the effects of long-term depressive symptoms on the outcome of surgery have not previously been examined. To our best knowledge, this is the first study to investigate the effect of depressive symptoms on the surgical outcome during a 5-year follow-up among LSS patients.

Materials and methods

Study setting and participants

The study participants included 102 patients with radiologically and clinically defined LSS who underwent decompressive surgery. Selection for surgery was carried out by an orthopedist or a neurosurgeon at Kuopio University Hospital, Finland, between October 2001 and October 2004. The study design has been described more in detail by Sinikallio et al. (eg, [18]).

The inclusion criteria were the presence of severe pain in the back, buttocks, and/or lower extremities, with radiographic evidence of compression of the cauda equine or exiting nerve roots by degenerative changes and the surgeon's clinical evaluation of the patient having degenerative LSS requiring operative treatment. All patients also had a history of ineffective responses to conservative treatment.

The exclusion criteria were emergency or urgent spinal surgery precluding recruitment and protocol investigations; cognitive impairment prohibiting completion of the questionnaires or other failures in co-operation; and the presence of metallic particles in the body preventing the magnetic resonance imaging (MRI) investigation.

As published earlier by authors [19], 82% (84 of 102) of the original study population had central and lateral stenosis and 18% (18 of 102) had lateral stenosis only. The mean dural sac area at the most stenotic level was 68.6 mm^2. Sixteen patients had undergone previous lumbar operation. As published by Aalto et al. [20], at the present operation in addition to laminar decompression, disc excision was also performed in seven cases. Lumbar spinal stenosis because of other degenerative stenotic changes was also the main diagnosis in these patients. Lumbar fusion, two with instrumentation, was included in the decompression procedure in 19 cases. The indication for additional lumbar fusion was concomitant spondylolisthesis [20].

The patients received an account of the study during their outpatient visit to the Department of Physical and Rehabilitation Medicine and provided informed consent. The study design was approved by the Ethics Committee of the University of Kuopio (University of Eastern Finland since 2010) and Kuopio University Hospital.

EVIDENCE & METHODS

Context
The acute effects of behavioral health conditions on early outcomes following spine surgery are well described. Whether these issues persist into the long-term may be hypothesized, but high quality data on this topic are scarce. The authors performed a prospective observational study evaluating functional outcome in patients with depressive symptoms, as compared to controls, following surgical decompression for lumbar spinal stenosis.

Contribution
At five-year follow-up, patients with high depressive burden had significantly poorer function as measured by the Oswestry Disability Index (ODI) when compared to controls. Approximately 65% of the variation in ODI at five years was explained by depressive burden. No significant associations were appreciated for depressive symptoms and VAS scores.

Implications
Perhaps not unexpectedly given results published in prior literature, the authors found that patients with high depressive symptoms had significantly reduced physical function as compared to controls at five years after surgery. They were also able to show that a large amount of the variation in ODI score was attributable to depressive burden. It should be noted that this is a cross-sectional study evaluating patients at particular time-points, and the number of patients with depressive symptoms and the quality of those symptoms likely fluctuated over the course of the study. In addition, only a small portion of the cohort (n=10) exhibited depressive symptoms at the time of surgery. Finally, ethno-cultural and sociodemographic conditions unique to the population under study may limit the potential for translation to patients in other countries and from different backgrounds.

—The Editors

Questionnaires

Data collection took place before surgery and 3 months, 6 months, 1 year, 2 years, and 5 years postoperatively with the same questionnaires. Questions concerning sociodemographic background, lifestyle, and health were included in the preoperative questionnaire. The questionnaires have also been described in detail by Sinikallio et al. [18].

The questionnaires included the following:

1. The self-reported walking capacity in meters.
2. Overall back and leg pain with visual analog scale (VAS: 0–100 mm); 0 mm indicating "no pain" and 100 mm "the worst possible pain" [21].
3. Subjective disability measured by the validated Finnish version of the Oswestry Disability Index (ODI: