

Prognostic indicators for patients with degenerative lumbar spinal stenosis

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Chapter 8

Summary

Lumbar spinal stenosis (LSS) is a highly prevalent condition and the most frequent indication for spine surgery in elderly patients (**chapter 1**). Little is known about its prevalence in the general population as a result of inconsistent definitions of LSS and missing reporting in unselected populations. Furthermore, the economic burden of the surgical treatment of LSS is high.

In **chapter 2** we addressed the association between magnetic resonance imaging (MRI) findings and pain in patients with lumbar spinal stenosis. First, we identified all published articles in a systematic literature search. Four studies were finally included and analyzed. Of these, only two articles reported an association between a MRI parameter and pain outcome. In a second step, we analyzed our own data of the first 150 patients of the lumbar spinal stenosis outcome study (LSOS). Using Spearman correlation coefficients and graphical representations we were not able to identify a statistically relevant association between any of the multiple investigated MRI parameters and buttock, leg or back pain. Even by restricting the analysis to the level of the lumbar spine with the most prominent radiological 'stenosis' no relevant association could be shown. Our study indicated that there is a need for innovative 'methods/techniques' to learn more about the causal relationship between radiological findings and the patients' pain related complaints.

In **chapter 3** we appraised arguments reported in randomized controlled trials (RCTs) included in systematic reviews published or indexed in the Cochrane library studying surgical treatments in patients with lumbar spinal stenosis. Eight RCTs out of six systematic reviews listed arguments for the choice of their treatments under investigation. The main argument identified in this appraisal for and against decompression alone in patient with lumbar spinal stenosis was whether or not instability should be treated with (instrumented) fusion procedures. However, as a consequence of a lack of a broadly accepted definition and method of quantification of instability, researchers use different methods to quantify instability. This impedes the appraisal of the clinical impact of study results and the synthesis of results from original studies in a systematic review. Therefore, it is important that researchers and clinicians agree on definitions for important key concepts such as instability and reoperations in a first step.

Lumbar decompression surgery has been shown to improve quality of life in patients with degenerative lumbar spinal stenosis. In the existing literature the efficacy of lumbar decompression in the obese population remains controversial. To assess whether obese patients benefit after decompression surgery for lumbar spinal stenosis (LSS), we used again the data of the LSOS (**chapter 4**). One hundred and sixty-six patients met the inclusion criteria and were divided into three body mass index (BMI) category groups according to the World Health Organization (WHO). We found that obese patients reached minimal clinically important difference (MCID) in SSM in 36% at six months and in 48% at 12 months. To estimate whether BMI categories had a significant influence on reaching MCID, we fitted a multiple logistic regression model adjusting for levels of laminectomy. The estimated odds ratios for MCID in the obese group were 0.78 (0.34-1.82) at six months and 0.99 (0.44-2.23) at twelve months. Therefore, we concluded that obese patients can expect clinical improvement after lumbar decompression for LSS, but the percentage of patients with a meaningful improvement is lower than in the group of patients with under-, normal and pre-obese weight at six and twelve months.

In **chapter 5** we investigated the effect of catastrophizing on treatment efficacy and outcome in patients treated for low back pain in a systematic review. Heterogeneity in study settings, treatments, outcomes, and patient populations impeded meta-analysis. We found that catastrophizing at baseline was predictive for disability at follow-up in four studies and for pain in two studies whereas three studies found no predictive effect of catastrophizing. A mediating effect was found in all studies (n=5) assessing the impact of a decrease in catastrophizing during treatment. A greater decrease was associated with better outcome. Most studies that investigated the moderating effects on treatment efficacy found no effect (n=5). However, no study investigated the influence of catastrophizing on work-related outcomes including return to work. We therefore concluded that the presence of catastrophizing should be considered in patients with persisting back pain. Furthermore, future research should aim to clarify the role of catastrophizing as a moderator of outcome and investigate its importance for work-related outcomes.

Finally, in **chapter 6** we evaluated the effect of pre- and postoperatively assessed fear avoidance beliefs (FAB) on pain and disability in patients with LSS after decompression surgery. For this study we used again data of the LSOS and included 234 patients. To analyze the influence of FAB on pain and disability we built multiple logistic regression models with a priori selected potential confounders for MCID in SSM symptoms and SSM function at 12 months. Furthermore, we used multiple imputation based on chained to obtain data sets without missing values. Finally, we found baseline high FAB (>16 points) measured by the FAB physical activity subscale (FABQ-P) not to be associated with pain (OR 0.95; 95% CI: 0.55-1.67) and disability (OR 1.11; 95% CI: 0.64-1.92) at twelve months' follow-up. For continuous FABQ-P at baseline we found no linear association and for FABQ-P at six months there was an effect of about 5 percent reduced chance for MCID on SSM symptoms (OR 0.95; 95% CI: 0.92-0.99) and function (OR 0.96; 95% CI: 0.93-1.00) per one unit change at twelve months. In the final multiple logistic regression models patients with high FABQ-P at six months (OR 0.46; 95% CI: 0.24-0.91) and high persistent FABQ-P at baseline and six months (OR 0.34, 95% CI: 0.16-0.73) were less likely to report a MCID for SSM symptoms at twelve months. Our analysis found a similar trend for SSM function, however, the results were not statistically significant. Therefore, future studies should address the importance of persistent postoperative fear avoidance beliefs.