



Health-Related Quality of Life Scores Underestimate the Impact of Major Complications in Lumbar Degenerative Scoliosis Surgery

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Abstract

Study Design: Retrospective cohort.

Objective: To examine Charlson Comorbidity Index (CCMI) as a marker for deterioration in health status not reflected in standard Health Related Quality of Life (HRQOL) measures.

Summary of Background Data: HRQOL has become a primary metric for assessing outcomes following spinal deformity surgery. However, studies have reported limited impact of complications on postoperative HRQOL outcomes.

Methods: We examined serial CCMI, complications, and HRQOL outcomes for 138 adult lumbar deformity patients treated surgically with a minimum two-year follow-up that included 126 females (91%) with a mean age of 59.8 years (range, 40.2–78.5). Patients with no, minor, or major complications were compared at baseline and at one and two years postoperation.

Results: Minor complications were observed in 26 patients (19%) and major complications in 15 (11%). Major complications included motor deficit (7), deep vein thrombosis (4), and respiratory failure (3). There was no difference in preoperative SF-36 Physical Component Summary or Scoliosis Research Society–22R (SRS-22R) scores among the groups at baseline. Preoperative CCMI was lowest in the No Complication group (3.52 ± 1.70) followed by the Major (4.00 ± 1.13) and Minor Complication groups (4.15 ± 1.71 , $p = .165$). At one year, there was a significantly greater CCMI deterioration in the Major Complication group (0.80 ± 1.01) compared to both the Minor (0.08 ± 0.27) and No Complication groups (0.27 ± 0.47 , $p < .001$). There was no significant difference in SF-36 Physical Component Summary or SRS-22R scores among the three groups. Similar findings were observed at two years.

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This study was reviewed and approved by the University of Louisville Institutional Review Board.

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Conclusions: Despite similar one- and two-year HRQOL improvement, patients with major complications had greater deterioration in CCMI. As CCMI is predictive of medical and surgical risk, patients who sustained a major complication now carry a greater likelihood of adverse outcomes with future interventions, including any subsequent spinal surgery. Although this increased risk may not alter the patient's perception of his or her current health status, it may be important, and should be recognized as part of the shared decision-making process.

Level of Evidence: Level II, high-quality prognostic study.

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Introduction

Preliminary assessment of lumbar degenerative scoliosis primarily focuses upon the radiographic appearance of the deformity and the extent of associated neural compression. However, surgical decision making is driven largely by the severity of clinical symptoms [1-6]. The risk of complications is also a key element in surgical decision making, particularly as the increasing demands and expectations of an aging population have resulted in more frequent surgical treatment in older patients [5,7]. The challenge of managing complex pathology in high-risk patients has led to strategies designed to better quantify the impact of baseline demographics and comorbidities on perioperative complication rates and subsequent clinical outcomes. This analytic approach is termed risk stratification.

Historically, the success of an adult scoliosis surgery has been judged based on the extent of radiographic correction, the presence of a solid fusion, and the absence of complications [8-11]. Over the past 10 years, patient-reported Health Related Quality of Life (HRQOL) measures have become a primary metric for the assessment of clinical outcome following spinal deformity surgery [12-14]. Although radiographic results and complications are still routinely reported, the argument has been made that these traditional radiographic measures may be less important, particularly for coronal plane deformity, as patient-reported outcomes (PROs) more accurately reflect the patient's experience and perceived benefit.

The degree to which perioperative complications impact clinical outcomes, and the relative importance of complications in determining the value of surgical treatment, is less clearly defined. Certainly major neurologic complications remain a primary concern for both patients and surgeons [15-17]. In contrast, recent studies have reported only limited impact of complications, including major complications, on postoperative HRQOL scores [18,19]. Although it makes sense that occurrence of a urinary tract infection might not alter one- or two-year postoperative health status, it seems counterintuitive that major complications would not be more consequential.

The purpose of this study was to further examine the impact of postoperative complications on clinical outcome. As part of a National Institutes of Health—funded randomized controlled trial of adult lumbar degenerative scoliosis surgery, data collection included perioperative complications,

HRQOL measures, and serial Charlson Comorbidity Index (CCMI) scores [20]. In particular, we examined CCMI as a marker for deterioration in health status, which might not be adequately reflected in patient-reported outcomes.

Methods

The Adult Symptomatic Lumbar Scoliosis Study (ASLS) is a National Institutes of Health—sponsored multicenter prospective study designed to compare the outcomes of surgery and nonoperative treatment in patients with adult degenerative scoliosis. Enrollment criteria included patients aged 40 to 80 years, with adult degenerative scoliosis defined as a lumbar curve with a coronal Cobb measurement of 30° or more, who did not have a prior spine fusion procedure, and either of the following: Oswestry Disability Index version 2.1a (ODI) [21,22] score of 20 or more, or Scoliosis Research Society—22R (SRS-22R) [23] instrument score of 4.0 or less, in the domains of pain, function, and/or appearance.

The present study included ASLS patients enrolled in both the randomized and observational surgical arms who reached a minimum of two-year follow-up after the index surgery. As part of the data collection schedule, subjects complete SF-36 and SRS-22R surveys and the Charlson Comorbidity Index (CCMI) [20] every three months for the first two years after surgery and every six months at three, four, and five years after surgery. In addition, the subject's medical history was reviewed by the clinician at 3 months postoperatively and annually for five years postoperatively.

Perioperative complications were classified into major and minor complications [19] and were also categorized based on the physiologic system being affected. Subjects were grouped into those who have no complications, those with a minor complication, and those having a major complication. Comparisons of HRQOL outcomes and serial changes in CCMI among these three groups were performed using analysis of variance on ranks with post hoc Bonferroni correction. All statistical analyses were performed using IBM SPSS version 21.0 (Somes, NY).

Institutional review board approval was received for both the primary study and the current secondary analysis.

Results

Of 153 patients eligible for two-year follow-up, serial CCMI, complications, and HRQOL outcomes were

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