

# Patient Factors Associated with Prolonged Hospital Length of Stay Following Anterior Cervical Discectomy and Fusion: A Review

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**INTRODUCTION:** Anterior cervical discectomy and fusion (ACDF) is the most common surgery used to correct cervical spine pathology and its indications include cervical radiculopathy, myelopathy, and spondylosis. Patients typically spend 24-48 hours in the hospital following this procedure. Prolonged hospital length of stay (LOS) following ACDF is one of the most predictive and reliable measures of suboptimal outcomes in patients, which has correlation with increased healthcare costs and complication rates. For this reason, specifically in preoperative patients, it is imperative to understand the patient factors that may affect the hospital LOS. The objective of this review is to summarize the patient demographics and comorbidities that are associated with an extended hospital LOS following ACDF.

**METHODS:** Google Scholar, PubMed, and Ovid MEDLINE databases were searched to identify studies that report patient factors associated with a prolonged LOS following ACDF. The keywords used in the search were “anterior cervical discectomy and fusion OR ACDF,” AND “LOS OR length of stay.” Exclusion criteria included posterior cervical spine fusion and anterior cervical corpectomy and fusion. Furthermore, studies that reported factors not directly related to the pre-operative patient, such as day/time of the surgery, operative time, intraoperative blood loss, post-operative pain, transfer status, and surgeon volume were also excluded. Rayyan was used to screen articles and PRISMA guidelines were followed.

**RESULTS:** 36 studies met the inclusion criteria and were included in the analysis. Of the 12 studies that reported the number of patients, there was a total of 322,618 patients, with 36,273 (11.24%) patients experiencing an extended LOS following the index procedure. The patient demographic factors that were associated with an increased length of stay were age greater than 50 years, Medicaid insurance, low income, Black and Hispanic race, and single marital status. There was conflicting evidence regarding the influence of gender and smoking status on hospital LOS after ACDF. The results are summarized in table 1.

Patient comorbidities that were identified as a risk factor were dementia, clinical depression, hyponatremia, opioid use, bleeding disorders, low body mass index, hypertension, diabetes, coronary artery disease, psychological illness, COPD, dysphagia, dyspnea, Nurick gait, history of non-spinal malignancy, hypothyroidism, pre-operative anemia, greater American Society of Anesthesiologists (ASA) classification, and a modified frailty index (MFI) of 1. The results are summarized in table 2.

**DISCUSSION:** This review analyzed the patient factors associated with an extended hospital LOS following ACDF. Specifically, older patients from lower socioeconomic backgrounds with higher rates of comorbidities experienced longer hospital LOS following the procedure. Thus, further research is required to elucidate the pre-operative factors most associated with adverse outcomes after ACDF to maximize the postoperative quality of life of the patient.

**SIGNIFICANCE/CLINICAL RELEVANCE:** ACDF is among the most common surgery used to treat cervical spine pathology and rates of this procedure are expected to rise as the elderly population continues to grow. By understanding the factors that prolong LOS following this procedure, physicians can work with their patients to medically optimize them, thus resulting in greater clinical outcomes.

## IMAGES AND TABLES:

Table 1: Demographics Associated with Prolonged LOS

Demographic	Extended LOS
Age	> 50 years
Insurance Status	Medicaid
Income	Low
Race	Black and Hispanic
Marital Status	Single

Table 2: Comorbidities Associated with Prolonged LOS

Comorbidity	Extended LOS
Neurologic/Psychologic	Dementia
	Clinical Depression
	Nurick Gait
Substance Use	Opioid
Circulatory Disorders	Pre-Operative Anemia
	Hypertension
	Coronary Artery Disease
Endocrine Disorders	Insulin Dependent Disorders
	Hypothyroidism
Respiratory Disorders	Chronic Obstructive Pulmonary Disease (COPD)
	Dyspnea
Other Conditions	Hyponatremia
	Body Mass Index (BMI)
	History of Non-Spinal Malignancy
Other Tools	Modified Frailty Index (MFI)
	American Society of Anesthesiologists (ASA) Status