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Clinical Study

Complications and readmission after lumbar spine surgery in elderly patients: an analysis of 2,320 patients

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Abstract

BACKGROUND CONTEXT: There is a paucity of literature describing risk factors for adverse outcomes after geriatric lumbar spinal surgery. As the geriatric population increases, so does the number of lumbar spinal surgeries in this cohort.

PURPOSE: The purpose of the study was to determine how safe lumbar surgery is in elderly patients. Does patient selection, type of surgery, length of surgery, and other comorbidities in the elderly patient affect complication and readmission rates after surgery?

STUDY DESIGN/SETTING: This is a retrospective cohort study.

PATIENT SAMPLE: The American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) Database was used in the study.

OUTCOME MEASURES: The outcome data that were analyzed were minor and major complications, mortality, and readmissions in geriatric patients who underwent lumbar spinal surgery from 2005 to 2015.

MATERIALS AND METHODS: A retrospective cohort study was performed using data from the ACS NSQIP database. Patients over the age of 80 years who underwent lumbar spinal surgery from 2005 to 2013 were identified using International Statistical Classification of Diseases and Related Health Problems diagnosis codes and Current Procedural Terminology codes. Outcome data were classified as either a major complication, minor complication, readmission, or mortality. Multivariate logistic regression models were used to determine risks for developing adverse outcomes in the initial 30 postoperative days.

RESULTS: A total of 2,320 patients over the age of 80 years who underwent lumbar spine surgery were identified. Overall, 379 (16.34%) patients experienced at least one complication or death. Seventy-five patients (3.23%) experienced a major complication. Three hundred thirty-eight patients (14.57%) experienced a minor complication. Eighty-six patients (6.39%) were readmitted to the hospital within 30 days. Ten deaths (0.43%) were recorded in the initial 30 postoperative days. Increased operative times were strongly associated with perioperative complications (operative time >180 minutes, odds ratio [OR]: 3.07 [95% confidence interval {CI} 2.23–4.22]; operative time 120–180 minutes, OR: 1.77 [95% CI 1.27–2.47]). Instrumentation and fusion procedures were also associated with an increased risk of developing a complication (OR: 2.56 [95% CI 1.66–3.94]). Readmission was strongly associated with patients who were considered underweight (body mass index [BMI] <18.5) and who were functionally debilitated at the time of admission (OR: 4.10 [1.08–15.48] and OR: 2.79 [1.40–5.56], respectively).

FDA device/drug status: Not applicable.

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CONCLUSIONS: Elderly patients undergoing lumbar spinal surgery have high complications and readmission rates. Risk factors for complications include longer operative time and more extensive procedures involving instrumentation and fusion. Higher readmission rates are associated with low baseline patient functional status and low patient BMI.

Keywords: Complications; Elderly; Geriatric; Low Back Surgery; Lumbar Surgery; Readmission

Introduction

There is a paucity of literature describing adverse outcomes after lumbar spine surgery in the elderly patient. As the life expectancy and the elderly population increase, the prevalence of degenerative diseases of the lumbar spine also increases [1]. Degenerative disease of the lumbar spine includes spinal stenosis, degenerative spondylolisthesis, facet joint arthropathy, de novo lumbar scoliosis, and osteoporotic compression fractures [2,3].

With the increase in life expectancy, elderly patients have remained more active later in life. Degenerative disorders of the lumbar spine may cause significant neural compression, increased pain, and a decrease in the mobility and quality of life of elderly patients. To help maintain their independence, more elderly patients who have failed medical interventional management of their lumbar spinal disorder, are looking toward a surgical solution. Surgical intervention in the elderly population is not without increased risk secondary to medical comorbidities, polypharmacy, osteoporosis, bone remodeling, and degenerative spinal anatomy [2,4].

Over the past several years, the rate of lumbar spinal surgery in elderly patients has increased. Surgery for spinal stenosis has recently been shown to be one of the fastest-growing types of lumbar spine surgery in the United States [5]. The most rapid increase in the spinal fusion rates has been shown to occur in patients aged 60 years or above [6,7]. To date, there are no large studies looking at complication and readmission rates in elderly patients undergoing spinal surgery.

The purpose of the present study was to evaluate two questions with respect to geriatric patients who underwent surgery of the lumbar spine:

1. How safe is the surgical intervention?
2. Does patient selection, type of surgery, length of surgery, and other patient comorbidities affect complication and readmission rates after surgery?

Materials and methods

A retrospective analysis using the American College of Surgeons National Surgical Quality Improvement Program (ACS NSQIP) database was performed. The National Surgical Quality Improvement Program (NSQIP) database is compiled using data from multiple hospitals around the United Sates. Data are collected by a trained surgical clinical reviewer from each hospital. Data collected include patient demographic data, comorbidities, mortality, diagnoses, procedures performed, as well as complications and readmissions that occur in the initial 30 postoperative days.

Inclusion criteria

Patients were included in the study if they were over the age of 80 years old had lumbar spinal surgery, as determined by the Current Procedural Terminology (CPT) codes. The CPT Codes that were included in the present study included decompression, instrumentation, and arthrodesis codes of the lumbar spine (63030, 63042, 63047, 63048, 22612, 22614, 22840, 22842, 22843, and 22325). The International Statistical Classification of Diseases and Related Health Problems codes were also collected for each patient.

Outcome data of interest that were analyzed included mortality, complication, and readmission data within the initial 30 postoperative days. Complication data were stratified as either major or minor complications. Major complications included sepsis, pulmonary embolism, deep or organ surgical site infection (SSI), unplanned intubation, cerebrovascular accident, myocardial infarction, cardiac arrest, ventilator use for >48 hours, septic shock, acute renal failure, peripheral nerve injury, coma, or graft, prosthesis, or flap failure. Minor complications included perioperative blood transfusion, urinary tract infection (UTI), deep vein thrombosis (DVT), superficial SSI, pneumonia, renal insufficiency, and wound dehiscence.

Multivariate logistic regression models were used to determine factors that placed the patients at risk of developing adverse outcomes in the initial 30 postoperative days. The elderly patient cohort was divided into two groups: ages 80–85 years and ages 85 years and above. Patients were stratified using demographic data including gender, race, and ethnicity. Variables analyzed using multivariate logistic regression models resulting in odds ratios (ORs) included surgical location, admission source, surgeon, specialty, body mass index (BMI), alcohol consumption, and functional status. Operative variables analyzed included whether it was an emergency case, wound classification, operative time, American Society of Anesthesiologists classification, and the year the surgical procedure was performed. Also, CPT codes were grouped as decompression codes (63030, 63042, 63047, and 63048) vs. instrumentation and arthrodesis codes (22612, 22614, 22840,