

Open Transforaminal Lumbar Interbody Fusion Surgery and Minimally Invasive Transforaminal Lumbar Interbody Fusion Surgery: An Overview of Patient Demographics

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Abstract

Lumbar fusion procedures are indicated for patients with spinal instability with disabling symptoms and radiographic evidence of increased segmental spinal motion that have not responded to conservative treatments (1). This study examines patient demographics of individuals who underwent transforaminal lumbar interbody fusion surgery from a hospital system in northeastern Pennsylvania to analyze the patient populations for two surgical techniques. A total of 36 patients who underwent transforaminal lumbar interbody fusion surgery were randomly selected from November 2019 through January 2023. One half of the patients underwent a minimally invasive transforaminal lumbar interbody fusion (MITLIF) surgery, while the other half underwent open transforaminal lumbar interbody fusion (TLIF) surgery. The analysis provides a general overview of patient demographics for each surgical approach and offers demographic information to be used in future studies to perform statistical assessments to examine patient indications for each approach.

Introduction

Transforaminal lumbar interbody fusion (MITLIF) surgery was first described in 1982 by Harms and Rollinger (2). The procedure is used for stabilization and treatment of degenerative lumbar diseases such as spinal stenosis, degenerative disks, spondylolisthesis, or degenerative scoliosis (3). Its conception resulted from an attempt to limit the amount of neural retraction required to decrease potential nerve root injury, dural tears, and epidural fibrosis (3), while also trying to improve bone fusion due to increased laminar surface area for new bone to grow (1). The difficulty of the TLIF surgery is that it requires significant muscle dissection and retraction (2). As a result, the procedure is associated with lengthy hospital stays and significant costs (4) and is reported to be associated with a higher complication rate (5). The minimally invasive transforaminal lumbar interbody fusion (MITLIF) was therefore developed to minimize iatrogenic soft tissue trauma and improve overall patient outcomes (2). MITLIF attempts to achieve this through leaving the smallest operative footprint possible, using a unilateral approach when necessary to attain bilateral decompression, and achieve indirect neural decompression (5).

Understanding patient demographics is important for establishing indications for each approach. By collecting demographic information, future studies will be able to determine statistically important patient characteristics for

selecting one approach over the other, ensuring that patients undergo lumbar fusion surgery using the correct surgical approach.

Methods

A list of orthopaedic spinal surgeries performed at various Geisinger hospitals from November 2019 to January 2023 was obtained. Patients were then randomly selected from the list. Surgeries which included the neurological surgery department were excluded. Only patients who self-reported all the demographic variables examined in this analysis were included. Variables examined included height, weight, age, sex, race, and number of care partners. In total, 36 patients were selected. One half of the patients underwent TLIF surgery, while the other half underwent MITLIF surgery.

Results

Height, weight, race, and number of care partners were self-reported by the patients. Body mass index (BMI) was then calculated using the patient-reported height and weight. Age and sex were recorded from the patients' electronic health records. Mean height, mean weight, mean BMI, mean age, number of males and females, and the race of the patients for each surgical approach are shown in Table 1. Median values for age, height, weight, and BMI are also shown in Table 1. No statistical analysis was conducted to compare the two patient populations.

Discussion

This analysis offers a general overview of patient demographics for each type of surgical approach. Aggregating demographic information for patients undergoing each type of surgery will provide data for future statistical analyses about who are the best surgical candidates for each type of procedure. On average, patients for both TLIF and MITLIF surgeries tended to be older than 55 years old (58.3 and 56.2 years old, respectively), overweight or obese (32.8 kg/m² and 27.8 kg/m², respectively (note, a BMI of 25–29.9 kg/m² is considered overweight, and a BMI >30 kg/m² is considered obese (6)), and White (94% White for both surgeries). Additionally, most patients for both TLIF and MITLIF procedures were female (61% and 67%, respectively). In each patient group, 15 out of 18 individuals reported having at least one care partner.

The major limitation of this study was the lack of statistics performed. Without statistical analyses, significant similarities

TLIF Patients, n=18		MITLIF Patients, n=18	
Sex		Sex	
M	7	M	6
F	11	F	12
Care Partners		Care Partners	
≥ 1	15	≥ 1	15
0	3	0	3
Race		Race	
White	17	White	17
Asian	1	Asian	1
Age (years)		Age (years)	
Mean	58.3	Mean	56.2
Median	60.0	Median	53.0
Height (cm)		Height (cm)	
Mean	167.7	Mean	169.4
Median	167.5	Median	166.5
Weight (kg)		Weight (kg)	
Mean	92.7	Mean	80.5
Median	92.0	Median	79.0
BMI (kg/m ²)		BMI (kg/m ²)	
Mean	32.8	Mean	27.8
Median	34.0	Median	27.4

Table 1. Demographic Characteristics of Selected Patients Who Underwent Transforaminal Lumbar Interbody Fusion or Minimally Invasive Transforaminal Lumbar Interbody Fusion Procedures.

or differences cannot be determined. Additionally, this analysis is limited by the number of patients examined. Increasing the total patient number would provide a more accurate assessment of demographics for each group. Future studies should examine a larger population size and statistically compare the patient populations and determine whether significant similarities or differences exist between the two groups to determine selection criteria for the two surgical approaches.

Conclusion

The analysis performed on this patient population was intended to compile demographic information about the populations of each surgical technique. Patient characteristics were collected from medical health records, in addition to the characteristics self-reported by the patients. While the goal of this analysis is to provide an overview of patient demographics for the different surgical approaches, statistical analysis of demographic data is crucial to improving healthcare. Compiling the demographic data is necessary for future studies to perform statistical analyses about the different surgical techniques.

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