

Trends in Spinal Fusion Surgery for Idiopathic Scoliosis in the United States (2001-2010)

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Learning Objectives

- 1. To highlight trends in the surgical management and techniques of corrective surgery for idiopathic scoliosis.
- 2. To evaluate short-term outcomes of patients undergoing corrective surgery for idiopathic scoliosis.

Introduction

Idiopathic scoliosis (IS) results in significant deformity of the spine and requires corrective spinal fusion surgery (SFS). We sought to describe trends in SFS for IS in the United States.

Methods

Using ICD-9-diagnostic codes, we queried the 2001-2010 Nationwide Inpatient Sample and identified IS patients (737.30).

ICD-9-procedural codes (81.04-81.08) identified SFS procedures which were sub-categorized into:

DL- dorsolumbar

LS- lumbosacral

DL/LS- combined

dorsolumbar/lumbosacral

AC- anterior column

PC- posterior column

AC/PC- combined anterior/posterior column

AT- anterior technique

PT- posterior technique

AT/PT-combined anterior/posterior techniques

Results

Among 983,053 IS patients, 14.3% underwent spinal fusion surgery (SFS).

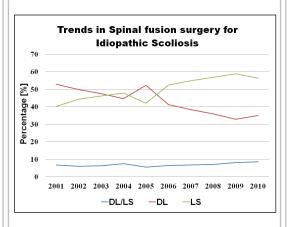
Most IS patients were female (76.0%); mean age was 55.7years (Standard-error/SE=0.06).

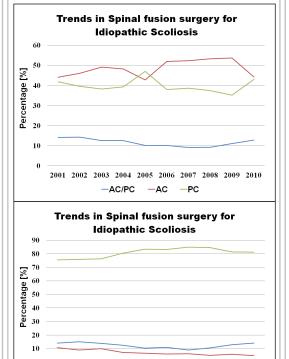
SFS performed were as follows:

- DL= 51.4%, LS= 41.5%, DL/LS=7.1%;
- AC=48.7%, PC=39.9%, AC/PC=11.4%,
- AT= 6.6%, PT= 81.2%, AT/PT= 12.2%.

Analysis of trends from 2001-2010 revealed significant changes in

- DL (52.9% to 35.0%, p<0.001)
- LS (40.2% to 56.4%, p<0.001)
- DL/LS (6.8% to 8.6%, p<0.001)
- AC (44.1 % to 44.2% p>0.05)
- PC (41.8% to 43.0% p<0.05)
- AC/PC (14.1% to 12.8%, p<0.05)
- AT (10.7% to 4.8%, p<0.001)
- PT (75.4% to 81.2%, p<0.001)
- AT/PT (13.9% to 14.0%, p>0.05)





Results (continued)

Overall mortality associated with IS was 1.9%, which decreased from 2.4% in 2001 to 1.9% in 2010, p<0.001

2001 2002 2003 2004 2005 2006 2007 2008

-AT

-AT/PT

Mortality was higher among non-surgery vs. surgery group (2.2 vs.0.2%, p<0.001).

Mortality in patients that underwent SFS were: [DL=0.2%, LS=0.2%, DL/LS=0.5%, p=0.02]; [AC=0.2%, PC=0.1%, AC/PC=0.5%, p<0.001]; [AT=0.2%, PT=0.2%, AT/PT=0.5%, p=0.002].

	Patient Age	Length of Stay	Total Inpatient Charges
	(in years)	(in days)	(in USD)
DL	47.6	8.8	207,035.0
	(46.7-48.6)	(8.5-9.1)	(200,741.3-213,328.7)
LS	22.6	6.3	120,345.1
	(22.2-22.9)	(6.2-6.4)	(118,718.4-121,971.8)
DL/LS	61.8	5.0	102,839.7
	(61.6-62.1)	(5.0-5.1)	(101,517.9-104,161.4)
AC	43.9	8.8	185,328.0
	(43.1-44.7)	(8.6-9.1)	(180,588.9-190,067.0)
PC	58.7	5.2	102,711.8
	(58.3-59.0)	(5.1-5.3)	(101,353.6-104,070.1)
AC/PC	27.5	5.7	116,210.9
	(27.1-27.9)	(5.6-5.8)	(114,631.2-117,790.7)
AT	47.9	8.8	193,300.2
	(47.2-48.7)	(8.6-9.0)	(188,833.0-197,767.3)
PT	38.9	5.9	102,803.4
	(37.8-40.0)	(5.7-6.1)	(99,041.7-106,565.1)
AT/PT	44.5	5.4	107,357.1
	(44.1-44.8)	(5.3-5.4)	(106,291.6-108,422.6)
Mean values (with 95% confidence intervals) for age, length of stay and total charges; USD=US dollars			

Results (continued)

Regression analysis adjusted for possible confounders revealed reduced odds of mortality as follows:

- LS versus DL (ref) (OR=0.13; 95%CI=0.04-0.46)
- Females vs. males (ref)
 (OR0.31; 95%CI=0.19-0.52)
- Persons <18 years vs.>18years(ref) (OR0.31; 95%CI=0.14-0.67)

Average duration of IS hospitalization was 5.4 days (95%CI=5.3-5.5). Individual mean total charges associated

with IS hospitalizations were \$41,015 (95%CI=\$40,740.73-\$41,290.71).

Total inpatient charges associated with SFS amounted to approximately \$1.7 billion annually.

Conclusions

There are significant shifts in SFS for IS treatment. The shift from dorsolumbar to lumbosacral surgery is associated with reduced inpatient mortality.

(Key)

Odds-ratios=OR; 95%Confidence-intervals=95%CI