



# Economic Analysis of Surgical Approaches for Lumbar Fusion Under the Bundled Payments for Care Improvement Program: Comparison of 360 versus Posterior Alone Approaches

Jordan C. Petitt MS, Paxton Gehling MD, James Wright MD, Christina Wright MD, Clifford Lin MD, Jung Yoo MD, Travis Philipp MD, Won Hyung A. Ryu MD

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# Background

- Increasing health care costs
- Bundled Payments for Care Improvement Program (BPCI)
  - Aim: Patient-centered, quality-based care
- Lumbar spine instrumentation/fusion
  - Wide spectrum of surgical approaches and techniques

# Objective

- To examine the financial impact of the BPCI program comparing 360 versus posterior alone lumbar fusion approaches

# Methods

- Single-center, retrospective, October 2018 – January 2022
- Inclusion criteria: BPCI Program, Thoracolumbar fusion or instrumentation
- Groups
  - Combined Anterior + Posterior Fusion/Instrumentation
  - Posterior Alone Fusion/Instrumentation

# Results

- N = 75 patients
  - 360: n = 57
  - Posterior alone: n = 18
- Mean age (p = 0.38)
  - 360: 68.33 ± 10.04
  - Posterior alone: 68.00 ± 11.96
- Levels Fused/ Instrumented (p = 0.08)
  - 360: n = 3.9 ± 3.1
  - Posterior Alone: 2.61 ± 2.23
- No differences
  - Gender, Procedure Location, Primary Diagnosis
- Posterior Procedure (p = <0.001)
  - 360 TLIF: n = 0 (0.0%)
  - Posterior Alone TLIF: n = 13 (72.2%)

Variable	360 Positioning n=57	Posterior Positioning n=18	P
Age, years	68.33 ± 10.04	68.00 ± 11.96	0.38
Female	37 (64.9%)	13 (72.2%)	0.57
Procedure Location			0.12
Thoracolumbar	21 (36.8%)	6 (33.3%)	
Thoracolumbar, Sacral	18 (31.6%)	10 (55.6%)	
Thoracolumbar, Sacral, Pelvis	18 (31.6%)	2 (11.1%)	
Levels Fused/Instrumented	3.9 ± 3.1	2.61 ± 2.23	0.08
Anterior/Lateral Procedure			N/A
ALIF	40 (69.0%)	N/A	
LLIF	3 (5.3%)	N/A	
XLIF	12 (21.1%)	N/A	
OLIF	4 (7.0%)	N/A	
Posterior Procedure			<0.001*
PLF	39 (68.4%)	4 (22.2%)	
TLIF	0 (0.0%)	13 (72.2%)	
PIF	11 (19.3%)	1 (5.6%)	
Instrumentation	7 (12.3%)	0 (0.0%)	
Primary Diagnosis			0.14
Adjacent segment degeneration	0 (0.0%)	1 (5.6%)	
Adjacent segment disease	2 (3.5%)	2 (11.1%)	
Adjacent segment stenosis	1 (1.8%)	0 (0.0%)	
Back pain	0 (0.0%)	1 (5.6%)	
Burst fracture	1 (1.8%)	0 (0.0%)	
Compression fracture	1 (1.8%)	0 (0.0%)	
Degenerative disk disease	1 (1.8%)	0 (0.0%)	
Disk Herniation	2 (3.5%)	0 (0.0%)	
Flatback Syndrome	2 (3.5%)	0 (0.0%)	
History of Fusion	0 (0.0%)	1 (5.6%)	
Nonunion	1 (1.8%)	0 (0.0%)	
Pseudoarthrosis	4 (7.0%)	0 (0.0%)	
Radiculopathy	1 (1.8%)	2 (11.1%)	
Scoliosis	7 (12.3%)	3 (16.7%)	
Spinal stenosis	23 (40.4%)	3 (16.7%)	
Spondylolisthesis	11 (19.3%)	5 (27.8%)	

Abbreviations: ALIF - Anterior lateral interbody fusion, LLIF - Lateral lumbar interbody fusion, XLIF - Extreme lateral interbody fusion, OLIF - Oblique lateral interbody fusion, PLF - Posterolateral fusion, TLIF - Transforaminal lumbar interbody fusion, PIF - Posterior instrumented fusion.

# Results (cont.)

- Clinical Outcomes Similar
  - LOS (p = 0.09)
  - Intraoperative Complications (p = 0.38)
  - Readmission (p = 0.42)
  - Post-Discharge ED Visit (p = 0.18)
  - Discharge to SNF (p = 0.13)
  
- BPCI Outcomes
  - Overbudget (p = 0.44)
    - 360: n = 9 (15.8%)
    - Posterior Alone: n = 1 (5.6%)
  - Outpatient spend (p = 0.62)
  - Performance Risk Adjusted Price (p = 0.08)
  - Professional Billing Spend (p = 0.02)
  - Total Health Care Cost (p < 0.05)

Table 2. Outcomes of Bundled Payment Positioning (n=75)			
	360 Positioning n=57	Posterior Positioning n=18	
Variable	Count (%) or mean ± SD	Count (%) or mean ± SD	P
Intraop Complications	1 (1.8%)	1 (5.6%)	0.38
LOS, days	4.65 ± 2.36	3.94 ± 1.51	0.09
Readmission	2 (3.5%)	0 (0.0%)	0.42
Post-Discharge ED Visit	13 (22.8%)	7 (38.9%)	0.18
Received HH Visits	29 (50.9%)	7 (38.9%)	0.38
HH Visits	13.00 ± 10.99	14.14 ± 6.36	0.50
Discharge to SNF	18 (31.6%)	2 (11.1%)	0.13
SNF LOS	19.72 ± 14.58	15.00 ± 2.83	0.41
Outpatient Spend	\$994.97 ± 1,213.74	\$1,008.19 ± 1,600.50	0.62
Professional Billing Spend	\$2,267.96 ± 3,636.47	\$1,198.53 ± 1,058.35	<b>0.02*</b>
Overbudget	9 (15.8%)	1 (5.6%)	0.27
Performance Risk Adj. (Target – Spend)	\$8,443.21 ± 20,151.51	\$12,287.49 ± 10,354.47	0.08
Total spend	\$60,051.32 ± 26,751.47	\$47,060.61 ± 14,836.95	<b>&lt;0.05*</b>

Abbreviations: LOS - Length of stay, ED - Emergency department, HH - Home health, SNF - Skilled nursing facility

# Conclusion

- In BPCI, professional billing and total healthcare spending is higher in anterior-posterior approach compared to posterior alone for lumbar spine fusion/instrumentation
- Further investigation of the BPCI-spine patient population is warranted



Thank You