Impact of Multi-Level Interbody Fusion in the Treatment of Severe Adult Scoliosis (Thoracolumbar Coronal Cobb Angle>50 Degrees)

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Introduction

The benefits of surgery in the treatment of severe adult spinal deformity (ASD) have been documented. Specific interbody fusion (IBF) techniques compared to all-posterior technique without IBF have yet to be analyzed.

Methods

Patients with ASD having thoracolumbar coronal Cobb angles>50, without primary thoracic curves or 3-column osteotomy, and 2-year follow up were included. Patients were split into 2 groups, IBF vs No IBF. IBF included either percutaneous or open pedicle screws. Open: all-posterior without interbody fusion. Differences in demographic, radiographic, and clinical parameters were analyzed. Subgroup analysis of IBF (ALIF vs TLIF vs LLIF) was performed.

Results

420 patients met inclusion criteria, of those 165 were identified and 118 had full data for analysis (88 IBF patients; 30 No IBF). IBF were older, had higher BMI, and worse preop ODI (p<0.05). There were differences in pre to post: PT (-3 vs 3, p=0.01), PI-LL (-13.5 vs 5, p<0.001), LL (13.6 vs -3.6, p<0.001), SVA (-36.1 vs 0.6, p=0.002) and ODI (-17.9 vs -7.7, p=0.024) in the IBF vs No IBF. IBF had more staged procedures, blood transfusions, iliac fixation, longer OR time, and LOS (p<0.05). Subgroup analysis revealed LLIF approach had less iliac fixation, EBL, transfusions, and posterior segments fused, while achieving the greatest coronal correction (p<0.05; Table 1).

Cobb greater than 50 - Table 1.

Table 1.

	IBF	No IBF	*p*
N	88	30	
Age	57.4	39.9	<0.001
BMI	26.3	24.1	0.048
Staged	38 (43.2%)	1 (3.3%)	<0.001
Transfusion	77 (87.5%)	21 (70.0%)	0.027
Illiac Fixation	64 (72.7%)	7 (23.3%)	<0.001
Max Cobb Location			0.129
TL	68 (77.3%)	27 (90.0%)	
LL	20 (22.7%)	3 (10.0%)	
Pre Op ODI	42.2	29	0.002
OR Time	572	353.6	<0.001
LOS (days)	8.8	6.9	0.018
	ALIF	**TLIF**	**LLIF**
N	37	15	15
Age	57.3	55.9	56.1
Staged	16 (43.2%)c	1 (6.7%)a,b	6 (40.0%)c
Transfusion	35 (94.6%)a	14 (93.3%)a	8 (53.3%)b,c
Illiac Fixation	31 (83.8%)a	13 (86.7%)a	2 (13.3%)b,c
Post levels treated	13.4 a	12.5 a	8.3 b,c
Interbody levels	3.7	1.4 a,b	4
Post Op Cobb	23.3 a,c	41.8 a,b	4.5 b,c
Post Op VAS Leg	1.5	0.3a	2.8c
Post Op ODI	18.5	30.6	29.5
EBL	1523.6	1732.1a	829.7c
OR Time	576.2	422.8	572.8
LOS (days)	9.2 c	6.3 b	8.6

a Significantly different from LLIF
b Significantly different from ALIF
c Significantly different from TLIF

Conclusions

IBF resulted in significant improvements in all spinopelvic parameters including SVA. Subgroup analysis of the IBF Group revealed the LLIF technique had significantly less EBL, transfusions, and posterior segments fused, while achieving the greatest coronal correction compared to ALIF and TLIF.

Learning Objectives

1. There were significant improvements in radiographic and clinical outcomes in the IBF (ALIF vs TLIF vs LLIF) vs No IBF Group. 2. LLIF had less posterior segments fused while achieving the greatest coronal Cobb correction.