Are We Focused on the Wrong Early Post-Operative Quality Metrics? Optimal Realignment Outweighs Perioperative Risk in Adult Spinal Deformity Surgery

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INTRODUCTION: While reimbursement is centered on 90-day outcomes, many patients may still achieve optimal, long-term outcomes following adult spinal deformity(ASD) surgery despite transient short-term complications. We compared long-term clinical success and cost-utility between patients achieving optimal realignment and suboptimally-aligned peers.

METHODS: Operative ASD pts with two-year(2Y) data were included. Groups were propensity score matched(PSM) for age, frailty, BMI, CCI, and baseline deformity. Optimal radiographic criteria was defined as meeting low deformity in all three SRS-Schwab parameters and being proportioned in GAP. Cost-per-QALY was calculated for each time point by 2Y. Multivariable logistic regression analysis and ANCOVA adjusting for baseline disability and deformity(PI, PI-LL) was used to determine significance for surgical details, complications, clinical outcomes, and cost-utility.

RESULTS: 930 ASD patients were considered. Following PSM, 253 “optimal”(O) and 253 “not optimal”(NO) patients were defined based on post-surgical alignment. O group underwent more invasive procedures and had more levels fused. Analysis of complications by two years showed O group suffered less overall major(38% vs. 52%,p=.021) and major mechanical complications(12% vs. 22%,p=.002), and less reoperations(23% vs 33%;p=.008). Adjusted analysis revealed O patients more often met MCID in SF-36 PCS, SRS-22 Pain and Appearance. Cost-utility adjusted analysis determined that the O group generated better cost-utility by one year and maintained lower overall cost and costs per QALY(both p<.001) at two years in favor of the O group.

DISCUSSION AND CONCLUSION: Surgical intervention for adult deformity is associated with heightened risk of postoperative complications, irrespective of final radiographic alignment. Fewer late complications (mechanical and reoperations) are seen in optimally aligned patients, leading to a better long-term cost-utility overall. Therefore, the current focus on avoiding short-term complications may be counterproductive, as achieving optimal surgical correction is critical for long term success.

	Did Not Meet Optimal Radiographic Outcome	Met Optimal Radiographic Outcome	p-value
6 Weeks			
Utility Gained	0.544	0.544	.212
W6 QALYs	0.062	0.062	.212
W6 Cost per QALY	$1,139,430.06	$1,100,550.25	.484
6 Months			
Utility Gained	0.429	0.403	.223
M6 QALYs	0.213	0.200	.223
M6 Cost per QALY	$482,327.64	$455,220.24	.280
1 Year			
Utility Gained	0.539	0.546	0.611
Y1 QALYs	0.531	0.538	0.611
Y1 Cost per QALY	$193,386.14	$169,257.78	.014
2 Year			
Utility Gained	0.470	0.482	.387
Y2 QALYs	0.912	0.936	.387
Overall Cost 2Y	$102,676.63	$91,032.99	.022
Y2 Cost per QALY	$112,551.46	$97,303.65	.005