

Use of Nutritional Supplements Post Spine Surgery to Enhance Healing: A Retrospective Cohort Study

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INTRODUCTION: Conditionally essential amino acids (CEAA) have demonstrated benefits in reducing postoperative complications, enhancing wound healing, and mitigating muscle wasting, particularly in orthopedic surgery. However, the impact of CEAA supplementation on postoperative outcomes specifically after spine surgery has not yet been studied. This retrospective study aimed to evaluate the effect of CEAA supplementation on postoperative complication rates, wound healing, and pseudoarthrosis incidence in spine surgery patients at a single academic center from 2018–2024.

METHODS: A retrospective chart review was conducted for 443 adults (≥ 18 years) who underwent surgery for various spine pathologies. Patients were stratified based on documented in-hospital CEAA consumption post-surgery. Demographics, CEAA use, and surgical invasiveness scores (SIS) were recorded. Primary outcomes were wound healing status, postoperative complications, and pseudoarthrosis rates. Likelihood ratios (LR) and relative risks (RR) were calculated, with statistical significance defined as $p < 0.05$.

RESULTS: A total of 187 patients met inclusion criteria: 91 (48.6%) received CEAA, and 96 (51.3%) did not. The CEAA cohort demonstrated significantly higher wound healing rates (96.7% vs. 76%, $p = .001$), lower pseudoarthrosis rates (1% vs. 17%, $p = .001$), and fewer postoperative complications (13% vs. 67%, $p = .001$). The non-CEAA cohort showed significantly increased risk for impaired wound healing (LR = 20.7, $p < .001$), pseudoarthrosis (LR = 18.0, $p < .001$), and overall postoperative complications (LR = 54.2, $p < .001$).

DISCUSSION AND CONCLUSION: CEAA supplementation significantly improved postoperative outcomes in spine surgery patients, reducing complications, enhancing wound healing, and lowering pseudoarthrosis incidence. This low-risk intervention offers a promising adjunct to standard perioperative care.

Table 1. Surgical Components Used to Calculate the ASD-S Invasiveness Score

Surgical Component	Points
Parameter	
Decompression	1 per vertebra
Fusion	2 per vertebra
Instrumentation	1 per vertebra
Chromatites	
1 column	14 per osteotomy
Smith-Petersen	1 per osteotomy
Anterbody Fusion	
Anterior lumbar	4 per interbody fusion
Transforaminal posterior lumbar	2 per interbody fusion
Disc Excision	2
Revision surgery	1

ASD-S, adult spinal deformity - surgical

Table 2. Additional Parameters^a Included in the ASD-S Invasiveness Score

Parameter	Points per 1° change ^b
Pelvic Incidence	0.5
Pelvic Tilt	2
Sagittal Vertical Axis	0.2
Thoracic Kyphosis	0.5

ASD-SR, adult spinal deformity - surgical and radiographical
^aThese points are added to those of the ASD-S developed in the current study.
^bFrom Proportionally to postoperatively.
^cExpressed as points per 1 mm change.

Table 3. Cohort Demographics

	CEAA Cohort *Mean Prevaling in 2022	Non-CEAA Cohort *Mean in 2022	p-value
Age	63 (18.2)	66 (11.0)	0.73
BMI	30.1 (16.5)	30.0 (16.8)	0.92
SIS	16.4 (118.0)	29.9 (112.9)	<.001
AKA	2.46 (0.3)	2.70 (0.4)	0.12
CCI	3.7 (3.0)	2.8 (1.4)	0.017
Instrumented Levels	3.8 (2.6)	6.15 (3.3)	<.001
Frailty Index	1.9 (1.2)	1.0 (0.8)	<.001
Total	91 (48.6%)	96 (51.3%)	

Table 4. Percentage of Patients Who Developed Post-Surgical Complications Between Cohorts

	CEAA Cohort (n=91)	Non-CEAA Cohort (n=96)	p-value
Pseudoarthrosis Rate	1%	17%	<.001
Wound Healing Rate	97%	76%	<.001
Post-Surgical Complication Rate	13%	67%	<.001