

The Impact of Osteoporosis on Patient Presentation in the Adult Spinal Deformity Population

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INTRODUCTION: Osteoporosis is commonly comorbid with adult spinal deformity (ASD), a cyclical relationship in which each condition may synergistically contribute to the severity of patients' clinical presentation. We hope to investigate osteoporosis's role in a patient's preoperative presentation.

METHODS:

Operative ASD patients with complete preoperative baseline (BL) were included. Osteoporosis defined as an existing diagnosis of osteoporosis at BL. High risk defined based on American Association of Clinical Endocrinologist definitions including female $\geq 65Y$ and clinical features (steroids, CKD, alcohol use, vit. D deficiency, limited mobility, diabetes). Alignment was assessed using the Global Alignment and Proportionality (GAP) score and the Sagittal Age Adjusted Score (SAAS). HRQLs: ODI, SF-36, and SRS-22r. ODI stratified by disability severity into quintiles. The three cohorts, osteoporotic (O), high risk (HR), and non-osteoporotic (NO), were characterized via descriptive statistics and means comparison analyses to understand group differences and multivariate logistic regression to assess risk factors while adjusting for appropriate covariates.

RESULTS:

899 patients included: age $60.3 \pm 15.0Y$, 74%F, BMI $27.5 \pm 5.8 \text{kg/m}^2$, CCI 1.7 ± 1.7 . Cohort composition: O 165 (18.4%), HR 194 (21.6%), NO 540 (60.1%). Differences between cohorts can be seen in Table 1. O was more likely to be considered severely frail (24.8% vs. 11.7%, $p < .001$). O and HR less likely to be GAP proportioned at BL (8.5%/6.7% vs. 19.8%, $p < .001$). O and HR more likely to be GAP severely disproportioned at BL (71.7%/73.0% vs. 51.2%, $p < .001$).

When adjusting for BL age, BMI, gender, CCI, and mFI, HR/O were significantly less likely to be SAAS-matched at BL (OR: .646, $p = .038$). When adjusting for BMI, CCI, and mFI, HR/O were significantly less likely to be GAP-proportioned at BL (OR: .485, $p = .003$). When adjusting for those GAP proportioned and SAAS-matched at BL, HR/O were more likely to be severely disabled (ODI > 60) (OR: 1.45, $p = .041$).

DISCUSSION AND CONCLUSION: Osteoporosis affects ASD patients in many domains. These patients suffer from a poorer quality of life, have higher comorbidity burdens, and present with more severe deformity.

Variable	Non-Osteoporotic	High-Risk	Osteoporotic	p-value
Age (years)	54.0	71.7	67.7	<.001
Female (n)	333	194	134	<.001
BMI (kg/m ²)	27.2	28.7	26.9	.002
CCI	1.17	1.84	3.13	<.001
Peripheral Vasc. Disease	0.7%	3.6%	4.2%	.004
Smoker	8.4%	2.8%	4.4%	.016
Prior Spine Surgery	46.6%	54.4%	59.9%	.007
mFI Category				
Not-Frail	56.1%	41.2%	38.2%	<.001
Frail	32.2%	42.8%	37%	
Severely-Frail	11.7%	16.0%	24.8%	