(OR=1.28, 95% CI: [1.06-1.54], P=0.010) and COPD (OR=10.36, 95% CI: [2.17-49.47], P=0.030).

CONCLUSIONS: Thirty-day mortality after 3CO is 1.2% globally. The greatest univariate risk factors are diabetes, COPD, frailty, and revision surgery. Regardless of age, sex, or BMI, it was found that COPD and duration of surgery were independently associated with 30-day mortality.

FDA DEVICE/DRUG STATUS: This abstract does not discuss or include any applicable devices or drugs.

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P166. Selection of upper instrumented vertebra in adult spinal deformity: risk calculator and recommendations based on proximal junctional kyphosis

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BACKGROUND CONTEXT: The surgical correction of adult spinal deformity (ASD) presents a complex and multifaceted challenge, further intensified by the need for revision surgery. Determination of the upper instrumented vertebra can often be challenging.

PURPOSE: To develop a UIV risk index score for patients undergoing ASD corrective surgery.

STUDY DESIGN/SETTING: Retrospective cohort study of a prospectively collected single-center ASD database.

PATIENT SAMPLE: ASD.

OUTCOME MEASURES: PJK.

METHODS: We included operative ASD patients with a minimum of a 2-year follow-up undergoing fusion from at least L1 and proximal to the sacrum. Patients without PJK were isolated to determine predictive thresholds based on patient and surgical factors. Variable importance was determined utilizing random forest analysis to determine the weighting of variables with multivariable logistic regression. Conditional inference tree (CIT) determined threshold values predictive of UIV level in those who didn't develop PJK.

RESULTS: A total of 334 patients met inclusion. (Age 63±10, 77% F, BMI 27.6±5.1 kg/m^2, frailty 3.5±1.5, CCI 1.9±1.7). The model for predicting PJK was significant for osteoporosis, LL, TK, TLPA, with posterior UIV and IBD UIV (p<.05). Table 1. Baseline UIV slope of >42.4 had a higher rate of PJK postoperatively (63% vs 27%, p<.001). Evaluating factor importance for the selection of UIV determined UIV slope to have the greatest weight, with T1PA, PJK prophylaxis, PI-LL, frailty, osteoporosis, and CCI following in those who didn't have PJK. For those with UIV slope <12.7, selection of upper thoracic UIV was contingent on T1PA being <7 (p=0.018). Patients with UIV slope >27 and T1PA >30 were likely to have UIV in the upper thoracic (T4 mean) in those who didn't develop PJK. Whereas, those with a UIV slope between 12.7 to 30 with T1PA >30 were less likely to develop PJK with a lower thoracic UIV (p<.001).

CONCLUSIONS: The selection of UIV was strongly correlated to UIV slope and T1PA for avoidance of proximal junctional kyphosis. Frailty and lumbar lordosis were important contributors to the model for the selection of optimal UIV.

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P167. Sequential correction of sagittal vertical alignment and lumbar lordosis in adult flatback deformity

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BACKGROUND CONTEXT: Flatback deformity causes sagittal imbalance, which leads to back pain, fatigue, and functional limitation. Biomechanical data on the effectiveness of different surgical techniques is lacking.

PURPOSE: This study investigated the correction of sagittal vertical alignment (SVA) and lumbar lordosis achieved through sequential procedures on human spine specimens.

STUDY DESIGN/SETTING: Thirteen thoracolumbar (T10-sacrum) spine specimens were CT scanned to allow kinematic assessment of vertebral position and motion. Specimens were stratified into the iatrogenic or degenerative flatback deformity group based on initial disc collapse at L5-S1 and/or L4-5 and preoperative lumbar lordosis.

PATIENT SAMPLE: N/A

OUTCOME MEASURES: Correction of lumbar lordosis and SVA.

METHODS: The procedures for degenerative specimens included anterior lumbar interbody fusion (ALIF) at L5-S1, ALIF at L4-5, lateral lumbar interbody fusion (LLIF) at L2-3 and L3-4, and posterior column osteotomy (PCO) at L2-3 and L3-4. Iatrogenic lumbar flatback specimens underwent posterior *in situ* fusion at L4-S1 followed by hypolordotic fusion at L4-S1 created with distraction across the pedicle screws. LLIF at L2-3 and L3-4 was then performed, followed by PCO at L2-3 and L3-4. Lumbar lordosis, L1-S1 SVA, and T10-S1 SVA were recorded initially and after each stepwise procedure.

RESULTS: For the specimens with degenerative flatback, statistically significant incremental corrections were noted in SVA and lordosis after the L5-S1 ALIF, L4-5 ALIF, and PCO. A statistically significant difference was also noted in overall correction when comparing preoperative values to those after completion of the PCO. The average correction obtained with these procedures was: T10-S1 SVA -116.7±17.8 mm, L1-S1 SVA -64.9±9.2 mm, and L1-S1 lordosis -32.6±10.5 degrees. For the iatrogenic group, a statistically significant worsening was noted in all three measures with performance of the hypolordotic fusion across L4-S1. Subsequent LLIF at L2-3 and L3-4 did not show significant improvement in sagittal alignment. However, with the addition of PCO at L2-3 and L3-4, the final alignment parameters approached their preoperative values (P>0.01).

CONCLUSIONS: ALIF cages in the lower lumbar segments significantly improved sagittal alignment in adult degenerative flatback deformity. LLIF cages in the upper lumbar segments by themselves were not effective in correcting SVA or enhancing lordosis. LLIF cages in conjunction with PCO improved alignment parameters in both degenerative and iatrogenic flatback deformities.

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P168. Severe hip and knee osteoarthritis worsens patient-reported disability in adult spinal deformity patients

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