Impact of Enhanced Recovery After Surgery (ERAS) Protocols in Adult Spinal Deformity Corrective Surgery Utilizing Three Column Osteotomies

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INTRODUCTION: Spine surgery for ASD is often highly invasive, especially when requiring three column osteotomies, that can often coincide with a prolonged recovery phase. These patients might benefit from ERAS, an evidence-based multidisciplinary approach to perioperative management that aims to decrease complications and readmissions while improving functional recovery.

METHODS: ASD patients who underwent at least one 3CO, ≥18 years old with complete baseline (BL) and perioperative (Peri-Op) data were included. Means comparison tests assessed differences in baseline demographics, surgical details, and perioperative outcomes between non-ERAS and ERAS patients. Additionally, multivariable logistic regression and ANCOVA assessed differences in outcomes while accounting for age, CCI, frailty, baseline deformity, and invasiveness.

RESULTS: 590 ASD patients were included. 67 of those had 3CO. Stratification of 3CO based on receiving ERAS (E3) and not (NE3) resulted in 30 in E3 and 37 in NE3. No difference in baseline demographics between groups in age 56.9±10.1, 43% female, CCI 2.46±1.45. BMI was higher in E3 (33.0 vs 29.2, p=.02). Baseline HRQL's were ODI 63.9±13.9, NRS-Back 7.7±2.4, NRS-Leg 6.75±2.9, SRS-22r 2.4±.45, EQ-5D 10.4±1.7, with no significant differences amongst groups. No significant difference in levels fused between groups (8.2 vs 6.2, p=.12). EBL was significantly higher in NE3 (2854 vs 848mL, p<.001), which translated to higher rates of blood transfusion (63% vs 33%, p=.035). No difference in operative time (567min). Discharge to home was higher in E3 (19.2% vs 10%, p=.3). SICU rates were lower in E3 (32% vs 68%, p=.008). Preoperative and postoperative opioid MME was significantly higher in NE3 (Pre: 64.5 vs 15.9, p=.001, Post: 118.9 vs 100.9, p=.003). Rates of opioid usage remained lower through two year follow up (SRS-22q11), with no difference in back pain (NRS-Back). Ambulation distance prior to discharge was significantly higher in E3 (134 vs 49ft, p=.011). Complication rates leading to readmissions were lower in E3 (4% vs 11%, p=.36), with reoperation rates higher in NE3 (11% vs 0%, p=.095). SRS-22R was significantly lower in E3 until 1 Year follow up (p<.05).

DISCUSSION AND CONCLUSION: Enhanced recovery after surgery protocol in adult spinal deformity corrective surgery utilizing three-column osteotomy has shown to improve earlier recovery and return to function while requiring less opioid usage during the postoperative period.