Optimizing Health Prior to Adult Spinal Deformity Surgery: Are Costs Outweighed by Perioperative Benefits?

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INTRODUCTION:

Operative Adult Spinal Deformity (ASD) patients are particularly vulnerable to the deleterious impact of comorbidities (Yagi et. al), thus preoperative optimization of modifiable health factors may improve surgical outcomes and improve cost effectiveness. The purpose of this study was to assess the impact of pre-operative optimization of modifiable health conditions on perioperative complications and operative costs in patients undergoing surgical correction of ASD.

METHODS:

This study is a retrospective analysis of patients prospectively enrolled in a single center ASD database. ASD patients with perioperative data were included. Optimization of diabetes (DM), osteoporosis, and nutritional status was assessed. Patients with DM were considered optimized (Opt) if pre-op HbA1c≤7%. Those with osteoporosis were Opt if treated with an FDA approved drug prior to surgery. In contrast, nutritional status was assessed by ranking patients into quartiles (Q1-Q4) by baseline BMI. Q1 (low BMI) and Q4 (high BMI) were considered N-Opt. Total Costs (TC) were calculated from average Medicare DRG reimbursement. Where applicable, pre-op (≤90 days) costs incurred that were directly related to optimization (e.g. drugs) were added to TC. ANCOVA and stepwise logistic regression analyses assessed perioperative outcomes while accounting for surgical and demographic differences between groups.

RESULTS:

269 patients were included (24.2% DM; 15.2% osteoporotic). Of diabetics (70.8% Opt; 29.2% N-Opt), Opt patients had 94.1% lower odds of wound infection (OR: 0.059 [0.007, 0.491], p=.009) and 89.3% lower odds of 90-day readmission (OR: 0.107 [0.033, 0.352], p< .001). Accordingly, Opt patients had significantly lower TC ($27,385 vs. $35,955, p<.001). For osteoporosis (85.4% Opt; 14.6% N-Opt), Opt patients had 79.3% lower odds of peri-op complications (OR: 0.207, [0.086, 0.498], p<.001) and lower TC ($28,053 vs. $33,171, p=.002). For nutritional status (50.2% Opt; 49.8% N-Opt), mean BMI of N-Op quartiles were 21.4 kg/m2 (Q1) and 39.1 kg/m2 (Q4). Compared to N-Opt quartiles (p>.05), odds of peri-op complications were significantly reduced for patients in Q2 (OR: 0.354 [0.200, 0.625], p<.001) and Q3 (OR: 0:380 [0.193, 0.751], p=.005) and TC were significantly lower in Opt quartiles (all p<.001).

DISCUSSION AND CONCLUSION:

Despite accounting for surgical differences and costs of preoperative interventions, total costs were significantly lower in optimized patients. Thus, optimizing modifiable health conditions prior to surgery may benefit ASD patients by reducing perioperative complications while also minimizing utilization of hospital resources and lowing total costs.