Does Preoperative Rehabilitation for Adult Spinal Deformity Surgery Improve Patient Recovery Kinetics and Cost Effectiveness

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INTRODUCTION:
Adult Cervical Deformity (CD) is a debilitating disease of the upper spine that significantly impacts patient quality of life. Surgical correction is a proven treatment option that provides functional restoration and pain relief. Little is known about the effect of preoperative rehabilitation on patient outcomes and costs of the procedure. The purpose of this study was to identify if preoperative rehabilitation influences patients ability to recover, as well as its cost effectiveness.
METHODS:
CD patients with baseline (BL) and two-year (2Y) follow-up and available preoperative rehabilitation data were included. Patients were dived on whether or not they completed a preoperative rehabilitation assignment (Prehab) or not (no Prehab). Normalized HRQL scores at BL and follow-up intervals (6W, 1Y, 2Y) were generated. Normalized HRQLs were plotted and area under the curve was calculated, generating one number describing overall recovery (Integrated Health State [IHS]). Cost was calculated using the PearlDiver database. This data is representative of national average Medicare cost differentiated by complication/comorbidity outcome, surgical approach, and revision status. Cost per Quality-Adjusted Life Year (QALY) at 2Y were calculated. Binary regression analysis assessed patient reported outcomes and cost adjusting for baseline and surgical characteristics.
RESULTS:
100 patients were included (36 Prehab, 64 no Prehab). Age (59.2 vs 56.2), gender (F: 58% vs 45%), body mass index (32.9 vs 31.4), and Charlson Comorbidity Index (3.8 vs 3.9) were similar between groups ($P > .05$). OpTime, EBL, and length of construct were similar between groups ($P > .05$). Normalized HRQLs determined Prehab patients to exhibit better ODI than no Prehab patients at 2Y follow-up, $P<.05$. Multivariate analysis confirmed Prehab patients more likely to improve in ODI (OR .055 [CI .006-.476], p=.008) at 2Y. However, Prehab and no Prehab patients exhibited similar ODI IHS recovery rates from BL to 2Y, $P<.05$. Total cost for Prehab patients was $59,272 compared to $72,878 for not Prehab, $P<.05$. Utility Gained at 2Y was 0.168 for Prehab and 0.121 for not Prehab, $P<.05$. This translated to QALY gained at 2Y of 5.09 for Prehab and 4.21 for not Prehab, $P>.05$. Cost effectiveness was determined via cost per QALY: Prehab = $14,463 and not Prehab = $45,515, $P<.05$.
DISCUSSION AND CONCLUSION:
Patients who had a preoperative rehabilitation prior to corrective surgery were in a better state of postoperative back disability at two year follow-up. While both patient cohorts had improvement following surgery, patients with preoperative rehabilitation had greater utility gained at two year follow-up. Costs by procedure and cost effectiveness were better for patients who had preoperative rehabilitation.