

Prehabilitation Reduces Postoperative Mortality and Need for Non-Home Discharge in High-Risk Surgical Patients

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Background: Surgical patients are older with more comorbidities than they were a decade ago, and this trend is expected to continue in the future. The preoperative period is an important target for interventions that can improve postoperative patient outcomes.

Hypothesis: A preoperative multidisciplinary program (Surgical Prehabilitation and Readiness [SPAR] program) will reduce the need for discharge to a post-acute care facility (i.e. skilled nursing facility or rehab facility) and 30-day mortality in high-risk surgical patients.

Methods: Over a period of 20 months, the SPAR program was implemented in the Washington University Department of Surgery. SPAR targets patients age ≥ 70 years undergoing inpatient surgery with an anticipated LOS ≥ 2 days, who have an acceptable minimum preoperative enrollment time of ≥ 14 days. However, surgeons can enroll any patient deemed to be at increased risk of poor postoperative outcomes. The SPAR program targets 4 domains with multiple evidence-based interventions: 1) physical activity/physical function; 2) pulmonary function; 3) nutrition; and 4) mindfulness/mindset. SPAR patients who underwent surgery with 30-days of follow up were compared to patients within the American College of Surgeons (ACS) NSQIP database undergoing similar procedures at the same institution during the 5 years (2016-2020) prior to the implementation of the SPAR program (pre-SPAR NSQIP patients). SPAR patients were propensity score matched to pre-SPAR NSQIP patients in a 1:3 ratio and their outcomes compared. The ACS NSQIP Surgical Risk Calculator was used to compare observed to expected ratios (O/E) for postoperative outcomes.

Results: 246 patients were enrolled in SPAR. A six-month compliance audit revealed that overall patient adherence to the SPAR program was 89%. At the time of analysis, 118 SPAR patients underwent surgery with 30 days of follow up. Mean age was 70.0 years (range: 36 – 90 years), average BMI = 29.2 kg/m² (range: 17.2 kg/m² – 59.0 kg/m²), 84.8% had a severe systemic disease (i.e. ASA class ≥ 3), and 48.3% were frail at baseline. The mean time from SPAR enrollment until surgery was 49.6 days (range: 14 – 194 days). Compared to pre-SPAR NSQIP patients, SPAR patients were significantly older with worse functional status and more comorbid conditions. Compared to propensity score-matched pre-SPAR NSQIP patients, SPAR patients had significantly decreased 30-day mortality (0% vs 4.1%, $p=0.036$) and decreased need for discharge to post-acute care facilities (6.5% vs 15.9%, $p=0.014$) (**Figure 1**). Similarly, SPAR patients exhibited decreased observed 30-day mortality (O/E: 0.41) and need for discharge to a post-acute care facility (O/E: 0.56) compared to their expected outcomes using the ACS NSQIP Surgical Risk Calculator.

Conclusion: The Surgical Prehabilitation and Readiness (SPAR) Program is safe, feasible, and may reduce postoperative mortality and the need for discharge to a post-acute care facility in high-risk surgical patients.

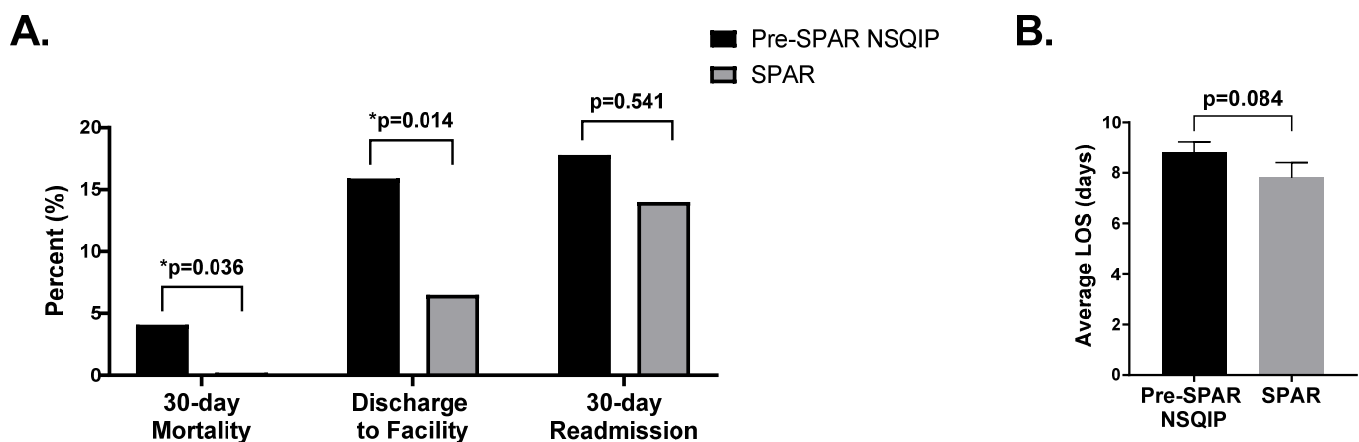


Figure 1. Postoperative outcomes of SPAR patients compared to propensity score-matched Pre-SPAR NSQIP patients: (A) 30-day mortality, discharge to facility, and 30-day readmission; (B) average postoperative length of stay (LOS) with standard error bars.