Postoperative Length of Stay is Associated With Unplanned Readmission in a Broad Surgical Population

Garrett Healy, BA[a,], Christina M. Stuart, MD[a], Michael R. Bronsert, PhD MS[a,b], Robert A. Meguid,

MD, MPH, FACS[a,b,*], Tochi Anioke, BS[a], William G. Henderson, PhD MPH[a,c]

Introduction:

Reduction in postoperative length of stay (PLOS) improves financial and operational outcomes and is a target for quality improvement. However, the relationship between PLOS and unplanned readmission, which may offset these improvements, is poorly understood. The aim of this study was to examine the association between PLOS and readmission in a broad surgical population.

Methods:

All inpatients who underwent operations in the ACS-NSQIP 2012-2018 were included. Associations of patient preoperative characteristics, in-hospital postoperative complications, and PLOS intervals with readmission rates were tested. The risk-adjusted association between PLOS intervals and readmission was assessed using multiple logistic regression analysis. Subgroup analyses by surgical specialty and the 20 most common individual operations were performed.

Results:

Of 3,140,280 patients analyzed, the majority were female (56.9%), white (66.0%), ASA class II-III (88.5%), and underwent general or orthopedic procedures (68.8%). A total of 168,672 patients (5.4%) experienced an unplanned readmission in the 30-day window. Unadjusted readmission rates increased with increased PLOS up to 10 days, but declined thereafter (Figure 1A). When compared to patients with PLOS of 0-2 days, risk-adjusted readmission was significantly increased for PLOS of 3-5 days (odds ratio=1.72, 95%CI 1.70-1.74), 6-8 days (OR=2.29, 2.25-2.33), and 9-10 days (OR=2.32, 2.27-2.38). This association was also observed for each individual surgical specialty and 17 of 20 different individual operations (Figure 1B-C). The only operations which did not demonstrate a significant risk-adjusted association between PLOS and unplanned readmission were hip fracture hemiarthroplasty (CPT 27236), treatment of intertrochanteric femur fracture with intramedullary hip screws (IMHS) (27245), and thromboendarterectomy (35301).

Conclusion:

These results suggest that prolonged hospital stay after surgery independently increases a patient's risk for readmission. After adjusting for preoperative risk, surgical complexity, and in-hospital postoperative complications, increased PLOS up to 10 days was associated with

increased 30-day unplanned readmissions. This finding held true across a range of surgical specialties and operations, with variations in magnitude of effect. The largest effects were seen in otolaryngology procedures and in laparoscopic bariatric surgery procedures. The plateau and subsequent decline in effect noted after a hospital stay of 11 days or greater is likely due in part to decreased opportunity to observe readmissions within the 30-day window.