

## **Standardization of Care: Impact of an Enhanced Recovery Protocol on Length of Stay, Complications, and Direct Costs after Colorectal Surgery**

Thiele RH, Rea KM, Turrentine FE, Friel CM, Hassinger TE, Goudreau BJ, Umapathi BA, Kron IL, Sawyer RG, Hedrick TL.

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### **Background**

Colorectal surgery is associated with significant morbidity and prolonged length of stay (LOS). Recognizing the need for improvement, we implemented an enhanced recovery (ER) protocol for all patients undergoing elective colorectal surgery at an academic institution.

### **Study Design**

A multidisciplinary team implemented an ER protocol based on: preoperative counseling with *active patient participation*, carbohydrate loading, multimodal analgesia with *avoidance* of intravenous opioids, intraoperative *goal-directed fluid resuscitation*, immediate post-operative feeding and ambulation. Discharge requirements remained identical throughout. A before/after study design was undertaken comparing patients prior to (08/2012 – 02/2013) and following implementation of an ER protocol (08/2013 – 2/2014). Risk stratification was performed using the National Surgical Quality Improvement Program (NSQIP) risk calculator to calculate the predicted LOS for each patient based on 23 variables.

### **Results**

109 consecutive patients underwent surgery within the ER protocol compared to 98 consecutive historical controls (conventional). The risk adjusted predicted LOS was similar for each group at 5.1 and 5.2 days. Significant reductions were seen in LOS, morphine equivalents, intravenous fluids, return of bowel function, and overall complications with the ER group. There was a \$7,129/patient reduction in direct cost corresponding to a cost savings of \$777,061 in the ER group. Patient satisfaction as measured by Press Ganey® improved significantly during the study period.

### **Conclusions**

Implementation of an ER protocol led to improved patient satisfaction and significant reduction in LOS, complication rates, and cost for patients undergoing both open and laparoscopic colorectal surgery. These data demonstrate that small investments in the perioperative environment can lead to large returns.