

## Enhanced recovery after surgery (eras) – an assessment at six months post discharge

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### Background

Enhanced Recovery After Surgery (ERAS) programs have been established as perioperative strategies associated with improved outcomes. Long-term results for patients undergoing ERAS interventions remain limited. This study collected prospective telephone questionnaire data six months post-colorectal surgery from patients who participated in an ERAS program at University of California, San Francisco (UCSF). Our goal was to detect previously unreported issues and associated predictive factors in patient outcomes.

### Methods

We conducted a prospective observational study at UCSF, using an automated telephone survey six months after patients underwent abdominal colorectal surgery. All patients from February 2015 to June 2016 in the ERAS program were included in this post-discharge survey. Prior IRB approval was obtained. Patients who responded to the survey received a follow up call for clarity and accuracy. Six month significant outcomes were defined by persistent pain, hospital readmission, and/or patient satisfaction. Patients reporting these outcome variables were compared with patients who met none of these criteria. These patients were categorized by age, gender, diagnoses (cancer/non-cancer), ASA rating, use of an epidural, and type of procedure (Open vs Minimally Invasive) to determine what variables correlate with the six-month outcomes. Preoperative and postoperative pain scores, length of procedure, and length of hospital stay were also analyzed. A chi-square test was used to determine any relationship for categorical variables, a two independent samples t-test for length of procedure/stay and a Wilcoxon-Mann-Whitney test for pain scores.

### Results

154 of 324 patients contacted six months after surgery completed the telephone survey (47.53%). There was no statistical difference between the patient populations of those completing and not completing the survey (Figure 1). 30 of 154 (19.48%) reported surgical pain, 31 of 154 (20%) reported hospital readmission, and 21 of 154 (13.6%) reported less than complete satisfaction with their stay (Figure 2). Hospital readmission was associated with patients with a cancer diagnosis ( $P=.049$ ) and those that had a longer mean length of procedure (282 vs. 206 minutes,  $P=.006$ ) (Figure 3). Median six-month pain scores were significantly higher for patients that underwent an open procedure compared to laparoscopic ( $Z=-2.06$ ,  $P=.04$ ). No relationship between pre/postoperative pain and six month outcomes was found. Of the patients reporting surgical pain at six months, 10 out of 30 (33.3%) reported using opioids to manage their pain. Postoperative pain (9 of 21, 43%) was the most common reason for patient dissatisfaction. Epidural use suggested a beneficial trend to decreased six-month pain scores, though this was not statistically significant.

## Conclusions

A six-month postoperative telephone survey was an adequate tool to assess outcome measures of interest. Long-term benefits of an ERAS program were mostly confirmed. However, longer procedure time and patients with cancer correlated with an increased likelihood of hospital six-month readmission. Type of procedure also had a significant effect on six-month pain score outcomes. Further studies are needed to identify long-term outcomes of ERAS patients.

	Completed 6 month call (N=154)	Unsuccessful 6 month call (N=170)	P-Value
Age	55±14	53±15	0.246
Male Sex	81 (53)	80 (47)	0.319
Dx of Cancer	75 (49)	73 (43)	0.299
Open Procedure	64 (42)	73 (43)	0.801
Median Length of Stay (hrs)	126	126	0.839
Median Length of Procedure (mins)	187	197	0.572
Median ASA rating	2	2	0.579
Pre-Op Pain	29 (19)	40 (24)	0.302
Post-Op Pain	73 (47)	81 (48)	0.948
Epidural Use	90 (58)	108 (64)	0.348

Figure 1

### 6 Month Adverse Outcomes

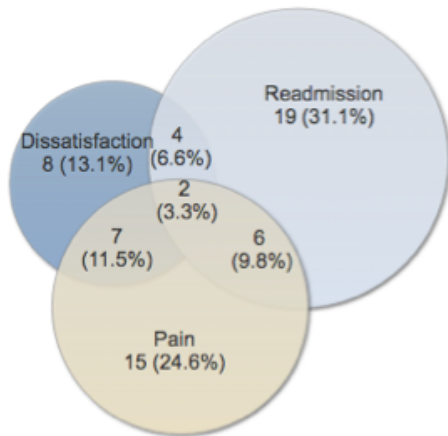


Figure 2

	Hospital Readmission within 6 Months of Discharge (N=31)	No Hospital Readmission within 6 Months of Discharge (N=123)	P-Value
Age	57±16	54±14	0.290
Male Sex	21 (68)	60 (49)	0.059
<b>Dx of Cancer</b>	<b>20 (65)</b>	<b>55 (45)</b>	<b>0.049</b>
Open Procedure	12 (39)	52 (42)	0.719
Length of Stay (hrs)	202±118	184±170	0.839
<b>Length of Procedure (mins)</b>	<b>282±167</b>	<b>206±126</b>	<b>0.006</b>
Median ASA rating	2	2	0.127
Pre-Op Pain	7 (23)	22 (18)	0.550
Post-Op Pain	14 (48)	61 (50)	0.836
Epidural Use	19 (61)	71 (58)	0.719
Dissatisfaction with Stay	6 (19)	15 (12)	0.299
6 month pain	8 (26)	22 (18)	0.320

Figure 3