

## Impact of adherence levels to eras protocol for elective colorectal surgery

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### Background

Prior studies have shown adherence to a multimodal Enhanced Recovery After Surgery (ERAS) protocol is associated with improved outcomes, indicating a dose-response relationship. We studied the impact of the adherence level, after implementing our ERAS protocol following elective colorectal surgery (CRS).

### Methods

A multidisciplinary team implemented an ERAS protocol at our centre in November 2013. The charts of 369 consecutive elective CRS performed since implementation to December 2015, were audited. 12 ERAS process measures were assessed: pre-operative counseling, pre-operative anesthesia consultation, CHO loading, maintenance of normothermia, timely administration of antibiotics, the use of multimodal analgesia, adequate PONV prophylaxis, use of a monitor to direct GDFT, mobilization on POD 0 and 1, introduction of fluids on POD 0 and solids on POD 1. ACS NSQIP defined post-operative 30-day complications, and length of stay (LOS) was determined. The complication rate was compared between two cohorts, those that had a  $\geq 75\%$  compliance and those than had  $< 75\%$ , as well as to our pre-implementation cohort (2011-2013 N=99). Univariate analysis was performed to assess the significance of each of the process measures.

### Results

Since implementation of our ERAS protocol 43% (158/369) of our patients have obtained  $\geq 75\%$  compliance to the ERAS protocol process measures. Patient demographics with respect to age, gender, and ASA status were comparable in the pre, and two post implementation cohorts as seen attached table. 71.3% of patients had a minimally invasive procedure, with a slightly higher percentage in  $\geq 75\%$  adherence cohort (82.3% vs. 63%) but this did not reach statistical significance. Greater than  $\geq 75\%$  adherence resulted in a significance decrease in LOS, mean 5.81 days vs. 8.46 days ( $p < 0.05$ ), a decrease in overall pulmonary complications: pneumonia 1.3% vs. 5.7%, ventilation  $> 48$  hrs 0.6% vs. 3.3%, re-intubation 0.0% vs. 4.7%. Overall complication rate decreased from 27.8% prior to implementation of ERAS to 15.2% with  $\geq 75\%$  adherence to ERAS components ( $p < 0.05$ ). Univariate logistic regression analysis demonstrated pre-operative counseling was an independent predictor of "no complications" Exp (B) 2.181, 95% CI 1.058-4.496 ( $p < 0.05$ ).

	Pre-ERAS (N=99)	<75% adherence (N=211)	>75% adherence (N=158)	P values
Age (mean)	65+/-15.3	66.6+/-14.36	67.6+/-12.7	
Female/Male	48/52	44.5/55.5	43/57	
ASA 1	7.1%	4.3%	5.1%	
ASA 2	52.5%	57.8%	60.8%	
ASA 3	38.4%	35.5%	32.3%	
ASA 4	2.0%	2.4%	1.9%	
All complications	*27.8%	18%	*15.3%	*p<0.05
Pneumonia	5.1%	5.7%	1.3%	p<0.05
Ventilation > 48hrs	5.1%	3.3%	0.6%	p=0.078
Reintubation	4.7%	5.7%	0.0%	p<0.05
LOS (mean)	10.7	8.46	5.81	p<0.05

### Conclusions

A high adherence to the ERAS process measures is associated with decreased LOS, and complications. Our adherence to pre-operative and intraoperative components was high, but postoperative components still requires improvement as well as clear documentation regarding these process measures. Adequate patient counseling is an integral component in the ERAS pathway.