Evaluating an Enhanced Recovery After Surgery implementations (iERAS) program using data from the National Surgical Quality Improvement Program (NSQIP)

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Introduction

Efforts to improve the value of our health care delivery include increasing quality while reducing costs. Enhanced Recovery After Surgery (ERAS) refers to multimodal peri-operative interventions that aim to standardize perioperative care established in evidence-based literature in order to reduce post-operative complications and length of stay (LOS).

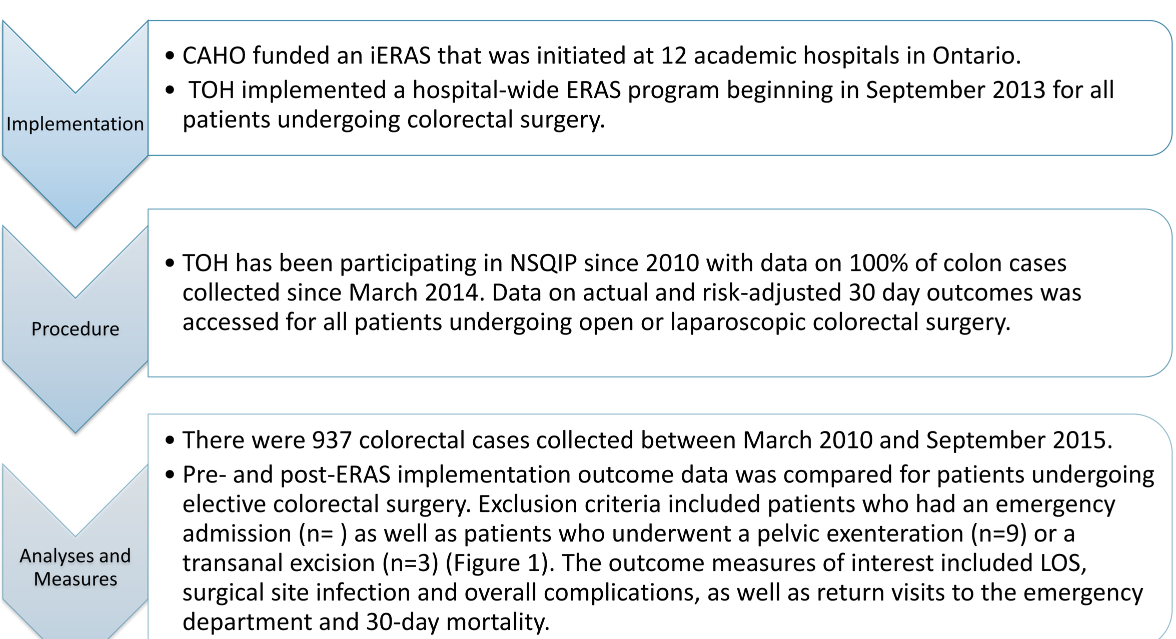
SUMMARY OF ERAS RECOMMENDATIONS		
PRE-OPERATIVE	INTRA-OPERATIVE	POST-OPERATIVE
• Patient education/pre-operative counseling • Reduced fasting duration • Carbohydrate drinks • No mechanical bowel preparation	• NSAIDS +/- thoracic epidural analgesia (TEA) • Avoidance of drains and nasogastric tubes • Multimodal pain management • Thromboprophylaxis • SSI prophylaxis • Goal-directed fluid management • Normothermia • TEA o IV Lidocaine	• Fluid restriction • Early removal/avoidance of urinary catheters • Early mobilization • Earl enteral feeding • Chewing gum • Multimodal pain management

Objectives:
The primary objective was to evaluate outcomes of patients undergoing elective surgery during ERAS protocol implementation, specifically whether iERAS was associated with reductions in LOS and overall postoperative complications as measured by prospectively collected NSQIP data.

Hypothesis: The iERAS program at TOH will be associated with reductions in:
1) hospital LOS;
2) post-operative complication rates

Methods

CAHO: ERAS Implementations Timeline



Colorectal Cases 03/2010-09/2015 (n=937)

CAHO = Council of Academic Hospitals of Ontario; NSQIP = National Surgery Quality Improvement Program

Removed:
Emergency cases
Pelvic Exenteration
TAE

Elective colorectal cases (n=619)
PreERAS N=184
PostERAS N=435

Figure 1: Study Algorithm.

Results

The dataset for analysis included 619 patients (320 colon resection, 299 rectal resections) of which 184 had a resection prior to the implementation of ERAS and 435 had a resection after ERAS implementation.

THE ROLE OF AN IMPLEMENTED ENHANCED RECOVERY AFTER SURGERY PROGRAM ON HOSPITAL LENGTH OF STAY

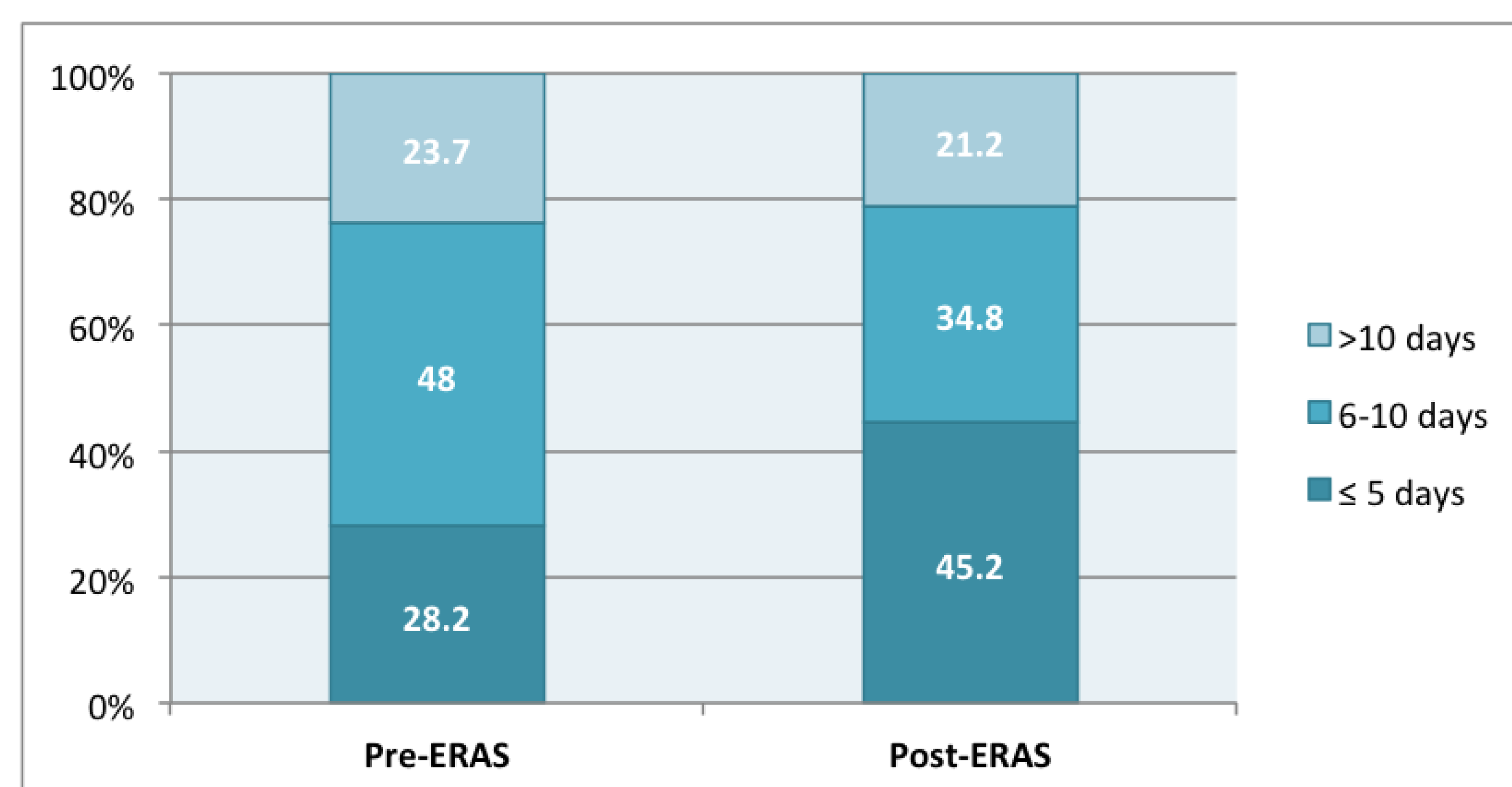


Figure 2a: Effect of iERAS on LOS for patients undergoing surgery pre- and post-implementation of an ERAS program at The Ottawa Hospital.

- Implementation of ERAS was associated with a significant increase in the percentage of patients discharged within 5 days of surgery from 28.3% to 45.2% ($p < 0.001$) with a significant decrease in the percentage of patients discharged between 6 and 10 days from 48% to 34.8% ($p = 0.001$).
- There was a non-significant increase in unplanned return visits to the emergency department, from 11.4% pre-ERAS to 18.6% post-ERAS, $p = 0.27$)

THE ROLE OF AN IMPLEMENTED ENHANCED RECOVERY AFTER SURGERY PROGRAM ON POST-OPERATIVE COMPLICATIONS

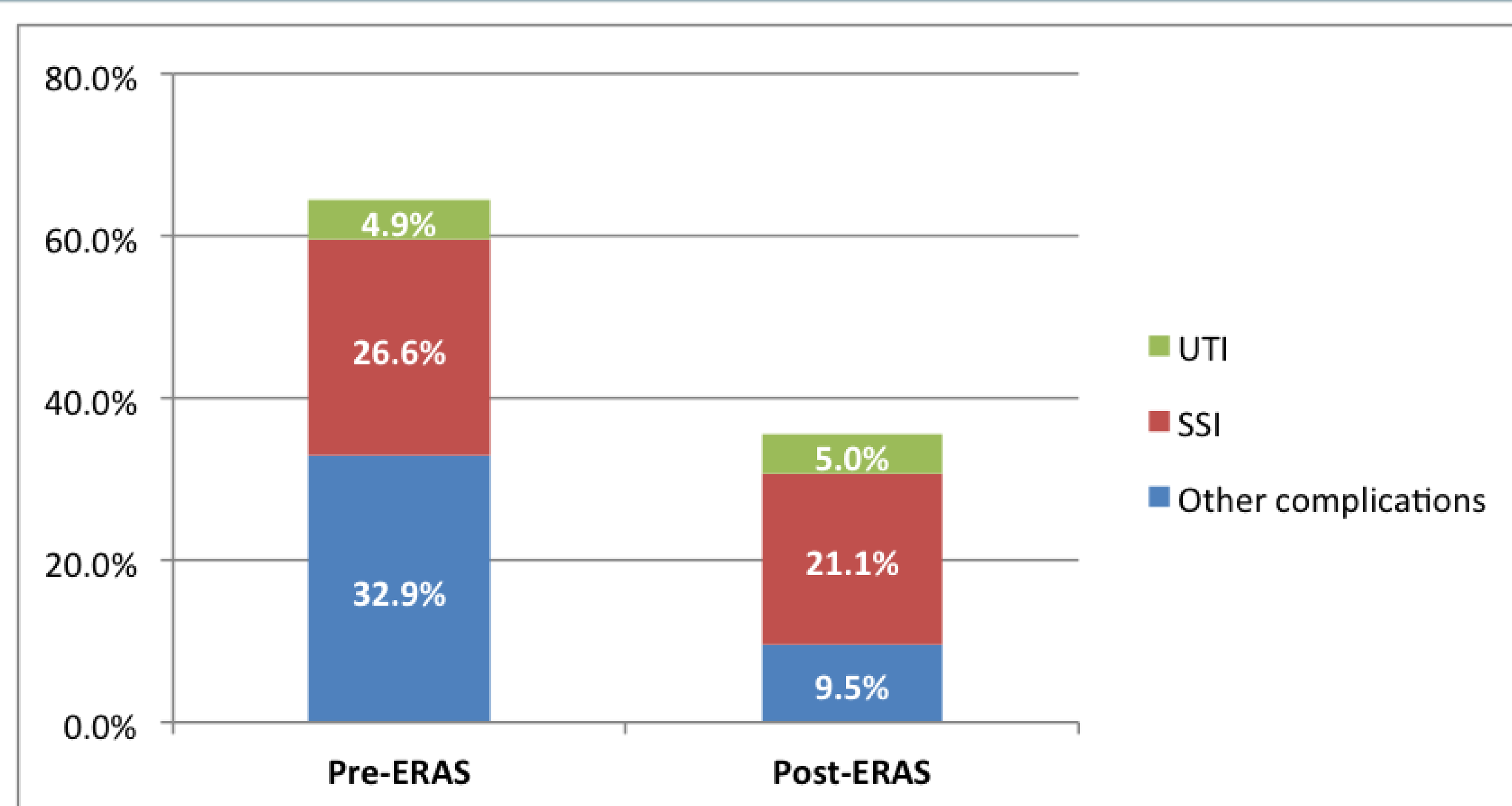


Figure 2b: Effect of iERAS on complications for patients undergoing surgery pre and post-implementation of an ERAS program at The Ottawa Hospital.

- The proportion of patients with post-operative complications was reduced from 64.4% pre-iERAS to 35.6% post-iERAS ($p = 0.007$).
- Postoperative urinary tract infections and surgical site infections were not significantly reduced after ERAS implementation.
- There was no significant difference in 30-day mortality between the 2 cohorts (1.1% pre-ERAS and 0.5% post-ERAS, $p = 0.4$)

Patient Demographics and Clinical Characteristics

	Pre-ERAS (*N = 184*)	Post-ERAS (*N = 435*)	Total (*N = 619*)
Age (years)	63.7 ± 14.4	64.1 ± 15.1	64.0 ± 14.9
BMI (kg/m2)	27.8 ± 5.9	28.5 ± 5.9	28.3 ± 5.9
Male/female gender	98/86	247/188	345/274
Colon Procedure	89 (48.4%)	231 (53.1%)	320 (51.7%)
Rectal Procedure	95 (51.6%)	204 (46.9%)	299 (48.3%)
Laparoscopic Procedure	57 (31.0%)	126 (29.0%)	183 (29.6%)
Ostomy Creation	39 (21.2%)	70 (16.1%)	109 (17.6%)

Data are expressed as mean ±SD or *n (%)*
ERAS = enhanced recovery after surgery

Conclusion

- The implementation of ERAS was associated with a significant reduction in LOS and overall post-operative complications for patients undergoing colorectal surgery. These findings are concordant with other studies evaluating the effects of ERAS programs in colorectal surgical patients.
- NSQIP is an effective tool to monitor outcomes following implementation.
- The introduction of an ERAS-NSQIP module for standardized peri-operative care and collection of process quality indicators may help inform implementation teams where best to focus their efforts and address specific barriers to iERAS.

Selected references

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