Reducing Readmissions: The University of Florida Experience

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Disclosures
None

The UF-Health Story

Causes of 30-day readmission
- Dehydration *
- Intraabdominal Abscess *
- Small Bowel Obstruction
- Wound Infection (SSI)
- Reus
- Other Complications *

Overlap between complications: [n=1]
* Includes small bowel perforation (n=1), acute renal failure (n=1), and Crohn's flare (n=1)
The Issue

- Colorectal Surgery (CRS) patients have higher postoperative morbidity than those undergoing non-colorectal procedures
- Sub-cohort of ileostomy patients have the worst outcomes
- Historical readmission rates for CRS patients range from 10% to 30% but are much higher in patients with new ileostomies
- Dehydration after ileostomy creation is the most common indication for readmission
- Readmissions within 30 days are closely scrutinized as an outcome measure and surrogate of quality with financial/reimbursement implications

Ileostomy Phone Call Protocol Instituted

- Mean LOS: 17 days
- LOS Index: 2.4
- Readmission rate: 65%

Ileostomy Output Reduction Protocol

- All patients with new ileostomies received a standardized approach to ileostomy education
- Follow up with a daily telephone call for three weeks post-discharge

Provider administered questionnaire:

- How do you feel?
- Have you been dizzy today?
- Do you have a dry mouth or feel thirsty?
- What is your weight today?
- How much urine have you made in the last 24 hrs?
- What color is your urine?
- How much ostomy output have you had in the last 24 hrs?
- What consistency is your ostomy output?
- How much Metamucil are you taking per day?
- How much Loperamide are you taking per day?
- How much Diphenoxylate/Atropine are you taking per day?
Enhanced Recovery After Surgery:
Acceleration of Positive Outcomes

RESULTS

- 100% of patients required telephone counseling with regards to their intake and output
- 91% required medication adjustments to help achieve a positive fluid balance
- Patient Satisfaction after 3 weeks:
  - The average score rating was 4.7 on a scale of 1-5 regarding the education and outpatient support provided to them in their postoperative period

Patient Satisfaction Survey Results:

<table>
<thead>
<tr>
<th>Question</th>
<th>Score*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Their knowledge and expertise of your illness?</td>
<td>4.7</td>
</tr>
<tr>
<td>The treatment and medical follow up they provided?</td>
<td>5</td>
</tr>
<tr>
<td>The attention they paid to your physical problems?</td>
<td>4.8</td>
</tr>
<tr>
<td>Their willingness to listen to all of your concerns?</td>
<td>4.8</td>
</tr>
<tr>
<td>The interest they showed in you personally?</td>
<td>4.6</td>
</tr>
<tr>
<td>The comfort and support they gave you?</td>
<td>4.5</td>
</tr>
<tr>
<td>The information they gave you about your illness?</td>
<td>4.3</td>
</tr>
<tr>
<td>The information they gave you about your lab results?</td>
<td>4.2</td>
</tr>
<tr>
<td>The information they gave you about your treatment?</td>
<td>5</td>
</tr>
<tr>
<td>The frequency and duration of the phone calls?</td>
<td>4.9</td>
</tr>
<tr>
<td>The time they devoted to you during the phone calls?</td>
<td>4.8</td>
</tr>
</tbody>
</table>

RESULTS

Comparison of baseline characteristics of pre and post-intervention groups:

<table>
<thead>
<tr>
<th></th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MEAN AGE (years)</td>
<td>55</td>
<td>55</td>
<td>0.70</td>
</tr>
<tr>
<td>SEX (M/F)</td>
<td>6/9</td>
<td>1/4</td>
<td>0.28</td>
</tr>
<tr>
<td>BMI (mean)</td>
<td>24</td>
<td>26</td>
<td>0.23</td>
</tr>
<tr>
<td>ASA Class (mean)</td>
<td>3</td>
<td>3</td>
<td>0.08</td>
</tr>
<tr>
<td>Postoperative admission day* (mean)</td>
<td>18.3</td>
<td>18.4</td>
<td>0.54</td>
</tr>
</tbody>
</table>
RESULTS

Quality-metric outcome comparison of pre and post-intervention groups:

<table>
<thead>
<tr>
<th>All ileostomy patients:</th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 30-day readmission rate (%)</td>
<td>65%</td>
<td>16%</td>
<td>0.004</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Length of Stay (days)</th>
<th>Pre-Intervention</th>
<th>Post-Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>2.5</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>3.5</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>4.0</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>5.0</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>6.0</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>7.0</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td>8.0</td>
<td>8.0</td>
<td></td>
</tr>
<tr>
<td>9.0</td>
<td>9.0</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Cost of Readmissions per year ($)</th>
<th>$88,858</th>
<th>$25,037</th>
</tr>
</thead>
<tbody>
<tr>
<td>p value</td>
<td>&lt; 0.0001</td>
<td></td>
</tr>
</tbody>
</table>

Cost analysis for the intervention:

<table>
<thead>
<tr>
<th>Cost analysis</th>
<th>Cost/annum</th>
<th>Overall Cost Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost Reduction:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 49% decrease in re-admissions</td>
<td>$48,821</td>
<td>$63,821</td>
</tr>
<tr>
<td>- &gt;1 day decrease in hospital stay for re-admissions</td>
<td>$15,000</td>
<td></td>
</tr>
<tr>
<td>Cost of administration:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost of administering questionnaire through Nurse Practitioners in the future</td>
<td>$2,030*</td>
<td>$61,791</td>
</tr>
<tr>
<td>Opportunity Cost Gain:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Potential gain by the upstream choice of an alternative in the freed hospital beds</td>
<td>$132,114</td>
<td></td>
</tr>
<tr>
<td>Total Cost Savings:</td>
<td></td>
<td>$173,905</td>
</tr>
</tbody>
</table>

* Assumes the average wage of a Nurse Practitioner in Florida being $87,653 per annum with 2,000 working hours/year and ~15 minutes/day required to complete the questionnaire

Timeline

- Ileostomy Phone Call Protocol Instituted
- Mean LOS: 17 days
- LOS Index: 2.4
- Readmission rate: 65%
- Mean LOS: 12.3 days
- LOS Index: 3.33
- Readmission rate: 29%
Enhanced Recovery After Surgery:  
Acceleration of Positive Outcomes

Timeline

- Mean LOS: 17 days  
  - LOS Index: 2.4  
  - Readmission rate: 65%


- Mean LOS: 12.3 days  
  - LOS Index: 1.33  
  - Readmission rate: 29%

- Mean LOS: 7.8 days  
  - LOS Index: 0.94  
  - Readmission rate: *

- Mean LOS: 4.8 days  
  - LOS Index: 0.58  
  - Readmission rate: 30%

- Mean LOS: 11.7 days  
  - LOS Index: 1.07  
  - Readmission rate: 28%

UF ERAS Protocol

**PREOP**

- Bowel:  
  - Clears starting 24 hrs preop → up to 3 hours prior to surgery → CHO drink prior to surgery  
  - Entereg (Alvimopan)

- Pain control:  
  - Gabapentin + oral tylenol

**INTRAOP**

- Bowel:  
  - OG tube (discontinued at case end)  
  - Minimal use of drains/foley

- Pain control:  
  - Intra-op Tylenol and Ketorolac  
  - PONV prophylaxis

**POSTOP**

- Bowel:  
  - Clears on POD #0, Regular diet starting POD #1 with boost supplement with each meal  
  - Entereg (Alvimopan) till 360F

- Pain control:  
  - Epidural (typically for 2 days)  
  - Scheduled oral tylenol, ibuprofen, tramadol  
  - Gabapentin 100 mg tid (titrated up to effect)  
  - PRN narcotics if above fails to control pain
Enhanced Recovery After Surgery: Acceleration of Positive Outcomes

**UF ERAS Protocol**

**PREOP**
- SSI:
  - Chlorhexidine body wash
  - Standardized antibiotics

**INTRAOP**
- SSI:
  - Normothermia
  - Glucose control (<180 mg/dl)
  - Fascial closure protocol (wound protectors, glove change after bowel anastomosis, fascial closure tray)
  - Incisional wound VAC (DC POD 3-5)

  Other:
  - Goal-directed fluid therapy with selective invasive monitoring (LR @3 ml/kg/hr for lap cases and 5 ml/kg/hr for open cases)

**POSTOP**
- SSI:
  - Glucose control (<180 mg/dl)

  Other:
  - DC Foley POD 1 (POD 3 in pelvic dissection + flomax)
  - Early mobilization

**Timeline**
- Mean LOS: 17 days
- LOS Index: 2.4
- Readmission rate: 65%
- Mean LOS: 12.3 days
- LOS Index: 1.33
- Readmission rate: 29%
- Mean LOS: 7.8 days
- LOS Index: 0.94
- Readmission rate: *

**Post-operative Phone Call Protocol Instituted**

**Early DC Protocol (PICC line + IVF) Instituted**

**ERAS Protocol Instituted**

- Mean LOS: 17 days
- LOS Index: 2.4
- Readmission rate: 65%

- Mean LOS: 11.7 days
- LOS Index: 1.07
- Readmission rate: 28%

- Mean LOS: 7.8 days
- LOS Index: 0.94
- Readmission rate: *

- Mean LOS: 11.7 days
- LOS Index: 1.07
- Readmission rate: 28%

- Mean LOS: 7.8 days
- LOS Index: 0.94
- Readmission rate: *
**Early Discharge Protocol**

- **POD #1:**
  - PICC line/midline catheter placed
  - Social Services consult for home health for PICC line and IV Fluid 1 L/day at night after discharge
  - Ileostomy/Regular diet

- **Discharge:**
  - D/C home when clinically ready → Ignore ileostomy output volume and consistency
  - Daily phone call to patient starting post-discharge day 2
  - Escalate the medications per CRS ileostomy output reduction protocol
  - D/C IV fluid & PICC line when:
    - 2 days of ileostomy output < 1.5 L/day AND
    - Oral Liquid Intake > Ileostomy Output

**Ileostomy Output Reduction Protocol**

**Timeline**

- Mean LOS: 17 days
- LOS Index: 2.4
- Readmission rate: 65%
  - 2011
- Mean LOS: 12.3 days
- LOS Index: 1.33
- Readmission rate: 29%
  - 2012
- Mean LOS: 7.8 days
- LOS Index: 0.94
- Readmission rate:
  - 2015
- Mean LOS: 4.8 days
- LOS Index: 0.58
- Readmission rate: 14%
  - 2016
Enhanced Recovery After Surgery: Acceleration of Positive Outcomes

Timeline
- **2011**
  - Mean LOS: 17 days
  - LOS Index: 2.4
  - Readmission rate: 65%
  - LOS for Readmission: 13.7 days
  - Dehydration-related readmission rate: 68%
  - Mean cost (Index procedure): $49,359
  - Mean cost (Readmission): $88,858
- **2016**
  - Mean LOS: 4.8 days
  - LOS Index: 0.58
  - Readmission rate: 14%
  - LOS for Readmission: 3.8 days
  - Dehydration-related readmission rate: 12%
  - Mean cost (Index procedure): $22,030
  - Mean cost (Readmission): $19,588

Narcotic usage

**Jan 2013 - June 2015**
**ERAS Protocol**
**July 2015 – March 2017**

<table>
<thead>
<tr>
<th></th>
<th>Pre-ERAS</th>
<th>Post-ERAS</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>INPATIENT:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCA use (%)</td>
<td>63%</td>
<td>7%</td>
<td>&lt;0.00001</td>
</tr>
<tr>
<td>PRN iv narcotics used (%)</td>
<td>79%</td>
<td>88%</td>
<td>0.11</td>
</tr>
<tr>
<td>PRN oral narcotics used (%)</td>
<td>90%</td>
<td>67%</td>
<td>0.001</td>
</tr>
<tr>
<td>OUTPATIENT:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Narcotics prescribed (%)</td>
<td>85%</td>
<td>55%*</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

INPATIENT + OUTPATIENT:
- Total narcotic dose (MEG mg)
  - Pre-ERAS: 2481
  - Post-ERAS: 307

* Marked variance by residents rotation (0% - 80%)

Narcotic usage
CONCLUSIONS

• An easily administered, novel ileostomy pathway, including an ERAS protocol, has resulted in a significant decrease in length of stay for the index procedure, reduction in readmission rates and length of stay for the readmissions, decreased narcotic usage and significant cost savings with excellent patient satisfaction

• Adoption of such a pathway is crucial in this era of cost savings with contiguous assessment of quality and outcome measures

Thank you