Increasing Adherence to Care Bundle Guidelines to Decrease Colon Surgical Site Infections

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The Team

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• **Facilitator** - Sherry Martin

• **Supporting Team Members**
  - Robert Kutschman, Asst. Dir
  - Kristi Hill Herrera, RN
  - Laura Solis, IC Dir
  - Jason Bowling, MD
  - Ronald Stewart, MD
  - Don Jenkins, MD

• **Sponsors**
  - Jim Barker, MD, Maureen Miller, Robert Kutschman
AIM Statement

- Decrease Surgical Site Infections on patients undergoing elective colon procedures (Laparoscopic, robotic and/or open) from a standardized infection ratio (SIR) of 1.370 to a consistent standardized ratio of less than 1 by increasing the adherence to care bundle guidelines from 0% to 80% by 2nd Quarter 2017

*SIR = Observed # SSI/Expected # SSI.
Expected # SSI = # operations in each procedure risk category X risk-stratified model rate/100
Value >1.0 = more SSIs than expected. 1.0 indicates your hospital is the same as national comparison data
Baseline Data
Background

• Abdominal surgical site infection represent a significant portion of healthcare associated infections. Surgical site infections can lead to increased length of stay, increased cost and to mortality. 75% of death among patients with surgical site infections are directly attributable to lack of standardized methods for pre-surgical preparation.

Reference:
Fishbone Diagram

**Increased Colon Surgical Site Infection Rates**

- **Place**
  - Performing pre-op prep in the holding area
  - Doors left open with increase in traffic
  - Decrease traffic in surgical area
  - Chloro prep not consistent
  - Electrical clippers not consistent
  - Bair Hugger not consistent

- **Environment**
  - Room temperature not monitored

- **Process**
  - Software problems: Temp not crossing over into EMR
  - No prep checklist
  - No prep timing
  - No insulin guidelines
  - No hair removal guidelines

- **Policy**
  - Colon bundle not followed 100%
  - Antibiotic guidelines
  - Chloro prep timed
  - Pre-warming guidelines not followed 100%
  - Variation in pre-op process between staff
Evidence-Based Strategies to Prevent SSIs

1. Optimize antimicrobial dosing
2. Avoid shaving surgical site hair
3. **Maintain perioperative normothermia**
4. Perioperative glucose control
5. Optimize tissue oxygenation
6. **Use of a surgical safety checklist**
7. **Minimize OR traffic**
8. **Surgical prep-chloroprep if not contraindicated**
Surgical Site Infections Guidelines

Procedure: ____________________________

Patient risk factors for SSI: DM, smoking, wound class, age, ________

PREOPERATIVE HOLDING AREA
1. Temp oral: ________ skin: ________
2. Bair Hugger on? yes no patient refused (too warm) ________
3. AccuCheck if diabetic: ________ Insulin given? ________units AccuCheck after insulin? ________
4. Hair clipping: none minimal other: ________ In Holding: ________ on OR ________

INTRAOPERATIVE
1. Prep Chlorhexidine: ________ other: ________
2. Three minutes wait between finishing prep and surgical incision: ________ timed? ________
3. Temperature monitored and recorded on anesthesia record: ________
4. Lowest temp in OR: ________ Average temp in OR: ________ esoph. nasal skin ________
5. Warming measures: Bair hugger: ________ fluid warmer: ________ OR room warming: ________
6. Appropriate antibiotic administration: Antibiotic: ________

Within 60 minutes of incision (120 minutes for vancomycin): ________

7. Percent Oxygen: ________%

POSTOP ANESTHESIA CARE UNIT
1. Lowest SaO2 in PACU: ________ Average SaO2 in PACU: ________ Supplemental Oxygen: ________
2. Temp: oral ________ skin: Bair hugger: ________
3. AccuCheck if diabetic: ________ Insulin given? ________ AccuCheck after insulin: ________
Pre-Interventions Data

PREOPERATIVE HOLDING AREA

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>Temperature</td>
<td>43</td>
<td>10</td>
</tr>
<tr>
<td>Bair Hugger</td>
<td>31</td>
<td>22</td>
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<tr>
<td>Accucheck</td>
<td>14</td>
<td>39</td>
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<tr>
<td>Hair Clipping</td>
<td>23</td>
<td>30</td>
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Pre-Interventions Data

INTRAOPERATIVE

<table>
<thead>
<tr>
<th>Measure</th>
<th>Yes</th>
<th>No</th>
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<tbody>
<tr>
<td>Prep Chlorhexidine</td>
<td>51</td>
<td>2</td>
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<tr>
<td>Three Minute Wait (Prep &amp; Incision)</td>
<td>43</td>
<td>10</td>
</tr>
<tr>
<td>Temperature Monitored &amp; Recorded</td>
<td>38</td>
<td>15</td>
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<tr>
<td>Warming Measures</td>
<td>53</td>
<td>0</td>
</tr>
<tr>
<td>Appropriate Antibiotic Administration</td>
<td>53</td>
<td>0</td>
</tr>
<tr>
<td>Antibiotic Administration within 60 minutes of Incision</td>
<td>52</td>
<td>1</td>
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<tr>
<td>High Flow O2</td>
<td>43</td>
<td>28</td>
</tr>
<tr>
<td>OR Traffic Control</td>
<td>25</td>
<td>28</td>
</tr>
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Pre-Interventions Data

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
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</thead>
<tbody>
<tr>
<td>High Flow O2</td>
<td>49</td>
<td>4</td>
</tr>
<tr>
<td>Adequate Oxygenation (No Desaturation in PACU)</td>
<td>53</td>
<td>0</td>
</tr>
<tr>
<td>Temp Oral</td>
<td>53</td>
<td>0</td>
</tr>
<tr>
<td>Bair Hugger</td>
<td>22</td>
<td>31</td>
</tr>
<tr>
<td>Accuchek if Diabetic</td>
<td>4</td>
<td>49</td>
</tr>
<tr>
<td>Insulin Given</td>
<td>0</td>
<td>53</td>
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University Health System
Decrease surgical site infections from a standard infection ratio of 1.370 to less than 1 by increasing adherence of the guidelines to 80% by Q2 2017

Variations in pre-op processes

- No policies/protocols and/or they are not being followed
- Not following warming guidelines
- Not timing cholor prep dry time
- Performing hair removal in OR instead of pre-op holding
- Inconsistency of following pre-op checking
- Staff performing pre-op processes differently
- Not limiting traffic in OR
- Room temperature not monitored
- Computer software problems

Environment-Traffic not controlled in surgical suite

- Not following warming guidelines
- Not timing cholor prep dry time
- Performing hair removal in OR instead of pre-op holding
- Inconsistency of following pre-op checking
- Staff performing pre-op processes differently
- Not limiting traffic in OR
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Interventions

- Create checklist
- Observation
- Create checklist
- Education with staff
- Observation/Education
- Observation/Education
- Observation/Education
- Create a door sign to limit traffic during time of surgical procedures
- Monitor documentation of room temp pre/intra/post procedure
- Have IT assist with changing documents
Interventions

Completed education and implemented interventions on 10/24/16

➢ OR Traffic: Sign on Door
  ➢ Keep OR doors closed during surgery except as needed for passage of equipment, personnel and the patient

➢ Timing for Pre-Op Prep=3 Minutes
  ➢ Use appropriate antiseptic agent and technique for skin preparation
Interventions (contd.)

- Temp Monitored on Anesthesia Record
  - Maintain patient’s core temperature at the recommended range for optimal wound healing and infection prevention
- New Bair Hugger Patient Gown*
  - Initiate preoperative warming interventions

*started 11/11/16
Post-Intervention Data

Sign on Door
(October 24th, 2016 - January 5th, 2017)
Post-Intervention Data

Timing Pre-op for 3 min
(October 24th, 2016 - January 5, 2017)

Week One | Week Two | Week Three | Week Four | Week Five | Week Six | Week Seven | Week Eight | Week Nine | Week Ten | Week Eleven
---|---|---|---|---|---|---|---|---|---|---
67% | 75% | 30% | 80% | 100% | 100% | 100% | 100% | 100% | 100% | 100%
Post-Intervention Data

Temp Monitored on Anesthesia Record
(October 24th, 2016 - January 5th, 2017)

Week One | Week Two | Week Three | Week Four | Week Five | Week Six | Week Seven | Week Eight | Week Nine | Week Ten | Week Eleven
---|---|---|---|---|---|---|---|---|---|---
100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100% | 100%
Compliance with Checklist

[SPC p-Chart: % Cases used Checklist]

- UCL = 1.00
- Avg = 0.56
- LCL

Dates:
- 10/24-10/28/2016
- 10/31-11/4
- 11/7-11/11
- 11/14-11/18
- 11/21-12/25
- 12/5-12/9
- 12/12-12/16
- 12/19-12/23
- 12/26-12/30
- 1/2-1/6/2017

% Cases used Checklist: 0% to 120%
ROI

- SSI increases hospital los 7-14 days
  - Nearly ¼ colon surgery patients are readmitted within 3 months of discharge at a cost of roughly $9,000 per readmission.

- Cost estimates vary around $30,000 per SSI
  - Readmission rates are a major financial burden on the national health care system nationwide, these findings account for $3 million dollars for colon rectal surgery.

## ROI Estimation

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
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<tbody>
<tr>
<td>Annual SSI Colon</td>
<td>36</td>
</tr>
<tr>
<td>Percent Reduction</td>
<td>5.00%</td>
</tr>
<tr>
<td>Reduced Number of SSI</td>
<td>1.8</td>
</tr>
<tr>
<td>Direct Cost per Second Visit</td>
<td>$10,729.19</td>
</tr>
<tr>
<td>Decrease Costs</td>
<td>$19,313.00</td>
</tr>
</tbody>
</table>
ROI SSIs
Lessons Learned

➢ Hair Removal
   ➢ Do not remove hair at the operative site unless it will interfere with the operation

➢ Diabetic Patients
   ➢ Lower diabetic population than expected
Sustainability

- Significant lag time (3 months) in the availability of SSI data
  - Will continue to monitor data and provide results at OR committee
  - Continue to use the data to guide and drive improvement decisions and additional initiatives
- A committed colorectal SSI champion to continue to lead project
- Colon surgeries will continue to be identified on the ORC board on DOS
- PCCs will monitor hand-off sheet compliance and report results to OR committee
Thank You for Your Attention

Comments

Questions

Feedback