Reducing surgical risk for the obese patient: A multi-center, multifaceted patient safety program

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MMIC Webinar
Wednesday – June 14, 2017

Learning objectives

• Describe the increased risk that morbidly obese patients face when having surgery
• Demonstrate how a multihospital collaborative can develop and implement a care map to address the surgical risks of obese patients
• Identify tools that can be used over time to measure the impact of an obesity care map for surgical patients

Our Hospital Clients
**Frequency Open and Closed Claims: 2005–2014**

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery</td>
<td>37%</td>
</tr>
<tr>
<td>Obstetrics</td>
<td>7%</td>
</tr>
<tr>
<td>Medical Specialties</td>
<td>11%</td>
</tr>
<tr>
<td>Internal/Family Medicine</td>
<td>7%</td>
</tr>
<tr>
<td>Emergency Medicine</td>
<td>7%</td>
</tr>
<tr>
<td>Gynecology</td>
<td>5%</td>
</tr>
<tr>
<td>Radiology</td>
<td>3%</td>
</tr>
<tr>
<td>Anesthesiology</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>17%</td>
</tr>
</tbody>
</table>

**Cost Open and Closed Claims: 2005–2014**

<table>
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<tr>
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<td>15%</td>
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<td>8%</td>
</tr>
<tr>
<td>Emergency Medicine</td>
<td>7%</td>
</tr>
<tr>
<td>Gynecology</td>
<td>5%</td>
</tr>
<tr>
<td>Radiology</td>
<td>4%</td>
</tr>
<tr>
<td>Anesthesiology</td>
<td>2%</td>
</tr>
<tr>
<td>Other</td>
<td>13%</td>
</tr>
</tbody>
</table>

**Our Role**

- **Financial Support**
  - Faculty time
  - Equipment – new technology
- **Joint collaboration with all hospitals**
  - Data
  - Internal
  - External
Can we improve patient safety?
Can we decrease claims?

- Build on experience with obstetrics
- Convene clinical leadership
- Standardize care
  - Identify medical comorbidities
  - Quantify risk
  - Optimize patient

Persons who are naturally very fat are apt to die earlier than those who are slender

-Hippocrates

Obesity risks by system

- **Respiratory**
  - Increased risk of perioperative hypoxemia
  - Careful monitoring needed
  - Use supplemental oxygen
  - Use CPAP (if/when indicated)
  - Use non-supine positioning (if possible)
  - Exercise extreme caution when administering respiratory depressants

- **Cardiovascular**
  - Increased blood volume, cardiac output, left ventricular thickness
  - Increased proinflammatory and prothrombotic mediators
  - Higher perioperative complications related to hypertension, thromboembolic events and left ventricular diastolic dysfunction

- **Gastrointestinal**
  - Risk of regurgitation
  - Higher gastric volume and lower pH increase risk of severe pneumonitis should aspiration occur
  - Current fasting preoperative guidelines (6h for solids, 2h for clear liquids) are acceptable
  - Preoperative assessment of liver function is recommended
Obesity risks by system

• Endocrine/metabolic
  – High prevalence of hyperglycemia, insulin resistance and diabetes
  – Close perioperative glucose monitoring
  – Metabolic syndrome (combination of central obesity, hypertension, dyslipidemia and impaired glucose metabolism) is frequent and doubles cardiovascular risk

• Genitourinary
  – Increased risk of renal disease
  – Higher incidence of pre-eclampsia and eclampsia
  – Higher perioperative complications related to hypertension, thromboembolic events and left ventricular diastolic dysfunction

• Neurologic
  – Careful positioning with extra padding needed

• Hematologic
  – Increased hypercoagulability and risk of perioperative thromboembolic events
  – Preoperative polycythemia suggests prolonged sleep apnea

• Musculoskeletal
  – Increased prevalence of osteoarthritis

Just the facts....

• Increased morbidity and mortality
• Increased risk of rhabdomyolysis
• Increased risk in skin breakdown
• Increased incidence of wound infection
• Increased operative time
• Prevalence of obstructive sleep apnea

Obstructive Sleep Apnea

June 20, 2013 Vol. 368 No. 25

A Rude Awakening — The Perioperative Sleep Apnea Epidemic

Steers C. Mountbatten, M.D., Ph.D., Melanie C. Bechard, Dr.P.H., and Mathia Macanedi, Ph.D.

"Avoiding the C coup de grace, the use of sleep apnea testing and...."
Guidelines for OSA from ASA

- Regional anesthesia techniques to reduce systemic opioids
- Need to consider risk/benefit when adding opioids to neuraxial local anesthetics
- If PCA, basal rates should be used with extreme caution
- Use NSAIDS and other non-opioid analgesics
- Supplemental O_2 administered until return to baseline saturation on room air
- Hospitalized patients at increased risk of respiratory compromise should be monitored with continuous pulse oximetry after discharge from PACU

Implementation Process

- Review of pertinent medical literature
- Review of medical malpractice claims
- Content experts (bariatric surgeons) engaged to learn best practices
- Education of nursing, surgeons, anesthesiologists and residents

Obese Surgery Patient Care Map – BMI>40

<table>
<thead>
<tr>
<th>Pre-op</th>
<th>Intra-op</th>
<th>Post-op</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nursing admission assessment</td>
<td>Intubation with presence of two Anesthesia providers</td>
<td>Anesthesia Attending assessment prior to leaving PACU</td>
</tr>
<tr>
<td>DVT Prophylaxis</td>
<td>Compliance with SOP antibiotic protocol</td>
<td>Nursing protocols: education in mobilization, nutrition, skin care</td>
</tr>
<tr>
<td>Special additional informed consent</td>
<td>Instruments and trochar availability</td>
<td>Bariatric beds, gowns, infrastructure support</td>
</tr>
<tr>
<td>Pre-op medical risk assessment using NIC format</td>
<td>Physical environment, OR tables, gurneys, b/p cuffs</td>
<td>Pain management protocol</td>
</tr>
<tr>
<td>Anesthesia assessment for ASA III, IV patients</td>
<td>Yearly training for OR staff in paraesthesia/pressure sore prevention</td>
<td>Discharge plan reviewed by Attending Surgeon specific for obese patients</td>
</tr>
</tbody>
</table>
Special additional informed consent

Surgical Patient Survey

SURGICAL PATIENT SURVEY

In an effort to improve quality and efficiency, Hospital Association Company, Inc. (HAC) is surveying the current state of how these patients are treated in the postoperative areas. Thank you for your participation.

SPECIALITY
Please circle one:
- Anesthesiology
- Breast
- Cardiac
- Colorectal
- ENT/Thoracic
- General
- Gynecologic
- Gastroenterology
- General Surgery
- GU/Genitourinary
- Head & Neck
- Hematologic
- Intravenous
- Intensive Care
- Internal Medicine
- Medical Oncology
- Neurosurgery
- Obstetrics
- Orthopedics
- Pain Management
- Plastic
- Thoracic
- Urology

Please answer the following questions:

Are you satisfied with the care you received?
- Yes
- No

Are you happy with the outcome of your surgery?
- Yes
- No

Is the length of your hospitalization acceptable?
- Yes
- No

What do you consider about:
- Weight
- BMI
- Age
- Gender
- Smoking
- Alcohol
- Others

Surgical Patient Survey

Please answer the following questions:

1. If your patient's behavior do you change your practice?
   - Yes
   - No
   (If you please explain: )

2. Do you do anything different for your other patients group?
   - Yes
   - No
   (If you, explain)

3. Do you do anything different for your other patients symptom?
   - Yes
   - No
   (If you, explain)

4. Do you do anything different for your other patients postop?
   - Yes
   - No
   (If you, explain)
**Outcomes Analysis**

- American College of Surgeons (ACS) National Surgical Quality Improvement Program (NSQIP) data
- Compared 30-day outcomes for inpatients with morbid obesity between:
  - 2013 (*before* implementation)
  - 2015 (*after* implementation)
- General surgery, vascular, gynecology, ENT, orthopedics, plastics, neurosurgery, urology
### Outcomes Analysis

#### Demographics - BMI ≥ 40, inpatient

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2015</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, years*</td>
<td>45.7±14.1</td>
<td>44.5±13.9</td>
<td>0.0484†</td>
</tr>
<tr>
<td>Male sex</td>
<td>219 (21.2%)</td>
<td>234 (22.8%)</td>
<td>0.3917</td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>257 (24.9%)</td>
<td>256 (24.9%)</td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>292 (28.3%)</td>
<td>223 (21.7%)</td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>121 (11.7%)</td>
<td>194 (18.9%)</td>
<td></td>
</tr>
<tr>
<td>Unknown/other</td>
<td>362 (35.1%)</td>
<td>354 (34.5%)</td>
<td></td>
</tr>
</tbody>
</table>
*These values are given as the mean ± standard deviation.  
†Significant (p<0.05)

#### Preoperative health and comorbidities, BMI ≥ 40, inpatient

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2015</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMI, kg/m²</td>
<td>47.1±7.1</td>
<td>47.3±6.6</td>
<td>0.5498</td>
</tr>
<tr>
<td>Current smoker</td>
<td>90 (8.7%)</td>
<td>133 (13.0%)</td>
<td>0.003†</td>
</tr>
<tr>
<td>Opiate</td>
<td>52 (5.0%)</td>
<td>135 (13.2%)</td>
<td>0.0003†</td>
</tr>
<tr>
<td>Medication refills</td>
<td>2 (0.2%)</td>
<td>0 (0.0%)</td>
<td>1.0001</td>
</tr>
<tr>
<td>Chronic obstructive lung disease</td>
<td>28 (2.7%)</td>
<td>27 (2.6%)</td>
<td>0.497</td>
</tr>
<tr>
<td>Congestive heart failure or hypertension</td>
<td>495 (48.0%)</td>
<td>498 (48.5%)</td>
<td>0.8114</td>
</tr>
<tr>
<td>Stroke</td>
<td>10 (1.0%)</td>
<td>5 (0.5%)</td>
<td>0.3163</td>
</tr>
<tr>
<td>Functionally dependent</td>
<td>19 (1.8%)</td>
<td>26 (2.5%)</td>
<td>0.2854</td>
</tr>
<tr>
<td>Open wound</td>
<td>24 (2.3%)</td>
<td>16 (1.6%)</td>
<td>0.207</td>
</tr>
<tr>
<td>Stroke prior</td>
<td>23 (2.3%)</td>
<td>23 (2.2%)</td>
<td>0.8672</td>
</tr>
<tr>
<td>Bleeding disorder</td>
<td>28 (2.7%)</td>
<td>33 (3.2%)</td>
<td>0.5034</td>
</tr>
<tr>
<td>Pre-op transfusion</td>
<td>3 (0.3%)</td>
<td>9 (0.9%)</td>
<td>0.0809</td>
</tr>
<tr>
<td>Sepsis/SIRS 48hrs</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| *These values are given as the mean ± standard deviation.  
†Significant (p<0.05)

#### Procedure information - BMI ≥ 40, inpatient

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Surgery</td>
<td>909 (88.1%)</td>
<td>939 (91.4%)</td>
</tr>
<tr>
<td>Vascular Surgery</td>
<td>34 (3.3%)</td>
<td>23 (2.2%)</td>
</tr>
<tr>
<td>Gynecology</td>
<td>32 (3.1%)</td>
<td>12 (1.2%)</td>
</tr>
<tr>
<td>Orthopaedics</td>
<td>18 (1.7%)</td>
<td>36 (3.9%)</td>
</tr>
<tr>
<td>Neurology</td>
<td>19 (1.8%)</td>
<td>5 (0.5%)</td>
</tr>
<tr>
<td>Plastic</td>
<td>8 (0.8%)</td>
<td>15 (1.5%)</td>
</tr>
<tr>
<td>ENT</td>
<td>5 (0.5%)</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>Urology</td>
<td>6 (0.6%)</td>
<td>3 (0.3%)</td>
</tr>
</tbody>
</table>
Outcomes Analysis

Operative Information - BMI ≥ 40, inpatient

<table>
<thead>
<tr>
<th>Measure</th>
<th>2013 (N=1,032)</th>
<th>2015 (N = 1,027)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ASA = 3 or 4</td>
<td>775 (75.3%)</td>
<td>855 (83.3%)</td>
<td>&lt;0.0001†</td>
</tr>
<tr>
<td>Operative Time (minutes)*</td>
<td>120.9 ± 79.7</td>
<td>106.4 ± 66.6</td>
<td>&lt;0.0001†</td>
</tr>
<tr>
<td>General Anesthesia</td>
<td>998 (96.7%)</td>
<td>969 (96.3%)</td>
<td>0.6165</td>
</tr>
</tbody>
</table>

†Significant (p<0.05)

Adjusted comparison of outcomes

Inpatients, BMI ≥ 40 between 2013 and 2015, decrease in:

- **Total LOS** (-0.87 days; p=0.009)
- **Postoperative LOS** (-0.69 days; p=.007)
- **Unplanned readmissions** (OR=.57; p=0.006)
- **Unplanned return to operating room** (OR=.49; p=0.039)

*Significant change compared to non-morbidly obese patients, who saw no adjusted change in LOS parameters over this period.

- **Total LOS** (-0.86 days; p=0.015)
- **Postoperative LOS** (-0.69 days; p=.012)

Post-Operative Pain Management Survey

1. Are you a:
   a. Surgical Attending
   b. Physician Assistant
   c. Nurse Practitioner

   Years in Practice:
   - <5
   - 5-10
   - 11-15
   - >15

2. Are you involved in care of patients undergoing ambulatory surgery?
   a. Yes
   b. No

3. Is there a BMI above which you will not perform ambulatory surgery on an obese patient?
   a. Yes
   b. No

4. For obese ambulatory patients, what discharge pain prescriptions would you write for:
   a. Mild pain score 0-3:
      - Drug:
      - Quantity Prescribed:
   b. Moderate pain score 4-6:
      - Drug:
      - Quantity Prescribed:
   c. Severe pain score 7-10:
      - Drug:
      - Quantity Prescribed:

5. For non-obese ambulatory patients, what discharge pain prescriptions would you write for:
   a. Mild pain score 0-3:
      - Drug:
      - Quantity Prescribed:
   b. Moderate pain score 4-6:
      - Drug:
      - Quantity Prescribed:
   c. Severe pain score 7-10:
      - Drug:
      - Quantity Prescribed:
### Post-Operative Pain Management Survey

#### Preferred Analgesic Protocol for Obese vs. Non-Obese Patients by Pain Level: Percent of Providers

<table>
<thead>
<tr>
<th>Drug Type</th>
<th>Mild Pain</th>
<th>Moderate Pain</th>
<th>Severe Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Obese</td>
<td>Resident</td>
<td>Attendance</td>
<td>Resident</td>
</tr>
<tr>
<td>Opioid</td>
<td>26.4%</td>
<td>31.1%</td>
<td>73.7%</td>
</tr>
<tr>
<td>Non-Opioid</td>
<td>73.6%</td>
<td>68.9%</td>
<td>27.3%</td>
</tr>
<tr>
<td>p-value</td>
<td>0.002</td>
<td>0.011</td>
<td>≤0.001</td>
</tr>
</tbody>
</table>

#### Preferred Analgesic Protocol by Obesity Status and Pain Level, <=15 vs. >15 Years in Practice: Percent of Providers

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<td>Obese</td>
<td>Resident</td>
<td>Attendance</td>
<td>Resident</td>
</tr>
<tr>
<td>Opioid</td>
<td>28.6%</td>
<td>26.0%</td>
<td>74.5%</td>
</tr>
<tr>
<td>Non-Opioid</td>
<td>71.4%</td>
<td>74.0%</td>
<td>25.6%</td>
</tr>
<tr>
<td>p-value</td>
<td>0.767</td>
<td>0.047</td>
<td>0.3156</td>
</tr>
</tbody>
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#### Preferred Analgesic Protocol by Obesity Status and Pain Level, Residents vs. Attendings: Percent of Providers

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<td>Attendance</td>
<td>Resident</td>
</tr>
<tr>
<td>Opioid</td>
<td>27.5%</td>
<td>26.2%</td>
<td>83.0%</td>
</tr>
<tr>
<td>Non-Opioid</td>
<td>72.5%</td>
<td>73.8%</td>
<td>17.0%</td>
</tr>
<tr>
<td>p-value</td>
<td>0.799</td>
<td>0.002</td>
<td>0.086</td>
</tr>
</tbody>
</table>

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### Summary

- Obesity remains a significant surgical risk
- Many surgeons and anesthesiologists are unaware of this risk, especially for non-bariatric surgery patients
- A comprehensive educational/awareness program can effectively reduce risk
- Ongoing studies needed, especially for ambulatory pain management
Thank You

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