Robotic, Laparoscopic, or Open Hysterectomy - Surgical Outcomes by Approach in Endometrial Cancer

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Thesis Presentation
June 9, 2015
Background

• Endometrial Cancer is the most common GYN malignancy

• Minimally invasive surgery (laparoscopy) compared to traditional laparotomy
  o Equivalent evaluation & treatment of cancer
  o Fewer complications
  o Lower cost
  o Faster recovery

This study was supported by the Maternal and Child Health Bureau, grant #T76MC00011
Background

• Robotic Assisted (RA) Surgery in Gynecology
  - Increasingly available across the US
  - Conflicting evidence regarding benefits

• Studies of RA surgery in Gynecologic Cancer are limited
  • Appropriate comparison group

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Among women with endometrial cancer managed surgically from 2008-2011

- **Aim 1:** Describe trends of surgical approach over time
- **Aim 2:** Determine if length of stay differs by surgical approach
- **Aim 3:** Determine if hospital readmissions differ by surgical approach

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Methods

• Population-based retrospective cohort study

• Study Population
  o Female patients ≥18 years old
  o Endometrial cancer treated surgically
  o Washington State from 2008-2011

• Data Source
  o Comprehensive Hospital Abstract Reporting System (CHARS)
  o Patients identified through ICD9 codes for diagnosis and procedure
    • RA surgery ICD9 code 2008

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Methods

• **Exposure of Surgical Approach**
  - Laparotomy (Standard of Care, referent group)
  - Laparoscopy
  - RA surgery

• **Primary Outcomes**
  - Surgical trends over time
  - Length of Stay (LOS)
  - Readmission Rate (30, 60, 90 days)
    - Linked records for up to 4 total admission

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Analysis

- Descriptive Statistics by Surgical Group
  - Baseline demographics
  - Preoperative comorbidities

- Multivariable Analysis
  - Trends for surgical approach over time - linear regression

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Analysis

• Multivariable Analysis
  o Differences in hospital LOS - linear regression to estimate change in mean number of days with 95% confidence intervals (CI)
  o Difference in frequency of readmissions - logistic regression to estimate odds ratios (95% CI)

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Analysis

• Important Covariates
  o Charlson Comorbidity Index
  o Surgical complexity – Lymph Node Dissection (LND)

• Additionally evaluated covariates
  • Age
  • Obesity
  • Diabetes
  • Year of surgery
  • Tobacco

• All analysis adjusted for year of surgery, CCI, and LND

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Results

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## Results

<table>
<thead>
<tr>
<th></th>
<th>Robotic n=1,003 (%)</th>
<th>Laparoscopic n=284 (%)</th>
<th>Laparotomy n=971 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;45</td>
<td>61 (6.1)</td>
<td>17 (6.0)</td>
<td>49 (5.1)</td>
</tr>
<tr>
<td>45-55</td>
<td>202 (20.1)</td>
<td>71 (25.0)</td>
<td>217 (22.4)</td>
</tr>
<tr>
<td>56-65</td>
<td>365 (36.4)</td>
<td>96 (33.8)</td>
<td>351 (36.2)</td>
</tr>
<tr>
<td>&gt;65</td>
<td>375 (37.4)</td>
<td>100 (35.2)</td>
<td>354 (36.5)</td>
</tr>
<tr>
<td><strong>Obese</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>322 (32.1)</td>
<td>100 (35.2)</td>
<td>280 (28.8)</td>
</tr>
<tr>
<td><strong>BMI 25-29</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>4 (1.9)</td>
<td>2 (4.8)</td>
<td>2 (1.2)</td>
</tr>
<tr>
<td><strong>BMI 30-34.9</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>19 (8.8)</td>
<td>4 (9.5)</td>
<td>7 (4.3)</td>
</tr>
<tr>
<td><strong>BMI 35 – 39.9</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>37 (17.1)</td>
<td>8 (19.0)</td>
<td>15 (9.2)</td>
</tr>
<tr>
<td><strong>BMI ≥40‡</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>156 (72.2)</td>
<td>28 (66.7)</td>
<td>139 (85.3)</td>
</tr>
<tr>
<td><strong>CCI</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-1</td>
<td>917 (91.4)</td>
<td>263 (92.6)</td>
<td>851 (87.6)</td>
</tr>
<tr>
<td>≥2</td>
<td>86 (8.6)</td>
<td>21 (7.4)</td>
<td>120 (12.4)</td>
</tr>
</tbody>
</table>

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Surgical Trends

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Length of Stay

- **Mean LOS**
  - 2.7 days shorter for RA surgery compared to laparotomy (95% CI: 2.5-2.9 days)
  - 2.5 days shorter for LS compared to laparotomy (95% CI: 2.2-2.8 days)
# Readmissions

<table>
<thead>
<tr>
<th>Timing</th>
<th>RA Surgery (N=1003)</th>
<th>LS (N=284)</th>
<th>Laparotomy (N=971)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>OR (95% CI)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Any</td>
<td>81 (8.1)</td>
<td>0.5 (0.3, 0.6)</td>
<td>28 (9.9)</td>
</tr>
<tr>
<td>Timing</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0-30</td>
<td>45 (4.5)</td>
<td>0.4 (0.3, 0.6)</td>
<td>17 (6.0)</td>
</tr>
<tr>
<td>31-60</td>
<td>17 (1.7)</td>
<td>0.4 (0.2, 0.8)</td>
<td>5 (1.8)</td>
</tr>
<tr>
<td>61-90</td>
<td>19 (1.9)</td>
<td>1.0 (0.5, 2.1)</td>
<td>6 (2.1)</td>
</tr>
</tbody>
</table>

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Limitations

• CHARS is based on billing codes
  o Limited or no ascertainment of some covariates
    • Obesity
    • Race
    • Reproductive history
    • Cancer histology or stage
  o Change in the codes over study period
    • Specificity & use of obesity codes
  o Introduction vs regular use of the robotic code procedure code

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Discussion

• Increase utilization of RA surgery in Washington State since introduction of the technology

• Both RA surgery and LS resulted in shorter LOS compared to Laparotomy

• Only RA surgery group had a lower risk of readmissions compared to Laparotomy

• Differences in readmissions were primarily in the 0-30 day range
  o Waning effect of surgical approach after this time frame

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• Renata Urban, MD

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Questions?