Rural-Urban Variation in Surgical Treatment, Lymph Node Examination, and Adequate Lymphadenectomy for Endometrial Cancer Patients

Laurent Brard, MD, PhD 1,2; Katherine S. Hyon, MD 1; Sonya R. Izadi, BA 3; Paula Diaz-Sylvestre, PhD 1,4; Whitney E. Zahnd, MS 5; Graham A. Colditz, MD, DrPH 3

1 Department of Obstetrics and Gynecology, Southern Illinois University School of Medicine, Springfield, IL; 2 Simmons Cancer Institute at SIU, Springfield, IL; 3 Division of Public Health Sciences, Department of Surgery, Washington University School of Medicine, St. Louis, MO; 4 Center for Clinical Research, Southern Illinois University School of Medicine, Springfield, IL; 5 Office of Population Science and Policy, Southern Illinois University School of Medicine, Springfield, IL

Introduction

• Endometrial cancer is the most common gynecologic cancer and is one of a few cancers with a rising mortality rate. 1
• Rural women often lack spatial access to gynecologic oncology services, which may put them at greater risk for endometrial cancer mortality. 2,3
• Surgery, including lymph node examination, is necessary to stage endometrial cancer. Clinical procedures are insufficient to determine disease extent and guide adjuvant therapy.
• There is a paucity of research on rural-urban differences in receipt of surgery, lymph node examination, and adequate lymphadenectomy among endometrial cancer patients.

Methods

Data: We analyzed data on endometrial cancer patients diagnosed between 2004 and 2013 from the Surveillance Epidemiology and End Results (SEER) registries, which represents ~30% of the United States population (n=60,661).

Demographic Variables:
• Rural-urban status, defined by Rural Urban Continuum Codes 4 (categorizes counties as rural or urban based on population size and proximity to urban area)
• Age, race/ethnicity, and marital status of endometrial cancer cases

Clinical Variables:
• Endometrial cancer histology type (Type I, II, or other; Type II is more aggressive)
• Receipt of surgery (Yes/No)
• Examination of regional lymph nodes (Yes/No and # of lymph nodes)
• Receipt of adequate lymphadenectomy- defined as at least 10 lymph nodes examined 5 (Yes/No)

Statistical Analysis:
• Univariate analysis to assess the relationship between rural-urban status and demographic/clinical characteristics, receipt of regional lymph node examination and adequate lymphadenectomy
• Cochrane-Armitage Test for trends in adequate lymphadenectomy
• Unadjusted and adjusted logistic regression to assess rural-urban differences in odds of receipt of surgery, lymph node examination, and adequate lymphadenectomy

Results

Table 1: Demographic Characteristics of Endometrial Cancer Patients

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Rural (n=33,513)</th>
<th>Urban (n=27,158)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-Hispanic White</td>
<td>3,448 (25.4%)</td>
<td>3,709 (28.1%)</td>
<td>0.01</td>
</tr>
<tr>
<td>Non-Hispanic Black</td>
<td>1,319 (9.5%)</td>
<td>1,464 (10.8%)</td>
<td>0.03</td>
</tr>
<tr>
<td>Hispanic</td>
<td>210 (1.5%)</td>
<td>611 (16.1%)</td>
<td>0.001</td>
</tr>
<tr>
<td>Non-Hispanic Asian</td>
<td>211 (1.6%)</td>
<td>4,831 (9%)</td>
<td>0.001</td>
</tr>
<tr>
<td>American Indian</td>
<td>100 (1.5%)</td>
<td>440 (6.9%)</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Table 2: Rural-Urban Differences in Node Examination among Surgical Patients

<table>
<thead>
<tr>
<th>Examination of Lymph Nodes</th>
<th>Rural (n=4,046)</th>
<th>Urban (n=3,574)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes†</td>
<td>2,680 (65.9%)</td>
<td>2,106 (67.1%)</td>
<td>0.001</td>
</tr>
<tr>
<td>None</td>
<td>1,466 (34.1%)</td>
<td>1,468 (32.9%)</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Table 3: Unadjusted and Adjusted Odds of Surgery, Node Examination, and Adequate Lymphadenectomy among Patients

<table>
<thead>
<tr>
<th>All Cancers</th>
<th>Receipt of Surgery</th>
<th>p=0.05 (OR 95% CI)</th>
<th>Adjusted (OR 95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type I</td>
<td>0.90 (0.85-0.95)</td>
<td>0.90 (0.85-0.95)</td>
<td></td>
</tr>
<tr>
<td>Type II</td>
<td>0.90 (0.85-0.95)</td>
<td>0.90 (0.85-0.95)</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Key Findings:
• Regardless of endometrial cancer Type, rural patients were less likely to have any lymph nodes examined.
• A smaller proportion of rural cancer patients had adequate lymphadenectomy.
• While rates of adequate lymphadenectomy increased for both rural and urban women, rates remained higher for urban women.
• Even after adjusting for important factors, rural women were less likely to have surgery, lymph node examination, and adequate lymphadenectomy.

Future research should explore rural disparities in adjuvant therapy and survival.

Acknowledgements

Drs. Brard and Colditz and Ms. Izadi are funded through the Siteman Cancer Center-Southern Illinois University School of Medicine Rural Cancer Disparities Partnership (NIH Grants P20CA192987 and P20CA192966, respectively).

References