Local Therapy for Early Breast Cancer: Trends, Complications, and Patient-centered Outcomes

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Patient Case

- 67 yo woman
- Obese, anxious
- Otherwise healthy

Smith BD, J Clin Oncol 2015
Patient Case

• How to treat this patient?
• Options
  – Lumpectomy alone
  – Lumpectomy + whole breast radiation
  – Lumpectomy + partial breast radiation
  – Mastectomy
  – Mastectomy with reconstruction

Theme of my research

• What is the optimal local therapy for women with early breast cancer?
  – Oncologic outcome
  – Complication profile
  – Cost
  – Burden on patients
Generating evidence to help patients choose between

- Lumpectomy alone
- Lumpectomy + whole breast radiation
- Lumpectomy + partial breast radiation
- Mastectomy
- Mastectomy with reconstruction

Generating evidence to help patients choose between

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- Mastectomy with reconstruction

Benefit of Radiation for DCIS

A. Low-Risk Group (N=539)

<table>
<thead>
<tr>
<th>Years</th>
<th>No Radiation</th>
<th>Radiation</th>
<th>% Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1%</td>
<td>8%</td>
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<td>5</td>
<td>10%</td>
<td>18%</td>
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<tr>
<td>10</td>
<td>12%</td>
<td>20%</td>
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P < 0.001
ARR = 7%

B. High-Risk Group (N=1,570)

<table>
<thead>
<tr>
<th>Years</th>
<th>No Radiation</th>
<th>Radiation</th>
<th>% Event</th>
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<td>4%</td>
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<td>5</td>
<td>5%</td>
<td>10%</td>
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<tr>
<td>10</td>
<td>8%</td>
<td>14%</td>
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</table>

P < 0.001
ARR = 10%

Smith et al, JNCI 98:1302-1310, 2006
Benefit of Radiation for Early Invasive

Invasive: Effect modifiers

Invasive: Effect modifiers

Smith et al, JNCI 98:681, 2006

Albert et al, Cancer August 2012

Albert et al, Cancer August 2012
Generating evidence to help patients choose between

- Lumpectomy alone
- **Lumpectomy + whole breast radiation**
- Lumpectomy + partial breast radiation
- Mastectomy
- Mastectomy with reconstruction
IMRT Adoption by LCD

Cost by LCD

MD Anderson 2010-0559

Eligible patients:
T1-2 N0-1 breast cancer
Receiving WBI plus boost
Age 40 and older
Chemo allowed
High tangents allowed
DCIS allowed

HF-WBI: Treatment with
42.56 Gy / 16 fx whole breast irradiation followed
by a boost (2.5 Gy x 4 or 5 fractions depending on
margin status)

OUTCOME:
% of patients with
patient-reported adverse cosmetic outcome at 3
years.

CF-WBI: Treatment with
50 Gy / 25 fx whole breast irradiation followed by a
boost (2 Gy x 5 or 7 fractions depending on
margin status)

RANDOMIZE
Stratify by:
Bra cup size;
Pre-RT cosmesis;
Chemotherapy;
Margin status
6 Month Patient FACT-B Scores

<table>
<thead>
<tr>
<th></th>
<th>CF-WBI</th>
<th>HF-WBI</th>
<th>p-value</th>
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<tbody>
<tr>
<td>Mean Physical Wellbeing Score</td>
<td>24.9</td>
<td>25.4</td>
<td>0.07</td>
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<tr>
<td>Lack of energy: somewhat or worse</td>
<td>38.8%</td>
<td>23.0%</td>
<td>&lt;0.001</td>
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</table>

Patient Reported "Somewhat" or more fatigue

<table>
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<tr>
<th></th>
<th>Pretreatment</th>
<th>6 Months</th>
<th>p-value</th>
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<tbody>
<tr>
<td>CF-WBI</td>
<td>38.5%</td>
<td>38.8%</td>
<td>p=0.94</td>
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<tr>
<td>HF-WBI</td>
<td>38.4%</td>
<td>23.0%</td>
<td>p&lt;0.001</td>
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</table>

Generating evidence to help patients choose between

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Post-Op Infection

16% vs 10%
OR=1.76, 95% CI 1.64-1.88

Smith et al, JAMA 2012
Non-infectious complication

16% vs 9%
OR=2.03, 95% CI 1.89-2.17

Smith et al, JAMA 2012

Kaplan-Meier Curves

Figure 2. Cumulative Incidence of Subsequent Mastectomy

The difference in risk was significant (p<.001, log-rank). Error bars indicate 95% confidence intervals.

Smith et al, JAMA 2012

Generating evidence to help patients choose between

• Lumpectomy alone
• Lumpectomy + whole breast radiation
• Lumpectomy + partial breast radiation
  • Mastectomy
  • Mastectomy with reconstruction
Mastectomy and Reconstruction

Complications of Reconstruction
How do we help patients choose?

- Lumpectomy alone
- Lumpectomy + whole breast radiation
- Lumpectomy + partial breast radiation
- Mastectomy
- Mastectomy with reconstruction

Objective

1. Characterize trends in local therapy for older women with early breast cancer
2. Determine predictors of choice of local therapy
3. Compare cost of different options
4. Compare complication profile of different options
Cohort

- 55,327 women
  - Age 66 and older
  - T1-2 N0 breast cancer
  - Diagnosed 2000 to 2008
  - Two years of subsequent claims to assess reconstruction

Methods

1. Evaluate time trends using Joinpoint
2. Identify predictors of local therapy choice using polychotomous logistic regression
3. Compare costs within first two years of diagnosis, adjusted for inflation
4. Use diagnosis codes to characterize complications within first two years of diagnosis

Time trends
### Predictive model

<table>
<thead>
<tr>
<th>Patient Factors</th>
<th>Mastectomy Alone</th>
<th>Mastectomy &amp; Reconstruction</th>
<th>Lumpectomy &amp; Brachytherapy</th>
<th>Lumpectomy Alone</th>
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<tbody>
<tr>
<td>Age</td>
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<tr>
<td>66-69</td>
<td>1</td>
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<td>1</td>
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<td>70-74</td>
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<td>1.17</td>
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<td>75-79</td>
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<td>1.36</td>
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<td>80-84</td>
<td>2.43</td>
<td>2.37</td>
<td>2.56</td>
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<tr>
<td>85+</td>
<td>4.40</td>
<td>4.01</td>
<td>4.81</td>
<td>&lt;.0001</td>
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<tr>
<td>Race</td>
<td></td>
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<tr>
<td>White</td>
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<td>1</td>
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<td>1</td>
</tr>
<tr>
<td>Black</td>
<td>1.18</td>
<td>1.09</td>
<td>1.29</td>
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<tr>
<td>Other/Unknown</td>
<td>1.57</td>
<td>1.49</td>
<td>1.72</td>
<td>&lt;.0001</td>
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### Comparative Cost

![Comparative Cost Chart](chart.png)
Cost by month

Longer-term costs

Complication Profile
Conclusions

- Brachytherapy and Mastectomy plus reconstruction are the options increasing at the fastest rate
- They are also the most costly
- They also carry the highest complication burden
- Their value is suspect
Next Steps

- Patient perspective and outcomes important yet missing
- Funding from ASTRO and Survivorship IRG
- Survey 1650 Medicare beneficiaries
- Diagnosed with breast cancer in 2009
- Population-based sample
- We have their claims

Sample equal numbers of patients

- Lump alone
- Lump + external beam radiation
- Lump + brachytherapy
- Mastectomy alone
- Mastectomy plus radiation

Outcomes

- Cosmetic outcome
  - Composite
  - Breast-Q
- EQ-5D
- Impact of Cancer
- Body Image
- Functional status
- Decisional regret
- Endocrine symptoms
Goals

- Compare QoL outcomes across local therapy options
- Determine patient and healthcare system/physician factors that influence QoL outcomes
- Develop web-based predictive calculator for key QoL outcomes by chosen local treatment strategy

Status

1. Launch survey pilot at MD Anderson in March
2. Medicare cohort nearly defined
3. Send out survey in July or August

Future directions

- Could we design a similar study with younger women in Texas?
Thank you Elise!