Interim Toxicity Results From RAPID: A Randomized Trial of Accelerated Partial Breast Irradiation (APBI) Using 3D Conformal External Beam Radiation Therapy (3D-CRT)

TJ Whelan, I Olivotto, S Parpia, T Berrang, DH Kim, I Kong, P Truong, B Cochrane, JA Julian and the RAPID Trial Investigators

For the Ontario Clinical Oncology Group and Trans-Tasman Radiation Oncology Group
Whole Breast Irradiation (WBI)

- Given following breast conserving surgery
- Reduces local recurrence, prevents mastectomy and improves survival
- Despite benefits, it is estimated that up to 30% of women do not receive WBI
- Investigators have evaluated alternative approaches to WBI: Hypofractionation and Accelerated Partial Breast Irradiation
Accelerated Partial Breast Irradiation (APBI)

- Delivery of large dose/fraction to the surgical cavity plus 1-2cm margin
- Smaller treated volume permits radiation to be given in shorter period of time (≤1 week)
- Several techniques have been developed:
  - Multi-catheter interstitial brachytherapy
  - Balloon-based brachytherapy (Mammosite)
  - Intra-operative therapy
  - 3D conformal radiation therapy (3D-CRT)
Accelerated Partial Breast Irradiation (APBI)

- Many of the techniques are labor and resource intensive

- 3D-CRT is attractive:
  - Non invasive
  - Standard CT planning and external beam linear accelerators to shape and deliver the multiple fields required
  - Less costly
Recruited between Feb 2006 and Jul 2011
From centers in Canada, Australia and New Zealand

Results

2135 Patients Randomized

WBI
1065 Patients

3DCRT
APBI
1070 Patients
## Interim Results*

### Adverse Cosmetic Outcome (Fair or Poor) Nurse Assessment at Baseline and 3 Years

<table>
<thead>
<tr>
<th></th>
<th>WBI</th>
<th>APBI</th>
<th>Difference APBI – WBI (95% CI)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Baseline</strong> (n=1995)</td>
<td>17%</td>
<td>19%</td>
<td>2% (-2 – 5%)</td>
<td>0.35</td>
</tr>
<tr>
<td><strong>3 Years</strong> (n=850)</td>
<td>19%</td>
<td>32%</td>
<td>13% (7 – 19%)</td>
<td>&lt; 0.0001</td>
</tr>
</tbody>
</table>

*median follow-up = 2.3 years
Conclusions

- APBI was associated with an adverse cosmetic outcome at 3 and 5 years
- Accompanied by an increase in G1, G2 toxicity. G3 toxicity was very uncommon
- Increase in toxicity may have resulted from:
  - Infrequent use of extra boost irradiation in WBI arm
  - Limited conformality of 3DCRT
  - Short time between fractions
  - Asymmetric nature of partial breast irradiation
- Further research is necessary to determine if there is a group of patients who can be treated with limited toxicity