Long-term Results of RTOG 0236: A Phase II Trial of SBRT in the Treatment of Patients with Medically Inoperable Stage I Non-small Cell Lung Cancer

R. Timmerman¹; C.Hu²; J. Michalski³; W. Straube³; J. Galvin⁴; D. Johnstone⁵; J. Bradley³; R. Barriger⁶; A. Bezjak⁷; G. Videtic⁸; L. Nedzi¹; M. Werner-Wasik⁴; Y. Chen⁹; R. Komaki¹⁰; H. Choy¹

¹University of Texas Southwestern Medical Center, Dallas, TX; ²American College of Radiology, Philadelphia, PA; ³Washington University, St. Louis, MO; ⁴The Jefferson Hospital, Philadelphia, PA; ⁵Medical College of Wisconsin, Milwaukee, WI; ⁶Indiana University, Indianapolis, IN; ⁷Princess Margaret Hospital, Toronto, ON; ⁸Cleveland Clinic, Cleveland, OH; ⁹University of Rochester Medical Center, Rochester, NY; ¹⁰MD Anderson Cancer Ctr., Houston, TX

The Radiation Therapy Oncology Group (now called the NRG) is supported by grants U10CA21661, U10CA180868, U10CA180822, U10 CA37422, U24CA180803 from the National Cancer Institute
Background

- First North American cooperative group trial using Stereotactic Body Radiation Therapy (SBRT).
  - High tech, image guided, focused
- 59 frail patients
- Medical problems preclude surgery, e.g.:
  - Emphysema
  - Heart disease
  - Stroke
- First presented in 2009 (ASTRO) and published in 2010 (JAMA) leading to a significant transition in routine care
Results

Median follow-up 4 years (7.2 years for survivors)

Irradiated Tumors
Well Controlled
Owing to Potent Therapy

Overall Survival Good
but Declining
Partly related to baseline medical problems

 Failure Rate (%)

<table>
<thead>
<tr>
<th>Fail</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>55</td>
</tr>
</tbody>
</table>

60 month
Primary tumor recurrence = 7%

Survival Rate (%)

<table>
<thead>
<tr>
<th>Dead</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>48</td>
<td>55</td>
</tr>
</tbody>
</table>

60 month overall survival = 40%
Median survival is 48 months
Results

• Out-of-field Recurrence
  ▪ 7 patients have a reported regional failure, out to 5+ years post SBRT
    o Only 2 patients in previous report
    o 5 year local-regional recurrence 38%
  ▪ 15 patients (31%) have experienced disseminated failure
    o 11 patient in previous report

• Treatment Associated Toxicity
  ▪ No treatment deaths
  ▪ 17 patients had high grade toxicity
    o Nearly same as initial report, even with long term follow-up
    o Toxicities were mostly pulmonary related
Conclusions

• Primary tumor recurrence (treated area) remained very low at 5 years (7%) owing to the potent SBRT regimen.
  ▪ Primary control similar to surgery

• Local-regional failure increased (38% at 5 years compared to 13% at 3 years), due to late failures (up to 6 years post SBRT) in mostly the involved lobe but also the hilum, and mediastinum (all untreated).
  ▪ ? Need better staging or effective adjuvant therapy

• Severe toxicity remained relatively unchanged with longer follow-up.
  ▪ Progressive “late” toxicity did not occur

• Disease free and overall survival in this medically inoperable population at 5 years was 26% and 40%, respectively.