Improving Value & Elevating the Patient Care Experience

Moderated by: Brian Kavanagh, MD, MPH, FASTRO

Monday, Oct. 19, 2015
10:30 – 11:30 a.m.
Comparison of 3-D Conformal and Intensity Modulated Radiation Therapy Outcomes for Locally Advanced Non-Small Cell Lung Cancer in NRG Oncology/RTOG 0617


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Background

• Locally-advanced lung cancer
  o Concurrent chemoradiotherapy standard of care
  o 3D-CRT technique used historically

• IMRT increasingly used Stage III NSCLC
  o More costly than 2D or 3D-CRT
  o Sculpts radiation to complex tumors
  o Reduce dose to normal tissue

• NRG/RTOG 0617
  o RT technique - 3D-CRT or IMRT at discretion of physician
  o Secondary analysis – 3D-CRT vs. IMRT in NRG/RTOG 0617
Results

Effect of IMRT on Severe Pneumonitis

<table>
<thead>
<tr>
<th>Pneumonitis</th>
<th>3D-CRT</th>
<th>IMRT</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 3+ pneumonitis</td>
<td>8%</td>
<td>3.5%</td>
<td>0.046</td>
</tr>
</tbody>
</table>

- Low dose bath **bigger** with IMRT
  - Lung V5 – 3D-CRT 55% vs. IMRT 62% (P < 0.0001)

- Low dose bath (Lung V5) **not** associated with severe pneumonitis
  - P = 0.14, OR 1.02, 95% CI (0.994, 1.04)
  - Nor any other severe toxicity outcome
## Results

Multivariate analysis of severe pneumonitis

### All Tumors

<table>
<thead>
<tr>
<th>Co-variates</th>
<th>Comparison</th>
<th>OR (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technique</td>
<td>3D-CRT* vs IMRT</td>
<td>0.44 (0.18, 1.04)</td>
<td>0.0621</td>
</tr>
<tr>
<td>Stage</td>
<td>IIIA* vs. IIIB</td>
<td>2.35 (1.05, 5.29)</td>
<td>0.0385</td>
</tr>
<tr>
<td>Lung V20</td>
<td>Continuous</td>
<td>1.081 (1.02, 1.146)</td>
<td>0.009</td>
</tr>
</tbody>
</table>

### PTV > median (460 mL)

<table>
<thead>
<tr>
<th>Co-variates</th>
<th>Comparison</th>
<th>OR (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technique</td>
<td>3D-CRT* vs IMRT</td>
<td>0.22 (0.06, 0.82)</td>
<td>0.02</td>
</tr>
<tr>
<td>Lung V20</td>
<td>Continuous</td>
<td>1.09 (1.00, 1.19)</td>
<td>0.051</td>
</tr>
</tbody>
</table>
Results

IMRT associated with lower heart doses and more consolidative chemotherapy

<table>
<thead>
<tr>
<th>Heart Doses</th>
<th>3D-CRT</th>
<th>IMRT</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>V20</td>
<td>23.5%</td>
<td>19.3%</td>
<td>0.049</td>
</tr>
<tr>
<td>V40</td>
<td>11.4%</td>
<td>6.8%</td>
<td>0.003</td>
</tr>
<tr>
<td>V60</td>
<td>2.4%</td>
<td>1.4%</td>
<td>0.045</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Outcome</th>
<th>3D-CRT</th>
<th>IMRT</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full consolidative chemo</td>
<td>29.1%</td>
<td>37.3%</td>
<td>0.051</td>
</tr>
</tbody>
</table>
Conclusions

• IMRT compared to 3D-CRT
  o IMRT associated with less severe pneumonitis
  o More consolidative chemotherapy associated with IMRT
  o Low dose bath not associated with any severe toxicity (i.e. lung V5)

• Radiation Treatment planning
  o Lung doses – V20 significantly associated with severe pneumonitis (lung V5 and MLD was not)
  o IMRT associated with lower heart doses

• IMRT practice patterns
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57TH ANNUAL MEETING

MEETING DATES: OCTOBER 18-21, 2015
EXHIBIT DATES: OCTOBER 18-20, 2015
HENRY B. GONZÁLEZ CONVENTION CENTER
SAN ANTONIO
Phase III RCT of Postoperative Adjuvant Conventional Radiation (3DCRT) Vs. Image Guided Intensity Modulated Radiotherapy (IG-IMRT) for Reducing Late Bowel Toxicity in Cervical Cancer (PARCER)

S. Chopra¹, R. Engineer², U. M. Mahantshetty², T. Dora¹, S. Kannan¹, R. Phurailatpam¹, S. N. Paul¹, J. Swamidis¹, J. Ghosh¹, S. Gupta¹, T. Shylasree², A. Maheshwari², R. Kerkar², and S. K. Shrivastava²

¹ACTREC, Tata Memorial Centre, Navi Mumbai, India
²Tata Memorial Centre, Parel, Mumbai, India
## Background

### Late GI Toxicity – Standard RT

<table>
<thead>
<tr>
<th>Study</th>
<th>Treatment</th>
<th>Moderate to Severe GI Toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rotman</td>
<td>Sx</td>
<td>6.6%</td>
</tr>
<tr>
<td></td>
<td>Sx + RT (No BT)</td>
<td></td>
</tr>
<tr>
<td>Keys</td>
<td>Sx</td>
<td>8%</td>
</tr>
<tr>
<td></td>
<td>Sx + RT (No BT)</td>
<td></td>
</tr>
<tr>
<td>Peters</td>
<td>Sx + RT</td>
<td>10%</td>
</tr>
<tr>
<td></td>
<td>CT/RT + Adj chemo</td>
<td></td>
</tr>
<tr>
<td>Chen</td>
<td>Sx + RT + BT + Chemo</td>
<td>16.4%</td>
</tr>
</tbody>
</table>

*Increasing toxicity with intensification of treatments that improve patient outcomes*

Hypothesis

- IMRT will significantly reduce grade ≥ II late bowel toxicity in women undergoing postoperative radiation for cervical cancer.

Trial Initiated 2011 NCT Clinical Trials.gov 1279135
CTRI 2012/120349

Planned Accrual=240 pts.
Interim Analysis planned when 50% complete median follow up of 18 months
Results

Screened = 160
Stratified Randomized = 120

3DCRT
58
- Consent Withdrawn = 2
- Evaluable for Toxicity = 56

IG-MRT
62
- Consent Withdrawn = 1
- Evaluable for Toxicity = 61
## Primary Endpoint

### Late GI Toxicity

<table>
<thead>
<tr>
<th></th>
<th>3DCRT</th>
<th>IG-IMRT</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late Grade $\geq$ II toxicity (Primary Endpoint)</td>
<td>25%</td>
<td>11.4%</td>
<td>0.13</td>
</tr>
<tr>
<td>Late Grade $\geq$ III toxicity (Exploratory Endpoint)</td>
<td>17.8%</td>
<td>3.2%</td>
<td>0.02* (NS)</td>
</tr>
</tbody>
</table>

Median Follow Up = 20 months
14% absolute difference; statistically insignificant at interim analysis
Results

Interim Analysis: Primary Endpoint

No Difference with type of Hysterectomy or use of chemo (Planned Strata)

Grade ≥ II Bowel Toxicity

P = 0.23
Results
Interim Analysis: Exploratory End point

Grade ≥ III Bowel Toxicity

Proportion with grade III or higher bowel toxicity

Months since treatment completion

3DCRT

IG-IMRT

P=0.03
Summary

• At Interim Analysis, despite 14% absolute difference IG-IMRT is statistically not superior to 3DCRT for reducing bowel toxicity.

• As stopping rules are not met, the study continues accrual.

• Overall, 167/240 patients have been randomized to-date.

Funding Support
Department of Atomic Energy, India
Department of Science and Technology, India
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HENRY B. GONZÁLEZ CONVENTION CENTER
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TARGETING CANCER CARE
Dexamethasone versus placebo in the prophylaxis of radiation-induced pain flare following palliative radiotherapy for bone metastases: a double-blind randomized, controlled, superiority trial

E. Chow\textsuperscript{1}, R. Meyer\textsuperscript{2}, K. Ding\textsuperscript{3}, A. Nabid\textsuperscript{4}, P. Chabot\textsuperscript{5}, G. Coulombe\textsuperscript{6}, S. Ahmed\textsuperscript{7}, J. Kuk\textsuperscript{8}, A. R. Dar\textsuperscript{9}, A. Mahmud\textsuperscript{10}, A. M. Fairchild\textsuperscript{11}, C. Wilson\textsuperscript{3}, J. S. Wu\textsuperscript{12}, K. Dennis\textsuperscript{13}, M. Brundage\textsuperscript{14}, C. de Angelis\textsuperscript{15}, and R. Wong\textsuperscript{16}

\textsuperscript{1}Sunnybrook Health Sciences Centre-Odette Cancer Centre, Toronto, ON, Canada, \textsuperscript{2}Juravinski Hospital and Cancer Centre and McMaster University, Hamilton, ON, Canada, \textsuperscript{3}NCIC Clinical Trials Group, Cancer Research Institute, Queen’s University, Kingston, ON, Canada, \textsuperscript{4}CHUS, Sherbrooke, QC, Canada, \textsuperscript{5}Maisonneuve-Rosemont Hospital, Montreal, QC, Canada, \textsuperscript{6}Hopital Notre-Dame du CHUM, Montreal, QC, Canada, \textsuperscript{7}CancerCare Manitoba, Winnipeg, MB, Canada, \textsuperscript{8}McMaster University, Hamilton, ON, Canada, \textsuperscript{9}London Regional Cancer Program, London, ON, Canada, \textsuperscript{10}Cancer Centre of Southeastern Ontario, Kingston, ON, Canada, \textsuperscript{11}Cross Cancer Institute, Edmonton, AB, Canada, \textsuperscript{12}University of Calgary, Calgary, AB, Canada, \textsuperscript{13}The Ottawa Cancer Centre, Ottawa, ON, Canada, \textsuperscript{14}Queen’s University, Kingston, ON, Canada, \textsuperscript{15}Sunnybrook Odette Cancer Centre, University of Toronto, Toronto, ON, Canada, \textsuperscript{16}Princess Margaret Hospital, Toronto, ON, Canada
Background

• Bone Metastases
  o Once cancer spreads to the bone, patients can experience debilitating bone pain and complications such as fractures
    ▪ Bone metastases can be very common – for example, up to 80% of patients with lung cancer will be affected

• Palliative Radiotherapy
  o Can be delivered in the form of 1 treatment to bone metastases to help decrease pain, prevent fracture, maintain skeletal integrity and improve patient function
  o Up to 80% of patients benefit from palliative radiotherapy (RT) for bone metastases
  o According to the US National Cancer Database, between 2005 and 2011, 24 992 patients with breast, prostate or lung cancer were treated with RT for bone metastases
Background

• Pain Flare
  o “A transient worsening in pain at the site of the treated bone metastasis due to RT which returns to baseline within 10 days”
    ▪ Occurs in 10-45%
    ▪ Results in: ↓ quality of life, ↑ need for pain medication, aversion to future RT
    ▪ Likely caused by ↑ inflammatory mediators

• Dexamethasone
  o Powerful anti-inflammatory medication with analgesic properties
  o Can be taken orally
  o Inexpensive
  o Previous data suggest preventative dexamethasone can reduce the likelihood of pain flare from 35% to 15%
## Method

### Double-Blind Study

<table>
<thead>
<tr>
<th>Randomize</th>
<th>1-2 Bone Mets</th>
<th>Arm 1</th>
<th>Dex</th>
<th>Day 0 Dose #1 + RT 8Gy / 1</th>
<th>Days 1-4 Doses #2-5 + Follow-up</th>
<th>Days 5-10 Follow-up</th>
<th>Day 42 Follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arm 2</td>
<td>Placebo</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Data collected: Patients reported worst pain, use of pain medication, quality of life, and side effects at baseline and through follow-up period.

Patients / Centers: 298 / 23
Results

Best Response

<table>
<thead>
<tr>
<th></th>
<th>Dex (N=148)</th>
<th>Placebo (N=150)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients with pain flare, D0-10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Complete data in patient diary</td>
<td>17.6%</td>
<td>29.3%</td>
<td>P=0.01</td>
</tr>
<tr>
<td>Median increase in pain score</td>
<td>+2.5/10 for median of 1.5d</td>
<td>+4/10 for median of 3d</td>
<td></td>
</tr>
<tr>
<td>during flare, D6-10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean change in score, D0-10</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Functional interference</td>
<td>-10.5</td>
<td>-3.8</td>
<td>P=0.02</td>
</tr>
<tr>
<td>• Nausea</td>
<td>-0.6</td>
<td>+8.0</td>
<td>P=0.04</td>
</tr>
<tr>
<td>• Appetite</td>
<td>+7.2</td>
<td>-0.6</td>
<td>P=0.02</td>
</tr>
</tbody>
</table>

When patients received a 5-day course of dexamethasone starting on the day of their single RT treatment, pain flare was less frequent and pain experienced was less severe.
Conclusions

• Pain flare should no longer be seen as a barrier to receiving a highly effective therapy for bone pain
• Inexpensive pill can help avoid debilitating pain due to treatment
• Well-tolerated and improved patients’ quality of life
• Should now be recommended as standard of care for all patients receiving RT for bone metastases

We would like to acknowledge funding from the Canadian Cancer Society Research Institute, as well as all of the participating clinicians and patients.
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MEETING DATES: OCTOBER 18-21, 2015
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HENRY B. GONZÁLEZ CONVENTION CENTER
SAN ANTONIO
Advanced Practice Nurse Follow up Clinic Reduces Emergency Room Visits and Admissions in High Risk Patients After (Chemo)Radiotherapy for Head and Neck Cancer

B. Harr¹, J. Hamker¹, N. P. Joshi², M. C. Ward², J. Bodmann¹, D. Ives¹, M. Rahe¹, T. Nwizu¹, D. J. Adelstein¹, J. F. Greskovich Jr³, and S. Koyfman²

¹Cleveland Clinic, Cleveland, OH, ²Cleveland Clinic Foundation, Cleveland, OH, ³Cleveland Clinic Florida, Weston, FL
Purpose

- Advanced nurse practitioner (APN) clinic initiated in 2014
  - Symptom management in the 90 days immediately post-(chemo) radiation
- Compare follow up practices of two head and neck cancer patient groups
  - Standard follow up (SFG)
    - 24 patients
    - Seen 4-6 weeks post-RT then at 3 month restaging
  - APN clinic
    - 25 patients
    - Seen 2 weeks post-RT then every 2 weeks until symptoms stabilize
Methods

• High risk if one or more of the following:
  o Limited social support (9 SFG, 6 APNCG)
  o Nursing home resident (2, 6)
  o Required multiple hydrations (2, 5)
  o Stereotactic body RT (SBRT) (4, 3)
  o Presence of feeding tube (13, 7)

• Adverse Events defined as emergency room visit and/or hospital admission within 90 days of completion of radiation
Results

• Patients in the APNCG were seen twice as often as those in the SFG (2.0 vs. 1.2 visits)
• 18 patients experienced 26 adverse events
  - 12 patients (50%) in the SFG
  - 6 patients (24%) in the APNCG (p=0.059).
• Difference confined to the patients treated with RT alone
  - 60% of patients in the SFG had an adverse event
  - 16.7% in the APNCG (p=0.010).
• No difference found in the patients treated with CRT
  - Potentially due to intensive post-RT FU also provided by medical oncology (p=0.816).
Conclusion

• APN follow up clinic allowed for more frequent outpatient visits and more intensive symptom management.
  ○ Correlated with reduction of ED visits and hospital admissions experienced in the first 3 months post-radiation.

• This practice model can help improve healthcare value for these patients.
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SAN ANTONIO

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TARGETING CANCER CARE
Outcomes of a Re-engineered Palliative Care and Radiation Therapy Care Model

P.W. Read¹, L. J. Blackhall², G. J. Stukenborg³, J. Harrison³, J. Barclay², P. M. Dillon², D. D. Wilson¹, T. N. Showalter¹, L. L. Handsfield¹, Q. Chen¹, and J. M. Larner¹

¹University of Virginia, Department of Radiation Oncology, Charlottesville, VA, ²University of Virginia, Department of Internal Medicine, Charlottesville, VA, ³University of Virginia, Department of Public Health Sciences, Charlottesville, VA
Background
Methods

Rapid UVA Clinical Program Implementation Timeline

<table>
<thead>
<tr>
<th>Q01</th>
<th>Q02</th>
<th>Q03</th>
<th>Q04</th>
<th>Q05</th>
<th>Q06</th>
<th>Q07</th>
<th>Q08</th>
<th>Q09</th>
<th>Q10</th>
<th>Q11</th>
<th>Q12</th>
</tr>
</thead>
<tbody>
<tr>
<td>STATRT</td>
<td>STAT RAD</td>
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<tr>
<td>CARE Tracks with Supportive Care Tumor Board (phase 1)</td>
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<td>MyCourse PRO in EPIC (phase 2)</td>
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<tr>
<td>MyCourse alerts (phase 3)</td>
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</tbody>
</table>
Methods

STAT RAD: SCAN Plan QA TREAT 3 Hour Procedure

- Rapid same day workflow
- Single visit and treatment of highly conformal radiation
- ~ 3 hours start to finish
## Results

### Program Health Metric Outcomes

<table>
<thead>
<tr>
<th>Health Metric or Cost</th>
<th>CARE Track Deceased (n=368)</th>
<th>Control Group Deceased (n=198)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hospitalization final 90 days of life</td>
<td>48.3%</td>
<td>64.0%</td>
<td>0.0004</td>
</tr>
<tr>
<td>Hospitalization final 30 days of life</td>
<td>31.5%</td>
<td>61.5%</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Died in a hospital</td>
<td>8.4%</td>
<td>38.5%</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Hospice care provided</td>
<td>69.6%</td>
<td>47.0%</td>
<td>&lt; 0.0001</td>
</tr>
<tr>
<td>Hospice median stay (days)</td>
<td>22 days</td>
<td>13 days</td>
<td>0.0004</td>
</tr>
<tr>
<td>Mean Inpatient costs final 90 days of life</td>
<td>$12,976</td>
<td>$20,398</td>
<td>0.0065</td>
</tr>
<tr>
<td>Mean Total costs final 90 days of life</td>
<td>$20,771</td>
<td>$28,088</td>
<td>0.0128</td>
</tr>
</tbody>
</table>

### Graphs

- **Percent Admitted to Hospital Last 90 Days of Life**
  - Control (n=200): 64.0%
  - Care Track (n=368): 48.4%
  - p-value: 0.0004

- **Percent Died in the Hospital**
  - Control (n=200): 38.5%
  - Care Track (n=368): 8.4%
  - p-value: < 0.0001

- **Percent Referred to Hospice**
  - Control (n=200): 47.0%
  - Care Track (n=368): 69.6%
  - p-value: < 0.0001
Conclusion

![Graph showing Total Health Care Costs Prior to Death]

Disclosure

The project described was supported by Grant Number 1C1CMS331031 from the Department of Health and Human Services, Centers for Medicare & Medicaid Services.

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The research presented was conducted by the awardee. Results and conclusions may or may not be consistent with or confirmed by the project’s independent evaluation contractor.
Q & A
Questions?

Contact ASTRO’s Press Office in San Antonio, Oct. 18-21
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703.772.2510
press@astro.org

Slides, photos, and a link to the recording will be available following the briefing in ASTRO’s online press room:
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