Session Name: SABR Session

Presentation Title: The Role of Stereotactic Body Radiotherapy (SBRT) in the Treatment of Oligometastatic Prostate Cancer (PCa)

Presenter Name: Nola Bailey
In accordance with the policy of The Royal Australian and New Zealand College of Radiologists, the Australian Institute of Radiography and the Australasian College of Physical Scientists and Engineers in Medicine the following presenter has indicated that they have a relationship which in the context of their presentation, could be perceived as a real or apparent conflict of interest but do not consider that it will influence their presentation. The nature of the conflict is listed:

- No Conflicts
Session Name:

- The presenter has advised that the following presentation will NOT include discussion on any commercial products or service and that there are NO financial interests or relationships with any of the Commercial Supporters of the 2014 Combined Scientific Meeting.
The Role of Stereotactic Body Radiotherapy (SBRT) in the Treatment of Oligometastatic Prostate Cancer (PCa)

-Initial Experiences at Epworth Radiation Oncology

Nola Bailey
Stereotactic Section Head, ERO
CSM: 7 September 2014
Overview

• Prostate cancer - incidence

• Oligometastases - definition

• ERO experience

• Preliminary Results
Prostate Cancer (PCa)

- Every year 18,700 Australian men are diagnosed with PCa
- > 3,000 die of the disease per year
- Second largest cause of male cancer deaths in Australia

- Today men are living longer
- Younger men (40s and 50s) are being diagnosed with PCa

- “Most men die with, not of, prostate cancer”
PCa Diagnosis

- 2008 - Approx 120,000 Australian men living with PCa
- 2017 - Predicted 267,000 Australian men will be living with PCa

Quality of life

Androgen Deprivation Therapy (ADT)

Standard first line Rx for men with metastatic PCa

• Aims to reduce the level of male hormones
• Controls disease for a median duration of 18 months

• Side effects of ADT may reduce QOL
  Include:
  Loss of sexual desire, Impotence
  Hot flushes, Depression
  Osteoporosis, Bone fractures
  Loss of muscle mass and physical strength
  Weight gain, Mood swings, Fatigue

Use of SBRT may defer commencement of ADT
‘Oligometastases’

• An intermediate metastatic state where the number and site of metastatic tumours are limited (1 – 5 lesions)<sup>2</sup>

• In some patients with a limited number of clinically detectable metastatic tumours, the extent of disease exists in a transitional state between localized and widespread systemic disease

• An emerging paradigm in cancer therapy is that the oligometastatic state may be more responsive to therapy delivered with a curative intent

Stereotactic Body Radiotherapy (SBRT)

Advantages of SBRT over Conventional EBRT

- Highly conformal treatment fields
- More sparing of normal anatomy
- Tighter GTV-PTV margins
- More effective radiobiological dose
- Shorter treatment course
- Less toxicity
- Better local control
Oligometastatic PCa at ERO

- SBRT to slow disease progression
- Most common sites PCa metastases:
  - Bone
  - Pelvic and abdominal lymph nodes

Goal - Local Control (LC)
- Duration of freedom from ADT
- Toxicity
- PSA response
SBRT Immobilization & Treatment Planning

Abdomen/ Pelvic region

- Immobilization- half body vacfix
- Axial Planning CT - 1mm slice thickness
- Fusion of Multiple Image sets (MRI, PET, diagnostic CT scans)
Margins & Planning Techniques

**Bony sites** (with the exception of vertebra & ribs)

GTV = CTV, PTV = CTV + 3mm uniform expansion

Average PTV=4.6ccm

Planned using Dynamic Conformal Arc technique
Margins & Planning Techniques

**Nodes:** PTV = ITV + 5mm uniform expansion

Average PTV = 11.5ccm

Planned using Dynamic Conformal Arc technique
Margins & Planning Techniques

Multiple Nodal Sites
Vertebral Metastases

SI Boost = CTV + 1mm uniform expansion
GTV Vertebra as per consensus guidelines

PTV Vert = GTV Vert + 1mm uniform expansion

Planned using IMRT (generally 7 beams)

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3 International Spine Radiosurgery Consortium Consensus Guidelines for Target Volume definition in Spinal Stereotactic Radiosurgery, Cox et al
Planning Brainlab iPlan RT Dose 4.5.3

Dose prescriptions

- 16-20Gy SRS
- 35Gy in 5#
- 50Gy in 10#

Plan Evaluation

DVH PTV and OAR, Conformity Index, Integral dose

Treatment: Novalis Tx

- HD 120 micro-MLC (2.5mm)
- 1000 MU/min
- Robotic couch with 6 DoF

http://radonc.ucla.edu/body.cfm?id=76
IGRT

Precise tumour localization:

• Bony sites - ExacTrac kV imaging
• Nodal sites - Combination of ExacTrac kV & Cone Beam CT
• All positioning utilises 6 degrees of freedom

Set Up Tolerances:

• Initial set up - zero action threshold
• Subsequent Intrafraction imaging: 1mm translations 0.7 degree rotations
# ERO Initial Experience

56 patients treated between May 2013 to July 2014

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<thead>
<tr>
<th>Treatment for Primary Tumour</th>
<th>Number of patients</th>
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<tbody>
<tr>
<td>Radical Prostatectomy only</td>
<td>22 (39%)</td>
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<tr>
<td>Prostate Bed Radiotherapy</td>
<td>25 (45%)</td>
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<tr>
<td>Prostate Radiotherapy</td>
<td>9 (16%)</td>
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<table>
<thead>
<tr>
<th>Oligometastases Symptomatic</th>
<th>Number of patients</th>
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<tbody>
<tr>
<td>No</td>
<td>53 (95%)</td>
</tr>
<tr>
<td>Yes</td>
<td>3 (5%)</td>
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## ERO Initial Experience

<table>
<thead>
<tr>
<th>Number of Sites</th>
<th>Number of Patients</th>
<th>Total number of sites</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>24 (43%)</td>
<td>24</td>
</tr>
<tr>
<td>2</td>
<td>19 (34%)</td>
<td>38</td>
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<tr>
<td>3 or more</td>
<td>13 (23%)</td>
<td>61</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>56</strong></td>
<td><strong>123</strong></td>
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<table>
<thead>
<tr>
<th>Lesion Type</th>
<th>Number of Patients</th>
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</thead>
<tbody>
<tr>
<td>Bony only</td>
<td>30 (54%)</td>
</tr>
<tr>
<td>Nodal only</td>
<td>17 (30%)</td>
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<tr>
<td>Both bony &amp; nodal</td>
<td>9 (16%)</td>
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Preliminary Results
Median follow up 4.5 months

Local Control
• Defined as a lack of tumour progression within the PTV.
• Early results from ERO show no in-field recurrences (100%)

ADT Status
• 8 patients had commenced ADT prior to SBRT
• Of the 48 ADT naïve patients, 33 currently remain ADT free
Preliminary Results
Median follow up 4.5 months

Toxicity
• 22% reported Grade 1 skin or GIT toxicity.
• Remainder reported no toxicity or transient fatigue only
• No Late toxicity reported

PSA
• The majority of patients showed a drop in PSA levels
• Median Pre SBRT 9.11
• Median Post SBRT 8.3
Conclusion

• SBRT shows promising results for oligometastatic PCa
• Excellent local control with Minimal toxicity
• Likely to delay systemic treatment such as ADT in many patients

Larger prospective studies are needed to assess:
• Longer term control
• Possible survival advantages
• To identify subgroups of patients most likely to benefit from this approach
References


4. H. Badakhshi · A. Grün Oligometastases: the new paradigm and options for radiotherapy Strahlenther Onkol 2013

5. Reeves F, Bowden P Treatment paradigm shifts in oligometastatic prostate cancer


8. Milano M, Katz A et al A Prospective Pilot Study of Curative-intent Stereotactic Body Radiation Therapy in Patients With 5 or Fewer Oligometastatic Lesions CANCER February 1, 2008 / Volume 112 / Number 3