Implementation of Gynaecological IMRT Planning Technique – Clinical Guidelines and Constraints

Chloe Pandeli
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- None
Session Name:
Proffered papers - Gastrointestinal / Gynaecological

- 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.
Background

- Endometrial cancer
  - 6th most common malignancy in women
  - Most diagnosed at an early stage
  - Most patients aged over 60 years
Patient Eligibility

• Diagnosis of Endometrial cancer
• Post-operative RT recommended
• No gross residual disease
• No extensive serosal involvement of uterus, tubes or ovaries
• Patient able to comply with bladder and bowel preparation instructions
Benefits of IMRT

• Several advantages of IMRT compared to conventional radiotherapy
  - Less dose to OARs

• Clinical targets
  - Pelvic lymph nodes and vaginal vault

• OARs
  - Bladder
  - Rectum
  - Small bowel
  - Femoral head and neck
Why implement IMRT?

• Experienced staff
• Available technology
  - Planning
  - Treatment
Implementation of IMRT for endometrial cancer at Epworth

- Staff selected for implementation - RO, RTs, Physics, Nursing

- Meetings with RO

- Protocols for planning and treatment - Based on RTOG 0418

- Staff training

- Development of templates in eclipse
Patient care path

• Initial appointment
  - RO consultation
  - RT discussion re bladder and bowel preparation

• Simulation appointment
  • Patient positioned supine with personalised vacfix

  • 2 CT scans with vaginal contrast
    - Empty bladder
    - Full bladder
Contouring

• Guidelines based on RTOG 0418 protocol

• Target volumes
  - Nodal CTV & PTV
  - Vaginal ITV & PTV

• OARs

• RT
  - Contours to assist with optimisation
Planning

- 50.4 Gy in 28 Fx
- 7 field IMRT technique (eclipse planning system)
- 10MV photons
- Dose constraints based on RTOG 0418 trial
- Developed in-house templates and guidelines
# IMRT vs. 4 field Conventional

<table>
<thead>
<tr>
<th></th>
<th>Patient 1</th>
<th>Patient 2</th>
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<tbody>
<tr>
<td></td>
<td>4 field</td>
<td>IMRT</td>
</tr>
<tr>
<td>Small bowel (V40Gy ≤ 30%)</td>
<td>41.7%</td>
<td>22.03%</td>
</tr>
<tr>
<td>Rectum (V30Gy ≤ 60%)</td>
<td>79.2%</td>
<td>60.9%</td>
</tr>
<tr>
<td>Bladder (V45Gy ≤ 35%)</td>
<td>98.6%</td>
<td>45%</td>
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<tr>
<td>Femur R (V30Gy ≤ 15%)</td>
<td>36.0%</td>
<td>6.44%</td>
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<tr>
<td>Femur L (V30Gy ≤ 15%)</td>
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<td>4.99%</td>
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<table>
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<th>IMRT</th>
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<tbody>
<tr>
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<td>13.0%</td>
<td>3.3%</td>
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<tr>
<td>Rectum (V30Gy ≤ 60%)</td>
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<td>Femur R (V30Gy ≤ 15%)</td>
<td>60.0%</td>
<td>6.2%</td>
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<tr>
<td>Femur L (V30Gy ≤ 15%)</td>
<td>60.0%</td>
<td>7.5%</td>
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</table>
IMRT vs. 4 field
Compromise

• Difficulty maintaining bladder filling towards the end of treatment
• 2-5 fold increase in monitor units per treatment
Workload Implications

• Increased time
  - Simulation
  - Contouring
  - Planning
  - Physics QA
  - Treatment
Conclusion

- IMRT for endometrial cancer has been successfully implemented
- Protocols and guidelines successfully adapted
- Treatment well tolerated by patients
- OARs receive lower doses than conventional RT
- The expectation is that with longer follow up, our patients will record reduced late side effects

- Preliminary outcomes
  - low toxicity rates and excellent pelvic control
- Future considerations
  - Use of fiducial markers
  - Dose escalation
Acknowledgements

Dr. Bronwyn King
ERO
References


2) http://www.pathologyoutlines.com/topic/uterusstaging.html


4) http://radonc.ucsd.edu/patient-info/treatment-options/cancer-types/gynecologic-cancers/Pages/imrt.aspx