Localised Prostate Cancer

- Current therapies
  - Surveillance
  - Surgery – radical prostatectomy
  - Radiotherapy (XRT)
    - External beam (3D conformal/IMRT)
    - Brachytherapy *(seed treatment)*
Radical external beam XRT

- UK doses now standard - 37 fractions in 7½ weeks
- Attempts now being made to increase dose by using new techniques
- May allow increased dose without extending overall treatment time

3-dimensional conformal therapy (3D-CRT)
Intensity Modulated RT (IMRT)

Image Guided RT (IGRT)
External beam RT

• Toxicity of RT
  – ACUTE (during/just after)
    • Urinary frequency, dysuria (painful urination), proctitis (rectal pain, bleeding), diarrhoea, fatigue affect majority of patients
  – LATE (months/years)
    • 1-2% risk of severe bowel/urinary toxicities (e.g. obstruction)
    • risk of impotence 40-60%

LDR Brachytherapy
Localised Prostate Cancer

• ‘Experimental’ Radiotherapy options
  • Protons
  • SBRT
  • HDR brachytherapy

HDR Brachytherapy
Protons

• Protons are charged nuclear particles which can only be produced in special generators (cost >£100 million!)
• Beams able to deliver high doses of radiation at specific depth in body
• Theoretical advantages for use in prostate cancer probably outweighed by massive costs
Stereotactic Body Radiotherapy (SBRT/SABR)

- Enables **high dose** of radiotherapy to be delivered to tumours in a **small number** of treatments, whilst **sparing the surrounding healthy tissue**.
- May be applicable to prostate cancer, but very limited data - lots of future interest/trials likely
- May allow very high doses of radiation to be given to prostate in just 3-5 treatments (not 37!)
- Some centres in USA treating prostate patients
The MRC PR07 trial: A UK clinical radiotherapy research success story

Disease Specific Survival

HR=0.57 (95% C.I. 0.37-0.78) p=0.001

140 Deaths from Prostate Cancer
89 ADT alone, 51 RT+ADT

# at Risk

Time (Years)

Percentage

7 yr DSS 99%

7 yr DSS 79%

7 yr DSS 99%

7 yr DSS 79%
### Late Toxicity

<table>
<thead>
<tr>
<th></th>
<th>Grade ≤ 2</th>
<th>Grade ≥ 3</th>
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<tbody>
<tr>
<td><strong>Gastrointestinal</strong></td>
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<tr>
<td><strong>Diarrhoea</strong></td>
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<tr>
<td>ADT Alone</td>
<td>8%</td>
<td>0.7%</td>
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<tr>
<td>ADT +RT</td>
<td>14%</td>
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<tr>
<td><strong>Rectal Bleeding</strong></td>
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<td>ADT Alone</td>
<td>5%</td>
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<tr>
<td>ADT +RT</td>
<td>12%</td>
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<td><strong>Genitourinary</strong></td>
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<td>ADT Alone</td>
<td>42%</td>
<td>2.3%</td>
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<tr>
<td>ADT +RT</td>
<td>44%</td>
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### Metastatic Prostate Cancer - Palliative Radiotherapy

- Aim to shrink tumours and control symptoms NOT eradicate cancer
- Especially useful for bone pain
- Single fractions to affected areas commonly used, occasionally 5
- Minimal side-effects or inconvenience
- Up to 70% success at relieving symptoms