Cancer Research: Improving Radiotherapy Outcomes for Patients

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Leeds Teaching Hospitals NHS Trust
• What is radiotherapy and how does it work?

• Advances in Radiotherapy Technology

• Improving treatment through research
Any sufficiently advanced technology is indistinguishable from magic.

Arthur C Clarke
How Radiotherapy Works
How is cancer cured?

Radiotherapy: 40%
Surgery: 49%
Chemotherapy: 11%

Professor Sir Mike Richards, NCRI 2011
From Cookridge......

1896- 2007

Leeds Cancer Centre

- Highly specialised teams
- One of the largest cancer centres in Europe
- High specification radiotherapy equipment
- Short radiotherapy waiting times
- Radiotherapy research culture

2008-
• Opened Jan 2007
• 7000 patients per year
• 88,500 fractions
• 35 Consultant Clinical Oncologists
• 101 radiographer
• 20 varying admin
• 30 technologists
• 25 physicists
• 22 engineering staff
• 10 Linacs and 2 research linacs.
• What is radiotherapy and how does it work?

• Advances in Radiotherapy Technology
Advances in Radiotherapy

Eccleshill man is first in world to try new cancer treatment
By Claire Lomax, Health Reporter
8:00am Wednesday 3rd October 2012 in News

Richard Berry (left) with (from left) radiographers Alan Needham and Mark Holmes and medical physicist Sally Derbyshire with the radiotherapy treatment machine.
Stereotactic ABlative Radiotherapy

- Highly targeted
- High ablative doses
- Small number of treatments

- Early stage lung cancer
  - Surgery standard of care
  - Unfit for surgery
    - Long course radiotherapy 30-40%
    - Palliative radiotherapy
    - Best supportive care

- Now SABR >90%

Local Control

3D 4D CT planning
SABRTooth Trial

Kevin Franks
Clinical Oncology
HCAP
Extending the benefit - SABR

Re-irradiation of pelvis

Oligometastases

Re-irradiation of spine

Hepatocellular carcinoma
• What is radiotherapy and how does it work?

• Advances in Radiotherapy Technology

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UK Recruitment to Cancer Studies

Number of participants recruited/year

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<th>Year</th>
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<th>Number of participants recruited to intervention studies</th>
<th>Number of participants recruited to observation studies</th>
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n=number of studies open/year

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Slides from Professor Matt Seymour
Patient View
Hormone treatment (3-6 months)

T1b-T3a N0 M0
Estimated risk of SV involvement ≤ 30%
PSA ≤ 30ng/ml

Randomise

- 74Gy / 37f (standard)
- 60Gy / 20f (hypofractionated)
- 57Gy / 19f (hypofractionated)

Slide from Emma Hall and David Dearnaley
Efficacy

5yr PFS

- 95% CI
  - 83.4-88.0
  - 85.9%
  - 2.0%

Late toxicity

- Grade 2 + late bowel toxicity
  - 1.3%
  - 2.3%
  - 2.0%

- Grade 2+ bladder late toxicity
  - No difference

Hard-and-fast prostate radiotherapy 'a win-win for NHS'
Radiotherapy Research Group
Anal Cancer Research

- Leading practice changing clinical studies in anal cancer
- Improving the radiotherapy for patients
- Understanding the long term effects of treatment
- Funded to perform future clinical studies
Assessment of long term side effects - Anal cancer

Alex Gilbert
NIHR funded PhD Student

OPTIMAL: Optimising Individual Treatment Regimes and Patient Outcomes through the use of Patient Reported Toxicity Assessments in Patients treated with Pelvic Radiotherapy
Anal Cancer – Change to IMRT
PLATO - Future anal cancer studies

• Standard treatment that we can now improve

• Smallest tumours may not need radiotherapy

• Medium sized tumours may benefit from a reduced dose

• Larger tumours may benefit from a higher dose
Need to improve radiotherapy with MRI

£1.5m

£8m
Conclusions –

• Continued improvements in radiotherapy

• New era of “ablative” treatments

• MRI guided radiotherapy next
Acknowledgements

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