The Clatterbridge Cancer Centre NHS
NHS Foundation Trust

Summary of HDR brachytherapy for the Pivotal Boost trial

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Introduction

- A phase III randomised controlled trial of prostate and pelvis versus prostate alone radiotherapy with or without prostate boost
- Target disease
  - Histologically confirmed adenocarcinoma of the prostate
  - Localised high risk or locally advanced disease
  - Intermediate risk disease

Introduction

- Study objectives
  - To evaluate the benefits of;
  - Pelvis lymph node radiotherapy
  - HDR brachytherapy in patients with no boost volume
  - Focal boost IMRT or focal HDR boost in patients with a boost volume on staging MRI

Introduction

- Trial population and treatment
  - Patients receiving radical radiotherapy for localised, node negative prostate cancer.
  - Patients will be allocated to one of four treatment arms;
    - A: prostate alone IMRT
    - B: prostate and pelvic IMRT
    - C: prostate IMRT and prostate boost
    - D: prostate and pelvic IMRT and prostate boost

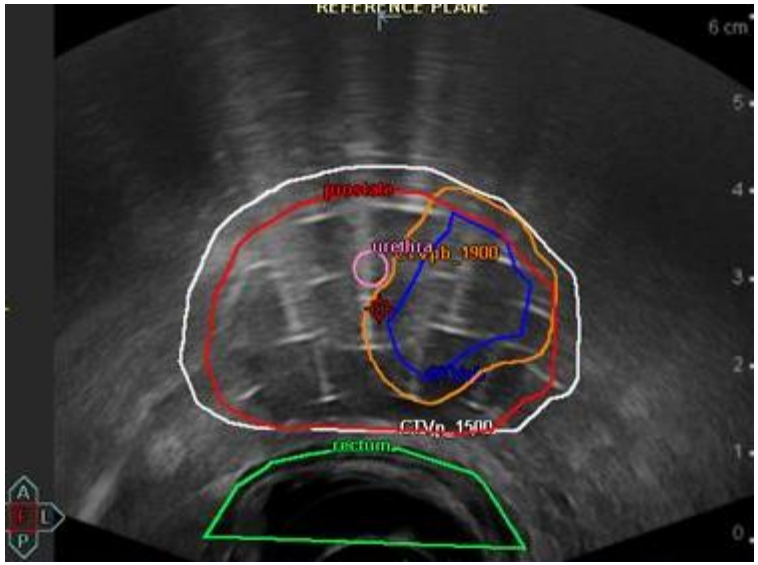
Introduction

- The boost can be delivered as;
  - Whole gland high dose rate brachytherapy (HDRB)
  - Focal boost high dose rate brachytherapy
  - IMRT
- Randomisation into arms C and D depend on the boost volume identified by MRI and patient suitability in the case of HDRB.

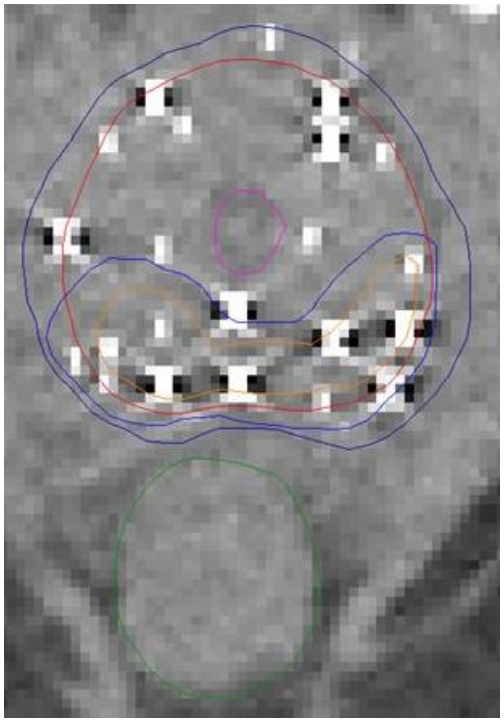
Planning

- High dose rate brachytherapy delivered as 15 Gy to the whole gland in 1 fraction
- In conjunction with 37.5 Gy in 15 fractions IMRT
- Patients suitable for HDR focal boost can have up to 50% of the gland boosted to up to 19 Gy.
- The boost volume can be delineated to two ways;
    - Boost volume planning where a boost CTV is contoured
    - Boost sector planning, only available to Oncentra Prostate users, divides the prostate into 12 sectors.

Boost volume planning

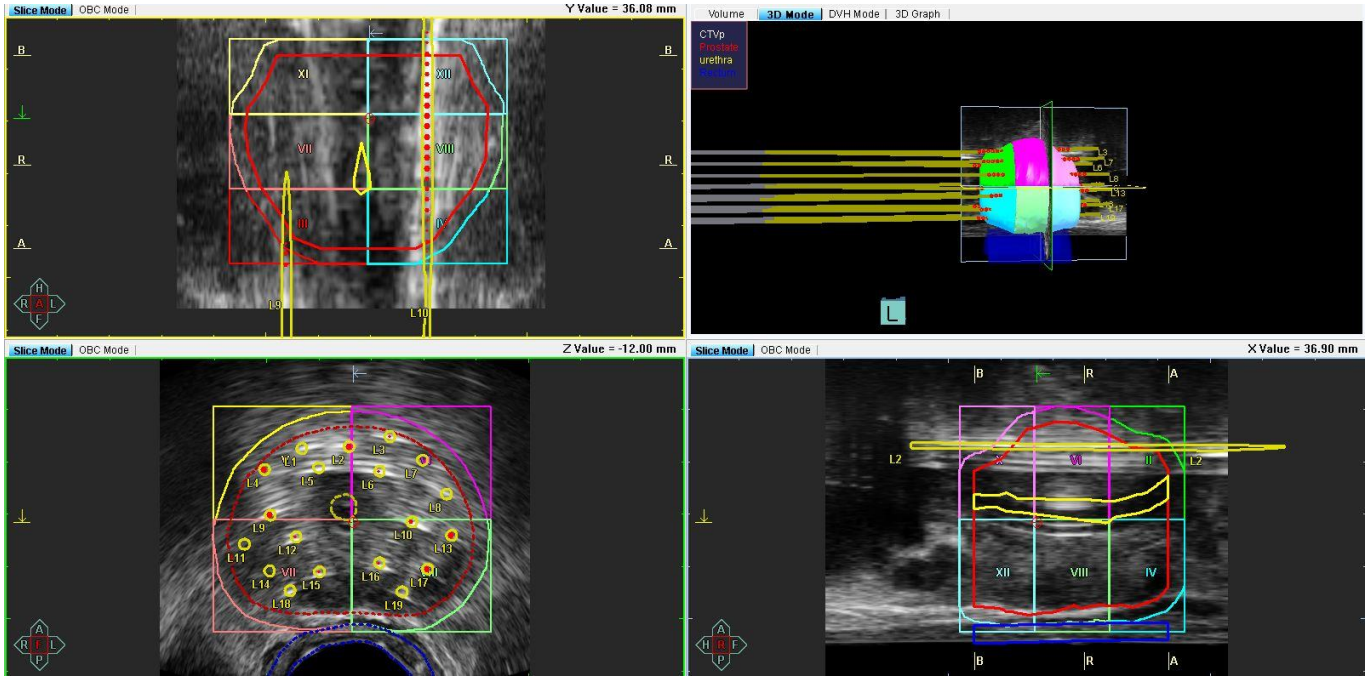


US based planning

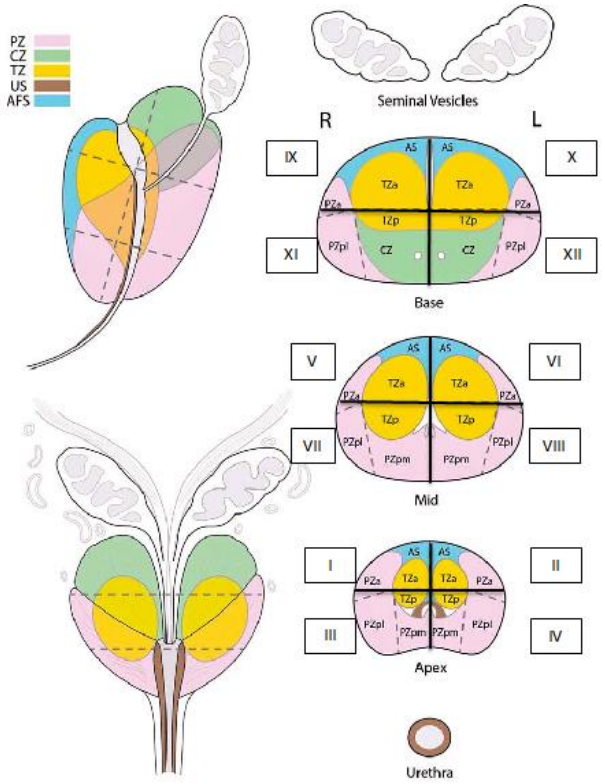


CT based planning

Boost sector planning



Boost sector planning

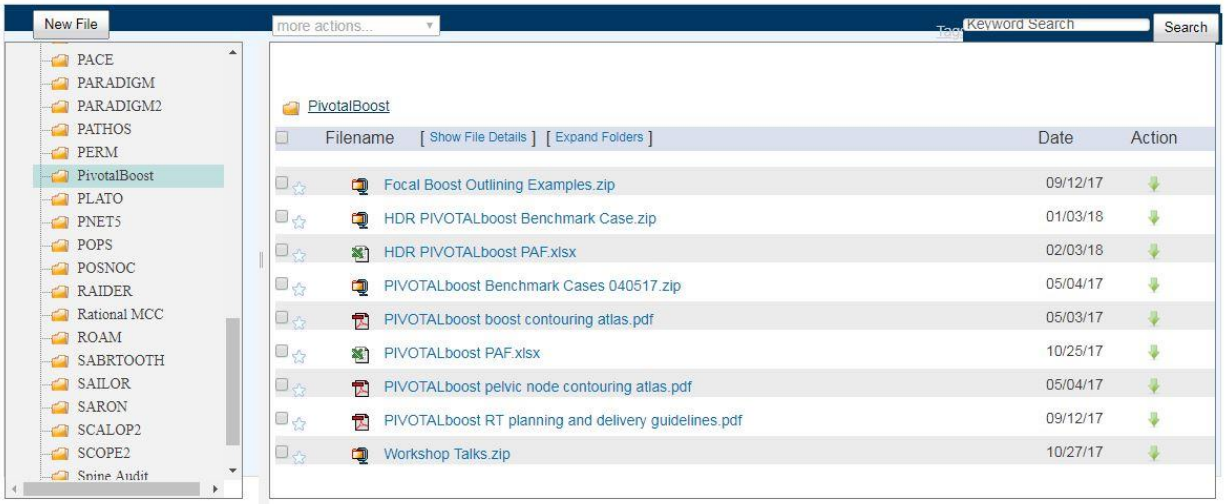


Benchmarking

- US and CT datasets can be downloaded from the RTTQA website
- Instructions for US based planning can be found in the latest guidelines
- CT based planning still work in progress at the moment, require input from Mount Vernon
- The Plan assessment form (PAF) can also be downloaded from the RTTQA website
- Once the plan has been approved locally, the completed PAF, image set, structure set and plan need to be exported using NHS SFTP (email pivotalboost.trial@nhs.net)

Benchmarking

Filedepot



Screenshot from RTTQA website

Plan assessment form

Dose to Prostate Target Volume

	Calculated dose [Gy]	Calculated volume [%]	Pass/Fail
Prostate CTV:	**CTVp_1500 (prostate+margin)**		
D90%≥15Gy			Fail
V15Gy≥95%			Fail
V22.5Gy≤45%			Pass
V30Gy≤15%			Pass

- PAF uses a traffic light system for DVH constraints

Plan assessment form

Dose to Organs at Risk

	Calculated dose [Gy]	Calculated volume [cc]	Pass/Fail	
Rectum				
D2cc ≤11.8Gy			Pass	
V15Gy=0cc			Pass	
Uretha				
D10%≤17.5Gy			Pass	
D30%≤16.5Gy			Pass	
V22.5Gy=0cc			Pass	

Plan assessment form

For ***arms C2 and D2 only*** please complete the table below. Indicate the number of the sector(s) which have been boosted.
For volume planning, provide the planning parameter for each CTVpb separately.
Indicate the position of each boost volume/sector using the diagram on Page 2 for either method.

	Calculated dose [Gy]	Calculated volume [%]	Pass/Fail	Comments
Focal Boost CTV: CTVpb_1900				
D90%≥19Gy *			Fail	
V19Gy≥90% *			Fail	
V28.5Gy≤45%			Pass	
V38Gy≤15%			Pass	

** Note: doses achieved may be limited by rectal/urethra dose*

Plan assessment form

Sector planning	Sector 1	Sector 2	Sector 3
Location of sector			
Volume [cc]			
D90% [Gy]			
V19Gy [%]			
V28.5Gy [%]			
V38Gy [%]			

Sector planning	Sector 4	Sector 5	Sector 6
Location of sector			
Volume [cc]			
D90% [Gy]			
V19Gy [%]			
V28.5Gy [%]			
V38Gy [%]			

Contacts

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Thank you for listening

Any Questions?