The Goodwood Hotel, Chichester, West Sussex, PO18 0PX, UK

Friday 14\textsuperscript{th} June 2013

Abstracts
<table>
<thead>
<tr>
<th>Oral and Poster</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MRI - Ultrasound Fusion Targeted Biopsies (M-U FTB) using Varian Brachytherapy Software</td>
<td>Rick Popert&lt;br&gt;Roy's Hospital, London</td>
</tr>
<tr>
<td>Comparison of Day-0 Ultrasound Real-time Dosimetry with Day 0 and Day 30 CT-based Dosimetry for Permanent Prostate Implants using 125I Single Seeds-Initial Study</td>
<td>Louise Fahy&lt;br&gt;Galway University Hospital, Ireland</td>
</tr>
<tr>
<td>Outcome of Patients Treated with Salvage Brachytherapy for Local Failure after Initial External Beam Radiotherapy for Prostate Cancer: Galway Experience</td>
<td>Jamsari Khalid&lt;br&gt;Galway University Hospital, Ireland</td>
</tr>
<tr>
<td>Dosimetry Modeling for Focal LDR Prostate Brachytherapy</td>
<td>Bashar Al-Qaisieh&lt;br&gt;St James's Institute of Oncology, Leeds</td>
</tr>
<tr>
<td>Poster</td>
<td></td>
</tr>
<tr>
<td>The Use of Failure Mode Effect Analysis to Enhance Quality in Prostate Seed Brachytherapy</td>
<td>Colin Kelly&lt;br&gt;St Luke's Radiation Oncology Network, Dublin, Ireland</td>
</tr>
<tr>
<td>Simple Positional Optimisation Allows Optimal Treatment Delivery to Larger Prostate Glands</td>
<td>David Wood&lt;br&gt;The Christie Hospital NHS Foundation Trust, Manchester</td>
</tr>
<tr>
<td>Lean Principles in HDR Prostate Brachytherapy Significantly Reduces Procedure Time</td>
<td>Michelle Boyle&lt;br&gt;The Christie Hospital NHS Foundation Trust, Manchester</td>
</tr>
<tr>
<td>Cone Beam vs. Conventional CT in 125 Prostate Brachytherapy</td>
<td>Patrick Leydon&lt;br&gt;The Galway Clinic, Ireland</td>
</tr>
<tr>
<td>Can a Mentored Training Program Help Overcome the Learning Curve for Prostate Seed Brachytherapy? Initial Experience at a Single Irish Centre</td>
<td>Paul J Kelly&lt;br&gt;Cork University Hospital, Ireland</td>
</tr>
<tr>
<td>An Update on Urinary Engrailed-2 (EN2), a Novel Biomarker for Detection of Prostate Cancer and its Correlation with Tumour Volume and Pathological Stage</td>
<td>Saqib Javed&lt;br&gt;Royal Surrey County Hospital, Guildford</td>
</tr>
<tr>
<td>Prostate Brachytherapy - Equal Access for All?</td>
<td>Caroline Manetta&lt;br&gt;University Hospital Southampton NHS Foundation Trust</td>
</tr>
<tr>
<td>A Report on the Initial Experience of the BARD 'Prolink Brachytherapy System' in the Treatment of early stage Prostate Cancer</td>
<td>Stephen Thompson&lt;br&gt;University Hospital Southampton NHS Foundation Trust</td>
</tr>
<tr>
<td>Median Lobe Resection followed by Delayed Permanent Seed Prostate Brachytherapy: A Retrospective Analysis of Urinary Toxicity</td>
<td>Kasia Owczarczyk&lt;br&gt;The Royal Free Hospital, London</td>
</tr>
</tbody>
</table>
MRI - Ultrasound Fusion Targeted Biopsies (M-U FTB) using Varian Brachytherapy Software

Rick Popert  
Consultant Urologist, Guy's Hospital, London

Paul Sturch  
Research Fellow, Guy's Hospital, London

Mark McGovern  
Radiation Physicist, Guy's Hospital London

Andrew Robinson  
Radiation Physicist, Harley St Clinic, London

Giles Rottenberg  
Consultant Radiologist, Guy's Hospital, London

Stephen Morris  
Consultant Oncologist, Guy's Hospital, London

Aims/Introduction:
MRI-ultrasound fusion targeted biopsies (M-UFTB) of ‘suspicious lesions’ is a developing area in prostate cancer diagnostics but commercial systems are expensive. We report the use of Variseed 8.0.2 standard brachytherapy software system (Varian Medical Systems), with the additional ‘image-fusion’ license option.

Materials/Methods:
67 men with a lesion suspicious for cancer on multiparametric MRI underwent transperineal MRI-UFTB. MRI images were imported into the Variseed software and the Region of Interest (ROI) and peripheral zone (PZ) sectors outlined separately. Live US images of the prostate were acquired from base to apex, outlined and fused with the pre contoured MRI images. The ROI was biopsied first followed by targeted PZ sector biopsies using our localisation protocol. The primary outcome measure was detection of clinically significant disease; max cancer core length 4mm and/or Gleason Grade 3+4.

Results:
67 patients with a mean age 62 years (45-80), mean PSA 7.5 ug/L (1.2-34) and a mean prostate volume 47mls (14-120) underwent MRI-US fusion targeted biopsy with an overall cancer detection rate of 66% (44/67). Clinically significant disease was identified within the fusion targeted lesion in 77% (34/44) but 36% (16/34) also had disease outside the identified lesion in areas normal on MRI review. The majority, 14 were in the same or an adjoining quadrant but 5 (15%) had CSD in a non-adjoining quadrant, entirely normal on MRI review.

Conclusions:
Unmodified Varian brachytherapy software can be used for MRI fusion targeted biopsies. Restricting biopsies to MRI identified lesions alone may miss clinically significant disease elsewhere and systematic biopsies are still necessary. The pathological information derived can help in the planning of targeted brachytherapy to the dominant pathological lesions.
Comparison of Day-0 Ultrasound Real-time Dosimetry with Day 0 and Day 30 CT-based Dosimetry for Permanent Prostate Implants Using 125I Single Seeds-Initial Study

Louise Fahy
University Hospital Galway
Anysja Zuchora
University Hospital Galway
Jamsari Khalid
University Hospital Galway
Frank Sullivan
University Hospital Galway

Aims/Introduction:
Day 30 CT-based dosimetry is the gold standard for final verification of prostate permanent implantation quality. This initial study will investigate whether clinically significant changes in the dose to the prostate and critical adjacent structures occur between Day 0 (CT-0) and 30 (CT-30). This is achieved using CT-based Dosimetry. Differences between Day-0 Ultrasound (US-I) and CT-0 are also analysed.

Materials/Methods:
Dosimetry for 29 patients with permanent prostate implants using 125I seeds were evaluated using intraoperative US Day 0, CT imaging Day 0 and Day 30. The dose received by 90% of the target volume (prostate D90), percentage of volume receiving 100%, 150% and 200% of prescribed dose (prostate V100, V150, V200), urethra D30 and D10, and rectal V2cc dose and prostate volume were analysed using Paired Student T-test. Differences were regarded as statistically significant at p < 0.05.

Results
This initial study shows significant differences between the CT-0 and CT-30 dosimetric parameters analysed. D90, V150 and V200 prostate and V2cc rectum mean values were higher for CT-30 than CT-0 and US-I. US-I and CT-0 urethral and rectal dosimetric parameters showed no significant differences.

Conclusions:
Early verification of dosimetric parameters using CT-0 is desirable as sub-standard implants can be identified. It is more convenient for the patient and allows verification of urethra dosimetry. Based on this initial study, with limited patient numbers, CT-0 cannot replace CT-30 as the gold standard for final verification of prostate permanent implantation quality.
Outcome of Patients Treated with Salvage Brachytherapy for Local Failure after Initial External Beam Radiotherapy for Prostate Cancer: Galway Experience

Jamsari Khalid
Research Fellow in Prostate Brachytherapy, Galway University Hospital

Anysja Zuchora
Medical Physics and Bioengineering, Galway University Hospital

Louise Fahy
Medical Physics and Bioengineering, Galway University Hospital

Peter Woulfe
Medical Physics, Galway Clinic

Claire Dooley
Medical Physics, Galway Clinic

Professor Frank Sullivan
Professor of Radiation Oncology, Galway University Hospital

Aims/Introduction:
To assess our experience with salvage brachytherapy (SBT) as a possible therapeutic approach for local recurrence after definitive external radiotherapy (EBRT) for prostate cancer.

Materials/Methods:
Between 2009 and 2013 we have treated 14 patients in the Galway hospitals with salvage brachytherapy whom had received prior EBRT. Primary outcomes were prostate specific antigen (PSA) control. Secondary outcomes were International Prostate Symptom Score (IPSS) and toxicities were graded using CTC v3.0. The planning dosimetry was also reviewed.

Results:
At the time of salvage therapy the median time to the diagnosis of local recurrence was 8 years, the median PSA was 4.71ng/ml, and all the patient were staged at <T2c. At salvage the GS (Gleason score) 6 were five, GS 7 were three and GS 8 were six patients. Nine patients had androgen deprivation therapy before salvage and six did not. The median dose EBRT were equivalent dose at 2Gy per fraction (EQD2) of 70Gy. Median follow up after salvage were 25.5 months (4-52). Mean IPSS at salvage and after salvage were at 4 and 7 respectively. There were one failure noted thus far with mean PSA post implant of 1.6ng/ml and median of 0.33ng/ml. Complications include one grade 2 rectal bleeding and one grade 2 haematuria. The brachytherapy prescription was120Gy to the prostate. The mean prostate volume before treatment was 18.03 ± 5.4cc. The mean urethra implant dose D30 was 146 ± 15.7Gy. The day 30 post implant dosimetry D90 was 136.1 ± 13.8Gy. V100 was 95.1 ± 4.5%, V150 was 54.9 ± 16.1% and the Rectum dose 2cc volume was 73.4 ± 16.7Gy.

Conclusions:
SBT appears to provide excellent cancer control rate with acceptable rate of rectal and urinary toxicity even after EBRT. An extended follow up is necessary to determine long term success and safety of SBT.
Dosimetry Modeling for Focal LDR Prostate Brachytherapy

Bashar Al-Qaisieh  
Medical Physics and Engineering, St James's Institute of Oncology, Leeds  
Josh Mason  
Medical Physics and Engineering, St James's Institute of Oncology, Leeds  
Ann Henry  
Clinical Oncology, St James's Institute of Oncology, Leeds  
Peter Bownes  
Medical Physics and Engineering, St James's Institute of Oncology, Leeds  
Stephen Langley  
Department of Urology, Royal Surrey County Hospital NHS Foundation Trust, Guildford

Aims/Introduction:  
Following the report of a consensus meeting on focal prostate brachytherapy(1), it was agreed to retrospectively model LDR treatment planning techniques, including evaluation of robustness of treatment plans against random and systematic seed movement, and measurement of inter seed attenuation (ISA).

Materials/Methods:  
Nine patients were selected for this study according to clinical data, template biopsy and multi parametric MRI. This data was used to contour target volumes and organs at risk. Three treatment plans were produced for each case: standard, hemi and ultra-focal as recommended by the consensus report(1). Plans used 6711 seeds with source strength 0.5 U and prescription dose 145 Gy. Monte Carlo code was created to assess plan robustness and ISA.

Results:  
Hemi and focal plans use between 30% and 70% less seeds and needles compared to standard plans. Prostate D90 increased by 19% and 69%, urethra D10 decreased by 7% and 55%, and rectal D2cc decreased by 28% and 60%, for hemi and ultra focal plans respectively. From plan robustness analysis, a random shift in seed position with SD=4mm would result in V100 and D90 dropping by 7.2% and 14% respectively for standard plans, 7.3% and 20% for hemi plans and 5% and 32% for ultra focal plans. ISA has similar effect on DVH parameters for hemi and ultra focal plans as for standard plans.

Conclusions:  
Treatment planning for hemi and ultra-focal options is feasible. Dose constrains are easily met with a notable reduction to organs at risk. Treating focal targets makes seed positioning more critical.

Additional co-authors: Louise Dickinson, Ahmed Hashim, Mark Emberton (all Division of Surgery and Interventional Science, University College London, UK).

The authors would also like to acknowledge the following: Peter Grimm, Ferran Guedea, David Bostwick, Francisco GÁmez Veiga, Stephan Machtens.

The Use of Failure Mode Effect Analysis to Enhance Quality in Prostate Seed Brachytherapy

Colin Kelly  
St Luke's Radiation Oncology Network, Dublin, Ireland

Brian Langan  
St Luke's Radiation Oncology Network, Dublin, Ireland

Christopher Walker  
St Luke's Radiation Oncology Network, Dublin, Ireland

Brian O'Neill  
St Luke's Radiation Oncology Network, Dublin, Ireland

Gerard McVey  
St Luke's Radiation Oncology Network, Dublin, Ireland

Aims/Introduction:
The delivery of high quality prostate brachytherapy is a complex task combining sophisticated hardware and software technologies with crucial human interventions and decision making across the multidisciplinary team. Ensuring that the potential benefit to the patient is maximised and that the risk of harm, by failures in the process, is reduced is the responsibility of the caregivers. In this work the use of Failure Mode Effect Analysis (FMEA) is described for the proactive identification of potential risk for patients undergoing I-125 permanent seed brachytherapy at a single institute.

Materials/Methods:
FMEA was conducted by applying four main steps to the brachytherapy process as follows:
1. Process Mapping: a detailed map involving the main nodes of activity and identifying associated inputs, outputs, tasks and check procedures was developed.
2. Catalogue of Failure Modes (FM): frontline staff were interviewed and asked to identify potential failures in the system.
3. Analysis of FM: Using actuarial methods the identified FMs were allocated a Risk Priority Number (RPN) defined as the product of indices associated with Severity, Occurrence and Detection.
4. Process redesign: Proactive re-engineering of the treatment process to strengthen defences against the pre-identified FMs.

Results:
A total of 43 FMs were identified of which 12 were considered to have RPNs sufficiently high to necessitate process redesign. The results included the commissioning of automatic contouring software, the development of an independent check programme for dose calculation and the design of a QA phantom for US image quality.

Conclusions:
FMEA is a tool that was developed first by the automobile industry. Its use in radiotherapy has been proposed by IAEA (ICRP 112) and it is currently the subject of a major project being carried out by the American Association of Physicists in Medicine (AAPM) (TG-100). This study demonstrates its effectiveness as a tool for enhancing quality and reducing risk in prostate brachytherapy.
Simple Positional Optimisation Allows Optimal Treatment Delivery to Larger Prostate Glands

D Wood  
Advanced Practitioner Brachytherapy Christie Medical Physics and Engineering, The Christie Hospital  
C Taylor  
Consultant Radiographer Prostate Brachytherapy, The Christie Hospital

Aims/Introduction:  
One limitation of delivering brachytherapy for prostate (LDR/HDR) cancer is the ability to access the prostate in order to place seeds or interstitial needles. Additionally, optimal positioning of the prostate in relation to the rectum and the positioning of the urethra is essential for favourable dosimetric coverage of the prostate and CTV.

Access to of the prostate gland can be limited by factors such as prostate size, position in relation to pubic arch, location of prostate in relation to the rectum, urethral deviation and BPH.

The implementation of a simple optimisation sequence can be incorporated into the pre-treatment positioning process and can maximise the number of patients in which an optimal implant is possible.

Materials/Methods:  
A two-step procedure is employed for LDR seeds with >90% of studies undertaken by a consultant radiographer.

HDR treatments are delivered in a single fraction of 15Gy and prostate optimisation is similarly performed.

The main elements of position optimisation include:
• Effective bowel preparation,
• Ultrasound standoff is degassed
• Lateral coverage is assessed against arch location and leg position optimised accordingly,
• Setting of a perpendicular base using the sagittal view by altering probe angle
• and probe height dropped to lift the prostate in relation to the grid
• Excess pressure on the rectum decreases the fat plane between the prostate and rectum.

Results:  
Particular progress has been made in the maximum prostate volume that can be treated. The maximum volume implanted was 69cc and 105cc in I-125 seeds and HDR respectively. The implantation of larger glands while reducing needle number by utilising higher activity seeds may reduce the need to resort to hormonal downsizing of the prostate gland and its associated morbidity.

In 5 years no patients have been unable to proceed to a satisfactory HDR implant due to the optimisation strategies employed.
Lean Principles in HDR Prostate Brachytherapy Significantly Reduces Procedure Time

Michelle Boyle  
Specialist Brachytherapy Radiographer, The Christie Hospital NHS Foundation Trust, Manchester.  
Christie Medical Physics and Engineering  

Laura Lane  
Lead Brachytherapy Radiographer, The Christie Hospital NHS Foundation Trust, Manchester. Christie Medical Physics and Engineering  

David Wood  
Advanced Brachytherapy Radiographer The Christie Hospital NHS Foundation Trust, Manchester. Christie Medical Physics and Engineering

Introduction/Aims:
The Christie began HDR prostate brachytherapy in April 2008 and to date have treated over 400 patients, around 90 patients annually. Current protocol is a single fraction boost of 15Gy in combination with EBRT (37.5Gy in 15#)

With increasing demands on resources, a need to maximise HDR availability and increase patient numbers “lean” management principles were applied to the HDR patient pathway. The aim was to remove any aspects that were not directly delivering “value” in achieving a quality implant with excellent patient care.

Materials/Methods:
All stakeholders in the process were involved in charting the procedure pathway, identifying bottlenecks and providing solutions. Work instructions were reviewed and amended, admin workflow streamlined and an upgrade from OCPv3 to OCP v4 implemented. Examples of strategies employed:
- Reduced duplicate checking and unnecessary imaging
- Reduce the number of non-essential staff in theatre
- Introduced a new procedure for probe decontamination
- Removed prostate fiducial markers

Results:
Our procedure time (Probe in: treatment complete) prior to the introduction of lean principles was on average 3h04. This reduced to an average of 2h27 post lean measures implementation.

Conclusions:
The HDR procedure time has been reduced by an average of 30 minutes (20%) as a result of the lean approach. Significant benefits include increased patient throughput, reduced anaesthetic times and overnight stays with associated cost savings.

The introduction of the new cart has not has yet reduced this time further but may well prove to do so in the future. Further logistical improvements in the pre-treatment pathway will arise from the completion of a specialist brachytherapy ward in Autumn 2013 incorporating dedicated brachytherapy trained nursing staff and a convenient location close to theatre. Overall many small gains throughout the HDR procedure with minimal resource investment have produced a significant reduction in procedure time with no negative effect on treatment quality.
Cone Beam vs. Conventional CT in I125 Prostate Brachytherapy

Patrick Leydon
The Galway Clinic
Peter Woulfe
The Galway Clinic

Aims/Introduction:
Transperineal interstitial implantation of radioactive I125 seeds is a technique which utilises three-dimensional image-based treatment planning and real-time visualization of needle insertion and seed deposition. Considerable emphasis is placed on 3D conformal dosimetric planning and precise seed placement.

Seed placement and dosimetry are verified using a CT scan between 0 to 30 days post implant, ideally within 24 hours of implantation with a catheter in situ. This allows for much more accurate contouring of the urethra and thus more accurate dose analysis is possible. The aim of this project was to examine the viability of using fluoroscopy based Cone Beam CT in theatre as a possible imaging alternative to conventional CT imaging to acquire a day 0 scan.

Materials/Methods:
A quantitative and qualitative comparison of image quality between Cone Beam CT images from the Philips Allura Xper FD 20 and regular axial CT images from the Philips Gemini 16 slice CT scanner was performed. The phantoms used for assessment of image quality were the CatPhan 600 and the Siemens EMMA Phantom. The programs IQWorks and ImageJ were also used for image analysis. A comparison of dosimetry results was performed using Varian™'s Variseed software and a Rando phantom implanted with several dummy seeds.

Results:
Generally cone beam CT performed well against conventional CT. CatPhan test results for resolution and geometric accuracy were excellent. The main areas where conventional CT outperformed Cone Beam CT were uniformity and low contrast resolution. Dosimetry results between the two modalities show some differences, most notably D90 values, but there is good agreement overall.

Conclusions:
Initial results suggest that real-time patient imaging with Cone Beam CT may be a feasible alternative to the current practice of conventional CT scanning. However this study’s sole reliance on phantoms does limit the clinically relevant conclusions which may be drawn.
Can a Mentored Training Program Help Overcome the Learning Curve for Prostate Seed Brachytherapy? Initial Experience at a Single Irish Centre

Paul J Kelly  
Cork University Hospital, Ireland  
Suzanne Kelleher  
Cork University Hospital, Ireland  
Admire Dzingwa  
Cork University Hospital, Ireland  
Ted J Fitzgerald  
Cork University Hospital, Ireland  
Jennifer Gilmore  
Cork University Hospital, Ireland  
Frank Sullivan  
University Hospital Galway, Ireland  

Aims/Introduction:
Prostate Seed Brachytherapy (PSB) was introduced at Cork University Hospital in July 2012 as part of the National Brachytherapy Programme. This followed a mentored training program for clinicians, physicists, and nurses led by University Hospital Galway. The Mentee Radiation Oncologist firstly observed 10 cases performed by the Mentor. Thereafter the Mentee performed a further 10 cases as the chief operator, observed closely by the mentor. The technique utilized is an Iodine-125 loose-seed nomogram-based technique with real-time dosimetry. The purpose of this study was to review the dosimetry from the 24 cases performed to date, including the initial 10 mentored cases [Group 1] and the subsequent 14 solo cases [Group 2].

Materials/Methods:
We retrospectively reviewed prospectively collected data from the first 24 prostate seed brachytherapy implants performed at Cork University Hospital. Day 30 CT dosimetric parameters including V100, V150, D90, VR100 are reported. Intra-op ultrasound-based urethral D30 is also reported. Dosimetric parameters for mentored cases [Group 1] and subsequent cases [Group 2] were also compared.

Results:
The median prostate volume implanted was 31cc (IQR 23.1-34.6). The median (IQR) Day 30 CT prostate V100, V150 and D90 were 95.6% (92.1-96.9), 50.4% (45.9-54) and 174.7Gy (163.5-184) respectively. Median Rectal V100 was 0.3cc (0.2-0.7). The median (IQR) intra-op urethral D30 was 177.4Gy (175.5-180). No statistically significant differences were observed between Group 1 and Group 2 V100 (p=0.14) or D90 (p=0.09).

Conclusions:
Satisfactory dosimetry was achieved following a structured mentorship program. No significant differences in dosimetry were observed between mentored cases and subsequent un-mentored cases. Initial dosimetry achieved supports mentored training programs for PSB.
An Update on Urinary Engrailed-2 (EN2), a Novel Biomarker for Detection of Prostate Cancer and its Correlation with Tumour Volume and Pathological Stage

Saqib Javed
Royal Surrey County Hospital, Guildford
Albert Edwards
Royal Surrey County Hospital, Guildford
Hardev Pandha
Faculty of Health and Medical Sciences, University of Surrey, Guildford
Richard Morgan
Faculty of Health and Medical Sciences, University of Surrey, Guildford
Robert Laing
Royal Surrey County Hospital, Guildford
Stephen Langley
Royal Surrey County Hospital, Guildford

Aims/Introduction:
Last year we showed our preliminary results on a pilot study which suggested that EN-2 may be a useful surveillance marker in patients who have undergone low dose rate brachytherapy for prostate cancer. Adding further to this we assessed the relationship between pre-prostatectomy urinary Engrailed-2 (EN2) with tumour volume and pathological characteristics in radical prostatectomy specimens.

Materials/Methods:
Patients first pass urine samples (10 ml) without prior digital rectal examination were collected and stored at 80°C. EN2 levels were measured using an enzyme-linked immunoabsorbent assay. Tumour volume in the prostatectomy specimens was determined histologically by a dedicated uropathologist.

Results:
57 men undergoing RP in one urological cancer network were evaluated. EN2 was detected in 85% of RP patients. EN2 correlated with tumour volume (but not total prostatic volume) in a linear regression analysis, with increasing pathological T stage and margin positivity. Using three cut-off levels of tumour volume (0.5 ml, 1.3 ml and 2.5 ml) to define ‘significant disease’, men with ‘significant disease’ had markedly higher levels of urinary EN2 (p < 0.001 for each cut off level).

Conclusions:
Urinary EN2 levels closely reflected tumour volume in prostatectomy specimens. Levels of urinary EN2 may be useful in predicting tumour volume in men with prostate cancer by potentially identifying men with small volume ‘insignificant’ disease. This may help in critical decision making in the management of PC patients i.e. active surveillance vs radical treatment. This study justifies a larger multicentre evaluation of urinary EN2 levels as a biomarker of PC significance using cancer volume, pathological and PSA criteria.
Prostate Brachytherapy - Equal Access for All?

Caroline Manetta
University Hospital Southampton NHS Foundation Trust

Susanna Brock
Poole Hospital NHS Foundation Trust

Aims/Introduction:
Evidence supports the use of both LDR and HDR brachytherapy (BT) in selected patients with localized prostate cancer. Demand for BT is increasing. Anecdotally, there is a discrepancy in brachytherapy funding across England and Wales. This survey sought to identify inconsistencies.

Materials/Methods:
22 centres in England and Wales were identified as providing prostate brachytherapy. An individually addressed email was sent with a link to the electronic survey; initially in May 2012 with non-responders re-emailed in June 2012. The survey consisted of 7 questions with drop-down answers and optional free-text comments.

Results:
The response rate was 81.8% (18 out of 22).

LDR
All 18 respondents carry out LDR. 61.1% (11/18) centres have PCT funding with no limit to the number of patients treated. The remainder has to apply on an individual patient basis, for some or all patients. Charitable funding contributes to one centre. Four centres state that their LDR activity is limited by funding. In three cases the funding arrangements lead to a delay in offering implant.

HDR
8 centres offer HDR. Funding of HDR in 5 centres has no limit to patient numbers. In 2 centres it has to be sought for referrals from outside the network (individual approval necessary). One centre offering HDR feels activity is limited by funding. Two centres not offering HDR state that this is due to funding limitations.

Conclusions:
The majority of centres have good funding provision for LDR BT. However, where limitations exist it impacts negatively on patient choice and time to treatment. HDR activity is less and two centres directly link this to funding limitations. The impact of inconsistent funding will increase as demand for brachytherapy increases. Hopefully, the recent changes to service commissioning will ensure equality of access to brachytherapy, and other emerging treatments.
A Report on the Initial Experience of the BARD ‘Prolink Brachytherapy System’ in the Treatment of early stage Prostate Cancer

S. Thompson
Radiotherapy Physics, University Hospital Southampton NHS Foundation Trust

J. Nevinson
Radiotherapy Physics, University Hospital Southampton NHS Foundation Trust

Aims/Introduction:
Practical implementation and initial experience of the Bard One-Step Interoperative Prolink technique at University Hospital Southampton NHS Foundation Trust (UHS); first UK hospital to adopt this technique is described. Key objectives for a streamlined fully dynamic one-step permanent prostate implant: utilising non-uniform seed spacing, reducing implant needle number, providing good visibility on ultrasound imaging and enabling precise seed drop screen-capture.

It is a requirement to independently perform a seed assay of at least 10%\(^1\)\(^,\)\(^2\) prior to clinical use of \(^{125}\)I seeds. Measuring seed activity whilst maintaining sterility is a Prolink Seed Cartridge Assay difficulty.

Both implant process and current seed assay techniques are examined.

Materials/Methods:
33 patients with prostate gland sizes of no greater than 50 cc were implanted using linked seed technique; non-uniformly spaced predominantly peripherally loaded STM1251 seeds. Planned needle number used has been compared with that of similar volume plans, from our previous uniformly spaced seed implant series.

Pre-implant dual method seed assay is performed: i) 5 evenly spaced linked seedtrain, with calibration route traceable to National Dosimetry Standard, and ii) Intact multi-seed cartridges within improvised sterile pouches, for which factors correcting for geometry & self-absorption\(^3\), are calculated from single seed versus intact cartridge measurement.

Results:
UHS Prolink plan analysis shows a 27% reduction in needle number. This fits with the previously described 30% reduction\(^4\) (compared with fixed interseed spacing).

Corrective factors ranging from 1.12 to 1.22 depending on seed number per cartridge, give assay tolerance within 5%, compared to 3% for the 5 linked seed strand.

Conclusions:
Adopting Bard Prolink technique has improved UHS Prostate Brachytherapy service, met key objectives with fewer needles required, reduced likelihood / severity of oedema, without compromising prostate dose, and shortened procedure duration. Accessory refinement will increase accuracy of intact cartridge whole seed batch assay and further service streamlining.

References
Median Lobe Resection Followed by Delayed Permanent Seed Prostate Brachytherapy: A Retrospective Analysis of Urinary Toxicity

Kasia Owczarczyk  
The Royal Free Hospital  
Juan Vilarino-Varela  
The Royal Free Hospital  
David Eaton  
The Royal Free Hospital  
Amir Kaisary  
The Royal Free Hospital  
Katherine Pigott  
The Royal Free Hospital  
Maria Vilarino-Varela  
The Royal Free Hospital

Aims/Introduction:
Median lobe resection (MLR) prior to permanent seed prostate brachytherapy (PSPB) may be considered for patients with high baseline International Prostate Symptom Score (IPSS) and median lobe hyperplasia. When carried out immediately prior to PSPB it is associated with high rates of urinary retention\(^1\). We conducted a retrospective institutional audit of functional outcomes, following a two-step approach, whereby PSPB (performed utilising peripheral loading of seeds and real-time dosimetry) is delayed by 3 months after MLR.

Materials/Methods:
Data was collected retrospectively on 13 patients treated at the Royal Free Hospital between 2009 and 2010. Serial PSA readings and IPSS were extracted from patient files. All patients received follow-up telephone consultation to verify IPSS.

Results:
All patients fulfilled criteria for PSPB. Mean baseline IPSS was 10.2 (1-20) with 76% being IPSS 8. Median time from MLR to PSPB was 116 days (82-181). Mean intra-operative prostate volume (PV) was 31cc (10-62); mean post-implant D90 was 176Gy (163-187), mean post-implant V100 was 94% (91-96).

At 3 months post brachytherapy, one patient reported severe (IPSS 20-35) and two patients reported moderate (IPSS 8-19) urinary symptoms.

During a median follow-up of 40 months (29-50) two patients developed urethral strictures, five had mild urinary toxicity (IPSS 1-7) and six were symptom-free at last follow-up. No biochemical PSA relapses were observed.

Patients with poor functional outcomes had significantly larger PV at implantation (median 51cc versus 23.5 in patients with mild LUTS and 33.8cc in patients with no LUTS, p=0.04)

Conclusions:
This single-centre experience suggests MLR followed by delayed brachytherapy with real time dosimetry is a relatively well-tolerated option for patients fulfilling the criteria for PSPB but presenting with high IPSS due to median lobe hyperplasia. The observed urethral stricture rate in this patient cohort was 15%, with risk confined to patients with high PV at implantation.

References: