Conclusions: K. Yip
Brachytherapy catheter insertion into the prostate
Feasibility of using multiparametric MRI to study the effect of
impact on urinary function as in the non-TURP group.
urethral defect. This results in accurate dosimetry and the same low
had prior TURP, using accurate ultrasound identification of the

Results: At Day30 the mean D90: 118.6 vs. 118.3 , V100: 97.4 vs. 96.8 and U100: 138.6 vs. 137.7 show no significant difference for both groups, seed loss is also comparable.
We observed no significant differences in acute urinary complications between the two groups.
Conclusions: Brachytherapy can be performed in patients who have had prior TURP, using accurate ultrasound identification of the urethral defect. This results in accurate dosimetry and the same low impact on urinary function as in the non-TURP group.

PD-0034
Feasibility of using multiparametric MRI to study the effect of brachytherapy catheter insertion into the prostate
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Purpose/Objective: A significant drop in blood flow, associated with an increase in tumour hypoxia has been shown experimentally following the insertion of temporary interstitial catheters into the prostate for high dose-rate (HDR) brachytherapy. In this study, we aimed to evaluate multiparametric functional magnetic resonance imaging (MRI) for the assessment of changes to the prostate micro-environment following the insertion of temporary brachytherapy catheters.
Materials and Method: 6 patients, due to undergo HDR brachytherapy as monotherapy for their prostate cancer, underwent multiparametric MR imaging before and within 2 hours after the insertion of temporary brachytherapy catheters. The following imaging techniques were used. (1) T1-weighted dynamic contrast enhanced imaging (DCE-MRI) to evaluate the transfer constant (Ktrans) and the area under the gadolinium concentration-time curve (IAUGCao), (2) diffusion-weighted MR imaging (DWI) to calculate the apparent diffusion coefficient (ADC) and (3) intrinsic susceptibility-weighted T2 imaging (ISW-MRI) to calculate the R2* relaxation rate.
The whole prostate was outlined as the region of interest (ROI) by a single radiation oncologist. Voxel-based calculations were performed using two bespoke software analysis packages - Magnetic Resonance Imaging Workbench for T1-weighted dynamic images & DiffusionView for ISW-MRI analysis (both © Institute of Cancer Research, London).

Results: One patient did not receive intravenous contrast therefore DCE-MRI scan analysis could not be conducted. The full data-set is shown in table 1. The IAUGCao & Ktrans values rose in one but fell in four patients. Changes in the R2* values ranged from -27% to 26%. Changes in the apparent diffusion coefficient were minimal for most patients.

Table 1: % change in each MRI parameter before and after catheter insertion

<table>
<thead>
<tr>
<th>Patient</th>
<th>R2*</th>
<th>Ktrans (min^-1)</th>
<th>IAUGCao</th>
<th>ADC (mm^2 s^-1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-27.3</td>
<td>-97.9</td>
<td>-14.4</td>
<td>2.3</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>-35.6</td>
<td>-7.3</td>
<td>3.1</td>
</tr>
<tr>
<td>3</td>
<td>-2.9</td>
<td>-</td>
<td>-</td>
<td>3.8</td>
</tr>
<tr>
<td>4</td>
<td>27.0</td>
<td>-19.7</td>
<td>-0.3</td>
<td>-12.7</td>
</tr>
<tr>
<td>5</td>
<td>-25.9</td>
<td>-11.2</td>
<td>-</td>
<td>3.4</td>
</tr>
<tr>
<td>6</td>
<td>-14.0</td>
<td>74.6</td>
<td>114.3</td>
<td>-4.2</td>
</tr>
</tbody>
</table>

Average | -7.2 | -8.4 | 14.6 | -0.4 |

Conclusions: It is feasible to use DCE-MRI imaging to evaluate changes in tissue perfusion immediately following the trauma of brachytherapy catheter insertion. However, the highly variable changes in R2* values observed in this series may preclude the use of ISW-MRI to assess the oxygenation status in the tissue micro-environment. The introduction of brachytherapy catheters into the prostate had minimal impact on the ADC values; it may therefore be possible to use DWI for tumour delineation despite the presence of brachytherapy catheters. Future studies that intend to use multiparametric MRI for the evaluation of physiological and biological changes within the prostate during or soon after HDR brachytherapy should include DCE-MRI and DWI but exclude ISW-MRI.

PD-0035
Dosimetric characteristics of CT-based multi-catheter brachytherapy in APBI out-of-trial patients
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Purpose/Objective: The aim of this study is to present dosimetric characteristics of CT-based high-dose-rate (HDR) interstitial brachytherapy in APBI (Accelerated Partial Breast Irradiation) patients treated outside of randomized control trial. Dosimetric and volumetric parameters of the treatment plans were evaluated.
Materials and Methods: From February 2010 to January 2012, 49 consecutive patients were treated with APBI according to GEC-ESTRO recommendations. HDR multi-catheter brachytherapy technique was used. Three-, four- and five-plane implants were used in 23, 22 and 4 patients, respectively. The median number of catheters was 14 (range, 10-26). The total dose was 32Gy in 4Gy fractions given twice daily with minimum 6 hours interval. Postimplant CT scanning was done for dose planning. Treatment planning volume (PTV) and organs at risk (OAR) were delineated. Geometrical and graphical optimization was performed. Dose-volume histograms were calculated for all structures in all patients. To quantify the dose distributions the following parameters were calculated: volume of the PTV (VPTV), percentage of the PTV receiving 90%, 100% and 150% of the reference dose (V90, V100 and V150), minimum dose encompassing 90% of the PTV (D90), the dose non-uniformity ratio (DNR), the dose homogeneity index (DHI), the conformal index (COIN), maximum dose (Dmax) to skin, lung and heart.

Results: The mean volume of the planning target volume (PTV) was 55.5 cm3 (range, 19.6-156.6 cm3). The average minimum dose received by at least 90% of the PTV was 107% (range 87-120%). One patient received D90 below 90% because of a pacemaker situated near PTV area. The volumes of V90, V100 and V150 were 97%, 94% and 43%. The mean values for dose non-uniformity ratio, dose homogeneity index and conformal index were 0.39 (range, 0.25-0.55), 0.55 (range, 0.30-0.73) and 0.65 (range, 0.45-0.82), respectively. The average value of maximum doses to skin, lung, and heart were 61%, 36%, and 23%, respectively.

Conclusions: Our analysis showed acceptable dose distribution in respect of target coverage and dose to organs at risk in APBI patients treated with multi-catheter brachytherapy outside of randomized control trial, according to GEC-ESTRO recommendations.