Image Guided Adaptive Brachytherapy in Cervical Cancer. Implementation at Oxford University Hospitals (OUH) Foundation Trust

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Purpose
Data from RetroEMBRACE¹ and EMBRACE² studies have demonstrated that Image Guided Adaptive Brachytherapy (IGABT) with MRI to be the gold standard treatment in locally advanced cervical cancer. These studies also highlighted the importance of:

- Delivering a HRCTV D90 dose of >85Gy
- Using intracavity/interstitial brachytherapy to reduce OAR morbidity and reach HRCTV dose targets
- Limiting dose at 2cm³ to rectum <70Gy, sigmoid <75Gy and bladder <80Gy
- De-escalating vaginal dose to by reducing the loading of vaginal ring/ovoids
- Limiting OTT to ≤50 days

In this study we have evaluated our compliance to the above Gyn GEC-ESTRO recommendations between June 2016 and November 2019.

How IGABT is delivered at the OUH
When the brachytherapy service was first established patients were treated with two separate IU insertions, 1 week apart with 2 fractions per insertion. Since March 2018 the service is run with 1 IU insertion and all 4 fractions given over 3 days as shown below:

Results
53 women with locally advanced cervical cancer were treated with external beam radiotherapy and weekly cisplatin followed by IGABT from June 2016 to November 2019.

<table>
<thead>
<tr>
<th>Mean EQD2</th>
<th>Aim EQD2</th>
<th>Percentage achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRCTV D90</td>
<td>88.74Gy (83-115.07)</td>
<td>&gt;85Gy</td>
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<tr>
<td>Bladder 2cm³</td>
<td>64.3Gy (47.74-79.55)</td>
<td>&lt;80Gy</td>
</tr>
<tr>
<td>Rectum 2cm³</td>
<td>54.6Gy (44.81-74.55)</td>
<td>&lt;70Gy</td>
</tr>
<tr>
<td>Sigmoid 2cm³</td>
<td>58.1Gy (43.88-74.80)</td>
<td>&lt;75Gy</td>
</tr>
<tr>
<td>OTT</td>
<td>42 days</td>
<td>&lt;50 days</td>
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Conclusion
Since the implementation of the IGABT at OUH we have achieved the HRCTV D90 and OAR dose constraints recommended by the GEC-ESTRO group in over 96% of patients. As our confidence in using interstitial needles has grown we have stopped using the ring applicator, allowing us to de-escalate the vaginal dose and adapt each plan to cover the HRCTV and limit the dose to the OAR. We anticipate that this will reflect improved outcomes and reduced vaginal toxicity which will be reported at a later date. We will try to maintain an OTT to <50 days.

References