The aim of this study is to evaluate feasibility, acute and late toxicities and cosmetic results with a long follow-up.

Material and Methods: Methods and materials: From January 2005 to December 2013 a total of 445 patients were enrolled in the study, implanted during surgery and treated using a microSelectron-HDR brachytherapy Unit. The median age of the patients was 65 years (range 48-88 years). All those enrolled had an infiltrating ductal carcinoma in the absence of an extensive intraductal component and with clear surgical margins. Sentinel node biopsy was positive in 19.9% of patients and the 76.7% of patients had histology was ductal infiltrating carcinoma, in the 51% of cases the stage was T1b, in the 35% was T1c. Adjuvant chemotherapy was given to 15.9% of patients and hormone therapy to 76.7% of patients. The reference dose is taken as 85% of the mean basal dose. A reference dose of 35 Gy (3.5 Gy in two fractions per day) to 83%. The average time of overall treatment was five days (76.8% in 4-5 days and 23.2% in 6-7 day); the difference is due to festivity and hospital provenience. Catheters were implanted (average of 14) guided by templates in most cases with distance between holes of 16 mm, in a double or triple-plane arrangement in 99% of patients. The mean volume surrounded by the prescription-isodose was 69.2 cc (range 13-129 cc). The treatment plans were evaluated in terms of skin dose, natural dose - histogram, quality (mean 2.15 - range 1-3.04) and uniformity (mean 2.33 and range 1-3.54) index.

Results: Results: The average overall treatment time is five/six days starting from implant commencement. The incidence of acute and late toxicities are given in Table I. Cosmetic results were excellent/good in 81% of patients. In a follow-up of 96 months we observed a local control of 7.7% and in 1.5% metastatic disease. Table II. Acute and late toxicities.

<table>
<thead>
<tr>
<th>toxicity</th>
<th>acute</th>
<th>late</th>
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</thead>
<tbody>
<tr>
<td>Erythema, grade III</td>
<td>4.1</td>
<td></td>
</tr>
<tr>
<td>Delavance</td>
<td>4.4</td>
<td></td>
</tr>
<tr>
<td>Reversible edema</td>
<td>4.1</td>
<td></td>
</tr>
<tr>
<td>Infection</td>
<td>2.7</td>
<td></td>
</tr>
<tr>
<td>Ulcer</td>
<td>3.4</td>
<td></td>
</tr>
<tr>
<td>Fever</td>
<td>5.7</td>
<td></td>
</tr>
<tr>
<td>Highly pigmented skin</td>
<td>9.4</td>
<td></td>
</tr>
<tr>
<td>Teleangiectasia</td>
<td>6.6</td>
<td></td>
</tr>
<tr>
<td>Moderate fibrosis</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Medium fibrosis</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Scarring Melodoe</td>
<td>9.4</td>
<td></td>
</tr>
<tr>
<td>Fat necrosis</td>
<td>7.7</td>
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</tr>
</tbody>
</table>

Conclusion: Conclusions: The initial data demonstrates that an interstitial perioperative brachytherapy implant is a feasible method of treatment with good tolerance and good cosmetic results.

Poster: Brachytherapy track: Gynaecology

PO-0956
Audit of 100 consecutive cervical cancer patients treated with HDR CT guided brachytherapy
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Purpose or Objective: To assess the outcome of patients treated with CT guided HDR brachytherapy for cervical cancer

Material and Methods: The records for 100 consecutive patients treated in our centre were reviewed. All patients prior to treatment had a biopsy for diagnosis, and a staging pelvic MRI and whole body PET scan. Treatment comprised of EBRT to a dose of 45Gy in 25 fractions given to the pelvis ± para-aortics with concurrent cisplatin chemotherapy. The brachytherapy was delivered in 3 fractions using a ring and tandem applicator with CT planning of each individual fraction and using information from a pre-implant planning MRI. The aim is to achieve HRTV d90 of >80Gy whilst staying within the published parameters for the OARs. The outcomes in terms of survival and pattern of relapse were recorded and correlated with the HRTV d90 and volume, and the dose to the OARs. The unpaired t-test and pearson correlation coefficient were used with 2-tailed significance testing level of 0.05.

Results: The median follow up was 32 months with a median age at time of treatment of 44 years (21 - 85 years). Most patients were diagnosed with squamous cell carcinoma (77) or adenocarcinoma (17), 3 patients had an adenosquamous carcinoma and there were 4 cases with unusual histological findings of small cell, serous papillary (2) or neuroendocrine carcinomas. At the time of follow up 78 patients are alive, 21 died from disease and 1 died from unrelated causes. The median time to relapse was 8 months (range 1-23 months). There were 2 cases of isolated pelvic central recurrences, 11 cases of pelvic and distant metastases and 8 cases with only distant disease. The median d90 was 83.9Gy and the mean HRTC volume was 32.3cm³ (range 9.0 – 83.9cm³). There was a statistically significant difference in d90 between patients with relapse v.s. no relapse (t = 2.49, p=0.019) and there was a strong negative correlation between the HRTC volume and the d90 (r= -0.48, p<0.0001). The median doses to the OARS: rectum 60.3Gy (46.8 - 74.1Gy), sigmoid 66.9Gy (46 – 76.5Gy), small bowel 59.1Gy (43.7 – 75Gy) and bladder 75Gy (51.4 - 93.9Gy). There were 3 cases with grade 3-4 toxicity that could be related to the brachytherapy: 1 vesico-vaginal fistula, 1 recto-vaginal fistula, and 1 post treatment hydronephrosis.

Conclusion: CT guided cervical brachytherapy allows the delivery of adequate radiation doses to the HRTC as shown by our acceptable local control and toxicity rates. The pattern of distant disease in the majority of relapses indicates that despite optimal staging investigations and adequate radiation doses to the HRTC, distant undetected microscopic disease will still determine the outcome in a proportion of cases.

PO-0957
Focal boost to GTV in interstitial and intracavitary cervical brachytherapy - a feasibility study
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2Mount Vernon Hospital, Cancer Centre, Northwood Middlesex, United Kingdom

Purpose or Objective: Image guided plan optimisation with MRI and CT for interstitial and intracavitary brachytherapy is an established technique in treating cervical cancer. The purpose of this current study is to assess the feasibility of boosting the dose to GTV(BT) to 140% of the HRTC prescription dose, while keeping critical structure dose volume histograms within tolerance.

Material and Methods: 14 MRI/CT guided treatment plans were analysed in this study. Patients were treated using either Vienna-style ring applicator or Fletcher-style applicator, with or without interstitial catheters. The median age of the patients was 51.5 years (range 25-80.2 years). One patient had FIGO Stage IB cancer, 10 had stage IIIB cancer and 3 had stage IIIB cancer. All received IMRT external beam
Locally advanced cervical cancer treated with IGABT: both interstitial catheters and IU in the GTV(BT) are most likely to be suboptimal. Plans without the GTV(BT) to 140% for treatment plans with interstitial needles lets improve HR-CTV and IR-CTV coverage sparing organs at risk. However, a further complication using interstitial applicators may be gynaecological bleeding during treatments. But, in big tumours, intrauterine applicators and new MRI-compatible applicators have improved our treatment results.

Results: Table 1 shows a comparison of the original and the re-optimised plan parameters. In 10 out of the 14 cases (71.4%) more than 90% of the GTV(BT) was covered by the 140% isodose after re-optimisation. The HRCTV V100 was reduced for the re-optimised plans by an average of 2.95% for the 7Gy plans. In 12 out of the 14 cases (85.7%) the treatment time was reduced with the boost plan.

Conclusion: It is possible to boost the prescription dose to the GTV(BT) to 140% for treatment plans with interstitial catheters and IU within the GTV(BT) volume. Plans without both interstitial catheters and IU in the GTV(BT) are most likely to be suboptimal. This planning study demonstrates that dose escalation to the GTV(BT) is feasible if clinically indicated, and further work into clinical application and outcome should be considered.

PO-0959
Dosimetric outcome and perioperative toxicity using Utrecht applicator in cervical brachytherapy
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2Hospital Universitari i Politècnic La Fe, Oncología Radioteráctica, Valencia, Spain

Purpose or Objective: GEC-ESTRO recommendations for IGRT in brachytherapy, the incorporation of MRI in the planning and new MRI-compatible applicators have improved our treatments. But, in big tumours, intrauterine applicators don’t seem enough in order to reach a good coverage. Interstitial CT-MRI Utrecht (Elekta®) applicator with plastic needles lets improve HR-CTV and IR-CTV coverage sparing organs at risk. However, a further complication using interstitial applicators may be gynaecological bleeding during the withdrawal of the applicator. The purpose of this study is to review perioperative toxicity and dosimetry in patients with cervix tumours using interstitial CT-MRI Utrecht applicator.

Material and Methods: Retrospective review of the records of 122 cervical cancer patients treated in our institution from radiotherapy (50.2Gy/27#, 50Gy/25# or 45Gy/25#) followed by brachytherapy (26Gy/4# or 28Gy/4# to HRCTV). In the current study the original treatment plans were re-optimised, using Brachyvision Version 11. The aim was to escalate the GTV(BT) dose to 140% of the original HRCTV prescription dose (8.4Gy and 9.8Gy/# respectively), keeping the HRCTV coverage and organ at risk DVH values within the tolerance which had been accepted for the original clinical plans. GTV (BT) and HRCTV were drawn according to GEC-ESTRO recommendations. The relationship between the volumes can be defined by the following equation. HRCTV2 = HRCTV1 - GTV(BT). The quality of the re-optimised plans was quantified by using dose volume histogram parameters.

Results: Table 1 shows a comparison of the original and the re-optimised plan parameters. In 10 out of the 14 cases (71.4%) more than 90% of the GTV(BT) was covered by the 140% isodose after re-optimisation. The HRCTV V100% was reduced for the re-optimised plans by an average of 2.95% for the 6Gy plans, and 81.7% for the 7Gy plans. In 12 out of the 14 cases (85.7%) the treatment time was reduced with the boost plan.

Conclusion: The inability to reach the target dose seems correlated with a higher propensity to metastases. Strategies integrating the metastatic risk are mandatory for maximizing the benefit of dose escalation.