radiotherapy (50.2Gy/27f, 50Gy/25f or 45Gy/25f) followed by brachytherapy (26Gy/4f or 28Gy/4f 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 D90 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 GTV1 V100% was reduced for the re-optimised plans by an average of 2.95% (range 0.7-6.01%), average coverage of HRCTV2 with the prescription isodose was 94.5% 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: Table 1 shows a comparison of the original and the re-optimised plan parameters.

Table 1: Reporting parameters for the standard and the re-optimised GTV (BT) boost plan

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<th>Original plan</th>
<th>Re-optimised plan</th>
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PO-0958
Locally advanced cervical cancer treated with IGABT: impact of the D90 HR-CTV on patterns of relapse

C. Charrari1, R. Mazeron1, P. Maroun1, I. Dumas1, F. Martinetti2, A. Tafo-Guemnie3, E. Deutsch4, P. Morice1, C. Haie-Meder5
1Institut Gustave Roussy, brachytherapy, Villejuif, France
2Institut Gustave Roussy, Radiotherapy, Villejuif, France
3Institut Gustave Roussy, Surgical Oncology, Villejuif, France
4Institut Gustave Roussy, Surgical Oncology, Villejuif, France

Purpose or Objective: Locally advanced cervical cancer patients with a bulky high-risk clinical target volume (HR-CTV) get the largest benefit of dose escalation in terms of local control. But the expected survival benefit could be lessened by a higher metastatic risk. We examined the patterns of relapse according to the HR-CTV and to the ability to reach the target dose.

Material and Methods: Pts treated with chemoradiation between 04/2007 and 02/2012 were included if they had a disease limited to the pelvis after an exhaustive primary staging (PET/CT plus primary laparoscopic para-aortic lymphadenectomy) and if they had received concurrent chemotherapy. Pts received pelvic irradiation (45 Gy) then a PDR brachytherapy boost +/- a pelvic sequential boost for PET positive pelvic lymph nodes. First sites of relapse were examined.

Results: 109 pts were included, with median follow-up of 39 months. Median D90 HR-CTV was 73.5 Gy in case of HR-CTV ≥ 30 cm³ (n = 28) versus 86.4 Gy in case of HR-CTV < 30 cm³ (p < 0.001). Pts with a not-bulky HR-CTV (< 30 cm³) experienced local failure in 5/81 (6.2 %), versus in 6/28 (21.4 %) in case of bulky HR-CTV (p <0.03), but the HR-CTV volume did not correlate with the risk of local failures as only events. Pts with a bulky HR-CTV volume had a higher risk of distant failures: 10/28 (35.8 %) versus 7/81 (8.6 %) in case of not-bulky HR-CTV (p = 0.002). Local failures were seen in 3/47 (6.4 %) for pts with a D90 HR-CTV ≥ 85 Gy and in 8/62 (12.9 %) for pts with a D90 HR-CTV < 85 Gy, respectively (p =0.055). Distant failures were seen in 1/47 (2.1 %) and in 16/25 (62.8 %), respectively (p <0.001). This higher frequency of distant events in pts with a D90 HR-CTV ≥ 85 Gy remained significant after exclusion of local failures: 0/44 (0 %) versus 11/54 (20.4 %), respectively (p < 0.001).

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.

PO-0959
Dosimetric outcome and perioperative toxicity using Utrecht applicator in cervical brachytherapy
F.J. Celada Alvarez1, J. Burgos1, S. Rołdán1, R. Chicas2, D. Farga3, M. Pérez2, I. Paredes2, J. Pérez-Calatayud4, A. Tormo1
1Universidad de Valencia, Programa de Doctorado de Medicina, Valencia, Spain
2Hospital Universitari i Politècnic La Fe, Oncologia Radioteràpica, Valencia, Spain
3Hospital Doctor Peset, Oncologia Médica, Valencia, Spain
4Hospital Universitari i Politècnic La Fe, Radiofísica, 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
Results: 110/122 (90.16%) patients were IIB stage or bigger, and in 68% of patients 6 needles were inserted in both applications. Median tumour volume at diagnoses was 39.8 cc (78.50-94.00) and median HR-CTV volume at first application was 41-44 cm³. Mean cumulative HRCTVD90 with daily plan optimization was 92 Gy10, and the mean rectal, sigmoid and bladder D2cc doses were 67, 65 and 83 Gy3 respectively. There were no clinically significant changes in the mean HRCTV or OAR D2cc doses with only two plans prior to fractions 1 and 3. The GEC-ESTRO HRCTV target dose >85 Gy10 was achieved in 16/20 patients with either daily plan optimization or planning only twice. All GEC-ESTRO OAR target doses (rectum <75 Gy3, sigmoid <75 Gy3, bladder <90 Gy3) were achieved in 14/20 patients with optimized daily replanning, and this was maintained when only two plans were used. Plan adaptation with addition of interstitial needles for second insertion resulted in improved HRCTVD90 dosimetry in 8/10 cases and in improved OAR dosimetry in 4/10 cases.

Conclusion: MRGBt can potentially improve outcomes of cervical cancer patients but is more resource intensive. This study suggests that improvements in efficiency can be achieved through process analysis and optimization. While adaptive MR-based replanning is fundamental to achieving the benefits of MRGBt, replanning at strategic intervals may be as effective as daily replanning with considerable savings in resources.

PO-0961 Retrospective dosimetric comparison of TG43 and a commercially MBDCA for gynecological brachytherapy

S. Pinto1, A. Pereira1, T. Viterbo1
1Instituto Português de Oncologia do Porto Dr. Francisco Gentil, Medical Physics, Porto, Portugal

Purpose or Objective: To compare dosimetric plans using a commercially model based dose calculation algorithm (MBDCA) following TG186 recommendations, and the conventional TG43 method in an 192Ir high dose rate (HDR) gynaecological brachytherapy (BT) procedures using two types of cylindrical applicators.

Material and Methods: We analyzed the data of six patients with cervical carcinoma, receiving a 192Ir HDR brachytherapy treatment. The dose was delivered with a micro-Selectron afterloader. A treatment plan was performed using both the TG43 and TG186 dose calculation methods of the Oncentra Brachy v4.5 treatment planning system (TPS). Two cylindrical applicators, of 30 mm and 35 mm diameter were used: the Vaginal Applicator Set and the Shielded Cylindrical Applicator Set, by Nucletron. The treatment dose is prescribed at 0.5 cm distance from the cylinder wall (prescription point), with a treated extension of 3 cm. Analysis included dose volume histograms (DVH) for bladder and rectum and prescription point, according to American Brachytherapy Society (ABS) consensus guidelines (2012). The TG186 results were obtained using the standard accuracy level option of model-based algorithm (Oncentra Brachy-Advanced Collapsed cone Engine (ACE), Elekta), resulting in calculation times on the order of 40 s.