Conclusion: Our study demonstrates that the pelvic lymph nodes receive a significant dose contribution from brachytherapy in cervical cancer, when employing the Manchester prescription system. This must be taken into account during external beam radiotherapy planning, and adequate external beam boost doses calculated to achieve cumulative tumoricidal doses to pelvic nodal disease.

PV-0034
HDR BT alone in endometrial cancer: up-date of Piedmont experience in 18 years (71 patients)
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Purpose and Objective: Endometrial cancer is the mainly gynaecologic malignancy, 80-85% in stage I at diagnosis. The standard primary treatment remains TAH&BSO, with appropriate surgical staging. The epidemiology of this disease favours elderly, obese women with multiple medical problems (hypertension, diabetes, cardiovascular diseases, coagulation disorders, respiratory disorders) that render some of them medically inoperable. RT alone is the only efficient option for these women. BT is the main component in this cohort of patients (pts).

Material and Methods: September 1997-September 2015: 90 pts RT alone, 71 BT HDR alone. Median age 79 years (range 57-93). Staging: clinical examination, TVUS, MR or CT scan and fractionated curatecture. Stage Ia 32 pts, Stage Ib 36 pts, Stage II 3 pts. OS, DSS, LC and late side effects were analysed retrospectively. Follow-up > 10 years (mean 57 months). BT HDR with Rotte “Y” applicator, plus VBT in stage II. Dose prescription at “uterine points” that are two points located 1 cm over the middle of a line drawn between the tips of the two ends of the “Y” applicator and at series of points placed laterally to the tandem according to the pre-treatment imaging data. We treat the entire length of the uterus to ensure coverage of the fund. To maintain the bladder and rectal maximum point doses below 100% of the prescribed dose we optimize with TPS. Until 2002 BT was performed 4-5 times, weekly, mean dose 29.3 Gy (range 18-35 Gy); from 2003 (42 pts) we deliver 30 Gy in five frs, 6 Gy each b.i.d. schedule, 6 hours interval between frs.

Results: 5 years OS, DSS and LC: 52.1%, 85.9%, and 91.2%. Stage Ia: 56.3%, 87.5%, and 90.6%; Stage Ib: 50%, 86.1%, and 94.4%; Stage II: 33.3%, 66.7%, and 66.7%. DSS was not affected by tumour grade or age. One patient had a PD, 6 (10.6%) developed recurrence after a median of 13 months (3 with distant metastases), 2 (3.5%) a lymph node recurrence with distant metastases. One patient had a GE grade III late side effect (1.8%) at 5 years, not related with rectal dose.

Conclusion: HDR BT with “Y” applicator is a very effective treatment modality with good LC rates and suitable DSS for pts who are not fit for surgery. This technique has proven to have a low risk of acute complications and long-term side effects. Longer follow-up will be required to document the incidence of late effects using the b.i.d. schedule. In the short term, it seems that this approach is a feasible way to limit the number of procedural complications and length of hospital stay and bed rest.

PV-0035
Electronic brachytherapy for basal cell carcinoma: two prospective pilot trials with different doses
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Purpose or Objective: Basal cell carcinoma (BCC) is a very common cancer in the Caucasian population. Treatment aims to eradicate the tumor with the lowest possible functional and aesthetic impact. Electronic brachytherapy (EBT) is a treatment technique currently emerging. This study aims to show the outcomes of two consecutive prospective pilot clinical trials using different radiation doses of EBT with Esteya® EB system for the treatment of superficial and nodular basal cell carcinoma.

Material and Methods: Two prospective, single-center, non-randomized, pilot studies were conducted. Twenty patients were treated in each study with different doses. The first group (1) was treated with 36.6 Gy in 6 fractions of 6.1 Gy and the second group (2) with 42 Gy in 6 fractions of 7 Gy. In one case the 6.1 Gy/fraction resulting from the theoretical RBE calculation was used, and in the second arm (7 Gy/fraction) the same dose as the Valencia applicator study was used. Cure rate, acute toxicity and late toxicity related to cosmesis were analyzed in the two treatment groups.

Results: In group 1, a complete response in 90% of cases was observed at the 1 year follow-up, whereas in group 2 the complete response was 95%. Tumor persistence or recurrence was suspected clinically and dermoscopically in two patients in the first group at 3 and 6 months respectively and in one patient in the second group at 1 year follow-up. The differences with reference to acute toxicity and the cosmetic results between the two treatment groups were not statistically significant.

Conclusion: Our initial experience with Esteya® EB system to treat superficial and nodular BCC shows that a dose of 36.6 Gy and 42 Gy delivered in 6 fraction of 7 Gy achieves a 90% and 95% clinical cure rate at 1 year respectively. Both groups had a tolerable toxicity and a very good cosmesis.

PV-0036
Dosimetric evaluation of 3D printed applicators for High Dose Rate brachytherapy
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Purpose or Objective: Feasibility and dosimetric study of 3D-printed cylindrical and skin mould applicators for High Dose Rate brachytherapy (HDR-BRT) using acrylonitrile butadiene styrene (ABS).

Material and Methods: Three cylindrical applicators (1 as reference and 2 as test) with a single 2.5 mm catheter channel and a 1 mm radial slit for radiochromic film support were 3D printed (HP3DX100, Hamlet, Dublin, IE) using ABS plastic. The reference had the radiochromic slit in contact
Results: The radiation attenuation profiles were comparable in all the cylindrical configurations. Dose attenuation were not sensitive to the density of the material (Tab.1a). When comparing 3D-printed skin mould applicators with the commercial Freiburg Flap applicator with 10%, 20% and 40% infill printing percentage (Fig.1c) and a parallelepiped applicator with 10%, 20% and 40% infill percentage (Fig.1d), a prescription dose of 2 Gy to the surface at 5 mm distance from the channel axes was delivered using a 192Ir source. Surface dose distributions were measured with Gafchromic EBT3 films for both the 3D-printed skin mould applicators and the commercial Freiburg Flap applicator considered as reference. The gamma index method with dose difference (DD) criteria of 3%, distance-to-agreement criteria (DTA) of 3 mm and 10% dose threshold was evaluated.

Conclusion: ABSSD-printed applicators are a reliable solution for patient-specific HDR-BRT of superficial lesions. Further assessment of 3D printing techniques and materials are required for clinical development.

PV-0037
Application of brachytherapy for residual nasopharyngeal carcinoma after external beam radiotherapy
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Purpose or Objective: Local residual disease occurs in 7-13 % after primary treatment for nasopharyngeal carcinoma (NPC). To prevent tumor progression and/or distant metastasis, treatment is indicated. This studies focus on the application of 3D-CT based and endoscopical guided brachytherapy for the treatment of residual lesion in nasopharyngeal cavity of NPC after the radical external beam radiotherapy and to assess the safety and clinical outcome of this technical.

Material and Methods: 26 patients with stage T1-T2b NPC who suffered from locally residual lesion in nasopharyngeal cavity involved (All the tumors were less than 1 cm below the nasopharyngeal epithelium) after standard radical radiotherapy (70-74 Gy) a platinum-based chemotherapy were further administrated by the 3D-CT based and endoscopical guided brachytherapy using the Foshan applicator or the standard nasopharyngeal applicator according the tumor location. The prescribed salvage dose of brachytherapy was 3.5 Gy/fraction, twice daily with an interval of 6 h to a total dose of 7-14 Gy (one week apart) depending on the total dose of external beam radiotherapy. The total dose ranged from 81.8-85.6 Gy when transformed to EQQ2 models, and the PtStm D1%< 60 Gy was restricted in planning. The primary endpoint was 1-, 3-year overall survival and secondary endpoints were: local control, distant metastasis and grade 3-4 adverse events.

Results: The whole brachytherapy procedure was well tolerated under local anesthesia. 24 patients (92.3%) get complete response (CR) as confirmed by enhanced CT/MRI after 1-3 month after the brachytherapy. With a median follow-up time of 40 months, no serious complications or late sequelae occurred. The 1-, and 3-year overall survival, locoregional free survival, and distant-metastasis free survival rates were 96.2%, 80.8%, 92.3% and 84.6%, respectively. And the patients with early-T stage at initial diagnosis had 100% local control rate.

Conclusion: Brachytherapy is of benefit to improve the local control of primary lesion of NPC with residual nasopharyngeal cavity involvement. It is a safe and effective approach for patients with poor tumor regression at the end of external beam radiotherapy for boosting the local irradiation dose.

PV-0038
Multivariable model development for mortality after total salvage iodine-125 prostate brachytherapy
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Purpose or Objective: Total salvage iodine-125 brachytherapy (TS I-125-BT) is a potentially curative treatment strategy for localized prostate cancer (PCa) recurrences after radiotherapy. Prognostic factors influencing PCa-specific and overall mortality (PCaSM & OM) are not known. The objective was therefore to develop a multivariable, internally validated prognostic model for survival after TS I-125-BT.

Material and Methods: Retrospectively, sixty-two TS I-125-BT patients were analyzed. These patients were treated from 1993-2010 in the Netherlands. Multivariable Cox-regression was used to assess the influence of pre-salvage characteristics on PCaSM and OM. Missing data was handled by using multiple imputation (20 imputed sets). Internal validation was done using 500 bootstrap resamples of every imputed set. Discriminatory ability was quantified with the C-statistic. Calibration plots were created to visually assess the