dose comparison between OARs; 2) Normalisation to the *OARs* in order to meet OAR's hard constraints while attempting to maximize dose escalation to the HR-CTV, thereby enabling comparison of dose coverage to the target.

Results

When normalizing to the target, mean D2cc of OARs is significantly higher with IC BT (Fig. 1). In particular, bladder D2cc hard constraint are not achieved when boosting with IC BT. Adding interstitial needles to IC BT results in a mean absolute reduction of bladder D2cc of 1 Gy (i.e. a relative dose reduction of 19%), thereby achieving the hard dose constraint. SBRT provides the lowest D2cc dose to OARs.

When normalizing to the OARs while escalating the dose to the target, IC BT provides significantly lower dose to the D90% of HR-CTV and cannot achieve the coverage goal of 7.1 Gy (Fig. 2). SBRT yields the highest dose to the D90% of HR-CTV. However, the inherent physical limitations of SBRT result in significantly lower D50% and D30%.

Conclusion

The main advantage of BT in comparison to SBRT is the higher D50% and D30% to the target. Dose escalation of BT naturally occurs at the center of the target and might therefore explain the inferior outcome of SBRT in epidemiological series. IC+IS BT provides a significantly better target coverage and lower dose to the OARs in comparison to IC BT, and therefore seems the best boost modality in locally advanced cervical cancer.

Figure 1: Dose to Organs at Risk

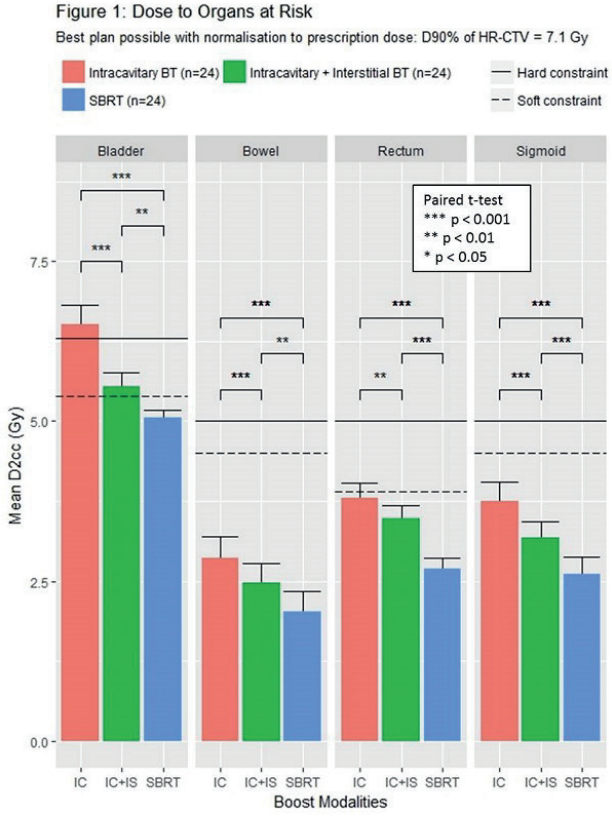
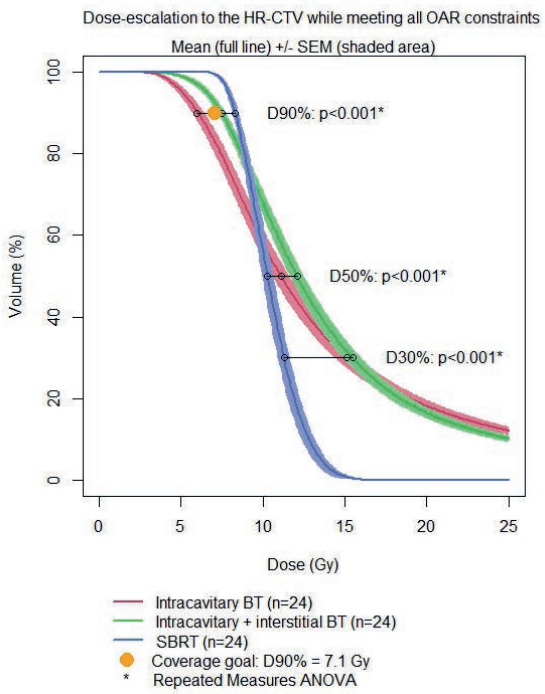


Figure 2: Mean DVH of High-Risk CTV (HR-CTV)



EP-2226 Toxicity results after treatment with Electronic Brachytherapy in patients with endometrial cancer

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Purpose or Objective

To analyse the toxicity outcomes after treatment with Electronic Brachytherapy (XB) in postsurgical endometrial cancer patients treated at our medical centre.

Material and Methods

Prospective study in which we selected 94 patients, between September/2015 and September/2017, that received treatment with XB administered twice a week after endometrial cancer surgery, with IMRT planification. The patients were divided in two groups: Group 1 (57/94) considered high risk received external beam radiotherapy (46Gy) followed by XB (15Gy in 5Gy fractions) and group 2 (37/94) considered intermediate risk received exclusive XB (25Gy in 5Gy fractions). We analysed the median dose in bladder, rectum and sigmoid D2cc, V50, V35 with XB comparing the doses with Ir192. The vaginal mucosa, gastrointestinal (GI) and genitourinary (GU) toxicities were analysed with the Common Terminology Criteria for Adverse Events (CTCAE 4.0) scale.

Results

The median dose in bladder with XB vs. Ir192 was: 2cc 62.9 vs. 69.9%, V50 7.1 vs. 12.6Gy, V35 15 vs. 28.1. In rectum XB vs. Ir192 was: D 2cc 64.01% vs. 67.7%, V50 7.8 vs. 10.9Gy, V35 16.5 vs. 31.8Gy. In sigmoid XB vs. Ir192

was: D 50.37%vs. 58.0%, V50 8.8 vs. 16.2Gy, V35 21.2 vs. 37.5Gy.
The median follow-up was 11 months (range 1- 23,9 months).
In group 1, acute vaginal mucositis (G1) was observed in 35.08% of the patients, GI toxicity (G1) in 5.26% and GU toxicity (G1) in 10.52%. In group 2, we observed acute vaginal mucositis G1 in 45% of the patients and G2 in 10.81%, GI toxicity (G1) occurred in 2.7% and GU toxicity (G1) was present in 16.21%. There was no grade 3 or greater toxicity in any of the groups. Late toxicity was observed in only 4 patients: Mucositis (G1) in 3 patients and GU toxicity (G1) in 1 patient.
Conclusion
The dose received by the organs at risk with the XB is less compared to Ir192, with a good coverage of the PTV. The greater toxicity was observed immediately after the treatment was finished with an important reduction of the symptoms after 6 months. This technique shows excellent results as for toxicity.

EP-2227 CT-simulation in intracavitary vaginal cuff brachytherapy. our centre experience.

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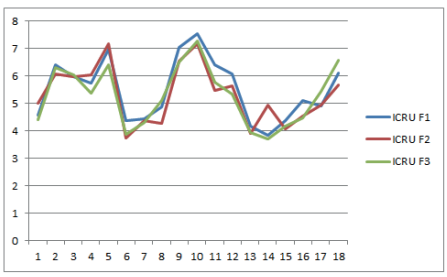
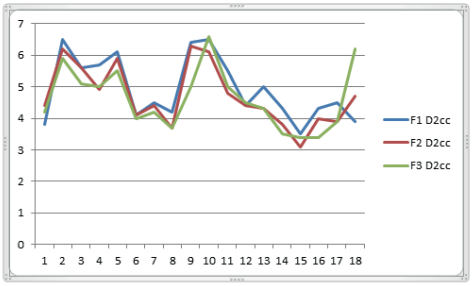
Purpose or Objective
To verify the reproducibility of point bladder dose parameters (ICRU point and D_{2cc}) between fractions, of the vaginal cuff brachytherapy (VCB) for the adjuvant treatment of the endometrial cancer patients.
Material and Methods
We analyzed eighteen patients, treated with three applications of VCB of 5 or 7 Gy per fraction. We acquired a CT-based HDR planning before each fraction. The dose calculation for the first fraction (F1dose) was reproduced in the other two. We determined the doses at the bladder ICRU point and D_{2cc}. Two-tailed paired t-test was performed to analyze the differences between the estimated dose (F1+F1+F1) and the real calculated dose adding the three fractions (F1+F2+F3). We also determined the average deviation between the estimated dose and the real calculated dose, and we set it as a confidence interval for the estimated dose.
Results
Both the estimated and the calculated dose in the bladder ICRU point are statistically identical with a 95% confidence interval ($p<0.05$). Also the bladder D_{2cc} are statistically identical in both, the estimated dose and the real calculated dose plans (95% confidence interval, $p<0.05$). So we can say that estimated dose, is a good dose estimator within a 5% uncertainty interval (k=2) in the bladder ICRU point and within an 8% uncertainty interval (k=2) regarding D_{2cc}.

BLADDER ICRU POINT



BLADDER D2cc



Conclusion
We have probed that dose variations from fraction to fraction are statistically negligible, so imaging with a CT-based in F2 and F3 can be avoided. We have also set a confident interval for the treatment total dose in bladder ICRU point and D_{2cc}.

EP-2228 Efficacy of rectal spacer to reduce rectum dose in HDR brachytherapy for carcinoma of uterine cervix

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Purpose or Objective
To evaluate the efficacy of using rectal spacer to minimize rectum and bladder doses during high-dose-rate (HDR) intracavitary brachytherapy for uterine cervical carcinoma.
Material and Methods
A total of 49 tandem and ovoids applications (Cervix Rotterdam applicator, Elekta, Stockholm, Sweden) treated in HDR intracavitary brachytherapy (Flexitron, Elekta, Stockholm, Sweden) were reviewed. In each application, an intrauterine tube (30-70 mm in length) was inserted into the uterine cavity followed by the placement of an ovoid pair (15-25 mm in diameter) at the level of fornices in the vagina of patient under general anesthesia. The 30 mm wide rectal spacer was an optional accessory that could be fixed beneath the ovoids to displace the rectal wall posteriorly. Vaginal gauze packing was then performed after applicator insertion to fill the vaginal space and displace the rectum and bladder from the applicator. The bladder and rectum reference points were defined according to the recommendations of the International Commission on Radiation Units & Measurements.
27 applications were performed by vaginal gauze packing only and 22 applications were performed with the use of rectal spacer as well as vaginal gauze packing. The rectal and bladder percentage doses relative to the prescription dose were compared between the two groups using Mann-Whitney U test with significance level set at 0.05.
Results
The mean rectal percentage dose in the rectal spacer with vaginal packing group was 54.0 %, which was significantly lower than the mean rectal percentage dose 65.5% in the vaginal packing only group (p = 0.022). Although the mean bladder percentage dose was lower in the rectal spacer with vaginal packing group (67.2%) than that in the vaginal packing only group (72.8%), no significant difference were observed between the two groups (p = 0.984).
Conclusion
Compared to the traditional technique of vaginal gauze packing, the use of rectal spacer with vaginal packing can further reduce the rectum dose in HDR intracavitary brachytherapy. The technique of adding rectal spacer in conjunction with vaginal packing is recommended when