status performed in 72 (75%) pts. median 4 (0-40) in other 24 (25%) N×. diameter of the cylinder used in 76 (84%) pts. was 3-4 cm remaining 20 (26%) diameter 1-2. Only 3 (3%) pts resulted disease progression. Psychological evaluation was performed on 69 pts (Median age 61; 44 - 71), the other 27 cannot be estimated because not interested. In the first area test showed for a third of pts a change of social relations judged value “from much up to very much”, while in half of respondents, there was same value in personal sphere. Considering couple intimacy the 71% of women had undergone a change, and 81% reported decrease of sexual desire. In third area half of pts said they were informed about impact of BRT on sexual life evaluating changes induced by it “from much up to very much”; 71% of women surveyed have been recommended to have therapeutic relationships, 73% of respondents reported painful intercourse and 91% of pts found it unsatisfactory. 13% of pts has explicitly requested psychological support

Conclusion: Apart from grading and lymph node status, BRT of vaginal cuff is effective in preventing local recurrence. Despite of use of larger diameter cylinders, remains problem of toxicity management post BRT. Analysis of impact on quality of life of these pts causes several issues: whether treatment should always be recommended, if we have to review informed consent and if a psychological support pre-treatment is necessary. An appropriate supportive therapy during and after BRT is always necessary

EP-1961
Factors influencing the risk of uterus perforation in high-dose rate tridimensional brachytherapy
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Purpose or Objective: To evaluate the factors associated with uterine perforation in a population treated with tandem and ovoids high-dose rate tridimensional (HDR 3D BT) brachytherapy for gynecological cancer, without ultrasonographic guidance.

Material and Methods: Computed tomographic images used for HDR 3D BT of 47 cases of gynecological cancer (46 cervical and 1 endometrial cancer) were studied. The perforation rate (PR) was determined by software Oncentra MasterPlan V3.3 (Veenendaal, Netherlands). The categorical variables tested were: bladder filling (empty vs. full), age (≤60 years vs. >60 years), uterine lateral position (left or right vs. central) and uterine sagittal position (anterior vs central or retrograde). For statistical analysis, multiple logistic regression was performed (SPSS V.20).

Results: The study evaluated 186 insertions. The treatment was performed using 4 fractions of 7 Gy in 45 patients (95.7%) and 3 fractions of 7 Gy in two patients (4.3%). Median age was 47 years (range, 24 - 82). The total PR was 21.5% (40 events). The rate of the perforation was: 67.5% posterior wall (27 cases), 17.5% left lateral (7 cases), 7.5% cranial (3 cases), 5% anterior wall (2 cases) and 2.5% right lateral (1 case). In forty-three cases (91.5%), the perforation occurred in the opposite direction of the uterus anatomic position. Factors that increased the PR in univariate analysis were: empty bladder (p<0.001), anterior uterine position (p=0.010) and age (p=0.010). In multivariate analysis, only empty bladder remained as an independent prognostic factor for perforation (p=0.002).

Conclusion: In our series, the modifiable factor empty bladder correlated with uterine perforation. Although uterine anatomic position did not influenced significantly the incidence of uterine perforation, it determined the direction of the perforation in more than 90% of the cases. Our data suggest a potential value of image guidance for brachytherapy insertion.

EP-1962
CT-based optimisation of single source line HDR vaginal vault brachytherapy: a dosimetric study
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Purpose or Objective: To compare CT-based dose distribution to CTV and organs at risk (OAR) of HDR vaginal vault brachytherapy (VVB) with stump applicator according to 2 prescription modes: standard prescription to 5 mm from the applicator head, versus individualised prescription according to the thickness of the vaginal wall.

Material and Methods: This study was performed between January 2013 and December 2014, on a cohort of 61 consecutive patients (pts) with endometrial cancer referred for a post operative HDR VVB. Mean age was 68 years. According to FIGO stage, 21% were la G3, 54% Ib, 10% II and 15% III. 24 Gy in 4 fractions were delivered as sole treatment in 33 pts; whereas 28 pts received 10 Gy in 2 fractions after 45 Gy pelvic irradiation. The CT was performed with applicator in situ before the first fraction. The size of the applicator was determined according to the clinical examination, but was modified if significant air gaps were observed on CT. CTV was defined as the vaginal vault and the upper third of the vagina; intestine as the lower third of the peritoneal cavity. Bladder and rectum were delineated entirely. Using brachyvision®, the Standard Plan (SP) was calculated for delivering the fraction dose (FD) on a reference line placed at 5 mm of the applicator surface irrespective of the location of OAR. The Individualised Plan (IP) was calculated from a line that conformed to the outer contour of the CTV with the following constraints: CTV90 = FD +/- 5%, D2cc to rectum and bladderFD and D2cc to Intestine ≤ (FD-1Gy). The CTV90 and D2cc to OAR were used for the plans comparison.

Results: According to constraints (in, above, under), 6 different groups could be defined: Gp1 : D90 and D2cc in; Gp2 : D90 in and D2 cc above; Gp3 D90 and D2cc above; Gp4 : D90 above and D2cc in ; Gp5 D90 under and D2cc in ; Gp6 D90 under and D2cc above. Results of the comparison are summarised in the following table.

Conclusion: CT-based individualised single source line HDR VVB was feasible and resulted in optimisation of the dose distribution to CTV and/or OAR in the majority of cases. In only 20% of cases, individualisation didn’t change the dose distribution. Consequently, CT-based dosimetry became the standard procedure in our department since January 2015. The assessment of the clinical impact will be the next step.

EP-1963
Dosimetric evaluation of image guided brachytherapy using tandem-ovoid and tandem-ring applicators
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Purpose or Objective: The aim of the study is to evaluate the differences in dosimetry between tandem-ovoid and tandem-ring gynaecological brachytherapy applicators in image guided brachytherapy.
Material and Methods: 100 CT datasets of cervical cancer patients (stage IB2 – IIIB) receiving HDR application (50 tandem-ovoid and 50 tandem-ring) were studied. The external beam radiotherapy dose was 50Gy. Brachytherapy was delivered using a CT-MRI compatible tandem-ovoid (50 patients) and a tandem-ring applicator (50 patients) to a dose of 5Gy/# in 2fractions. Bladder and rectum were contoured using oncentra planning system. DVHs were calculated and D2cc was recorded for bladder and rectum and compared with the corresponding ICRU point doses. The point B dose, the treated volume, high dose volume and the treatment time was recorded and compared for the two applicators.

Results:

<table>
<thead>
<tr>
<th>Applicator</th>
<th>Mean D2cc (Gy)</th>
<th>Mean ICRU/D2cc ratio</th>
<th>Mean D2cc Rectum (Gy)</th>
<th>Mean ICRU/D2cc ratio Rectum</th>
<th>Mean ICRU D2cc Bladder (Gy)</th>
<th>Mean ICRU D2cc Rectum (Gy)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tandem-Ring</td>
<td>6.57</td>
<td>5.56</td>
<td>3.95</td>
<td>5</td>
<td>0.847</td>
<td>1.265</td>
</tr>
<tr>
<td>Tandem-ovoid</td>
<td>7.30</td>
<td>5.63</td>
<td>4.79</td>
<td>5.65</td>
<td>0.772</td>
<td>1.179</td>
</tr>
</tbody>
</table>

Conclusion: The results indicate that the OAR doses assessed by DVH criteria were higher than ICRU point doses for bladder with both tandem-ovoid and tandem-ring applicators whereas DVH based dose was lower than ICRU dose for rectum. The point B dose, the treated volume and high dose volume was found to be slightly higher with tandem-ovoid applicator whereas the total treatment time was higher with the tandem-ring applicator. The mean D2cc dose for bladder and rectum was lower with tandem-ring applicators. The clinical implication of the above dosimetric differences needs to be evaluated further.

EP-1964 Measurement of vaginal dose with image guided vaginal vault brachytherapy

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Purpose or Objective: The aim of this study is to evaluate an accurate method to define vaginal dose distribution in the delivery of vaginal vault brachytherapy (VBT) utilising a single channel cylinder.

Material and Methods: A retrospective analysis of all 3D single channel cylinder VBT plans held on BrachyVision™ 10.0 treatment planning system obtained between April 2011 and December 2013. All patients received treatment to the top 4cm of the vagina at 0.5cm depth prescription point with fractional doses of 5.5Gy or 7Gy. Dose assessment is conducted using both point dose values and DVH parameters for vaginal wall. A vaginal apex dose point (VAdp) was defined as a midline point on the single channel cylinder, positioned at the apex representing vaginal surface dose (Gy). A second rectal / vaginal dose point (RVdp), positioned 0.5cm posterior to vaginal wall (ICRU rectal point) is also used. This is potentially a good surrogate for vaginal mucosa dose due to its proximity to vaginal cylinder. A presumed vaginal wall thickness of 0.5cm was used to grow a volume representing the upper 4 cm of vaginal mucosa; the D2cc (Gy) and D5cc (Gy) are recorded. Pearson’s correlation coefficient is used to calculate correlation between dose point values and dose volume parameters obtained. A p-value <0.05 was considered statistically significant in this study.

Results: A total of 113 CT data sets are analysed. 69% (n = 78) of patients had a prescribed fractional dose of 5.5Gy and 31% (n = 35) received 7Gy fractional dose.