Positron Emission Tomography/Computed Tomography (FDG-PET/CT) standardized uptake value (SUV) and total lesion glycolysis (TLG) with tumour characteristics and clinical response in a series of rectal cancer patients treated with neoadjuvant chemo-radiotherapy

**Material and Methods:** Fifty-six patients were included in the present analysis. Pre-treatment PET maximum SUV (SUVmax), mean SUV and TLG of primary tumour were calculated for each patient. The total dose of pelvic radiotherapy was 45-50.4 Gy, 1.8 Gy/fraction. Chemotherapy was delivered with capecitabina or 5-fluorouracil. Six to eight weeks after RT-CT, 44 patients (78.6%) had anterior rectal resection and 12 patients (21.4%) had abdominal pelvic resection (Miles). Tumor Regression Grade (TRG) (Mandard, 1994) was defined on surgical specimen. Complete regression (TRG1) was observed in 10/56 (17.9%). The correlation between PET/CT results and histopathological data and tumour response was analyzed.

**Results:** At the level of the primary tumour, SUVmax ranged from 4.17 to 54.06 (mean 22.46, median 18.89), SUV mean ranged from 6.22 to 32.64 (mean 13.42, median 11.09) and TLG ranged from 6.22 to 32.64 (mean 13.42, median 11.09) and from 4.17 to 54.06 (mean 22.46, median 18.89). Median SUVmax was significantly higher (p = 0.05) for lesions with partial response (PR, 46/56, 81.7%) than for lesions with complete response (CR, 9/54, 16.7%) but without statistical significance (p = 0.18).

**Conclusion:** Our results show that PET/CT follows by surgery gets excellent outcomes with acceptable toxicity and may reduce local recurrences. Besides it enables assessment of the pathological response.

**EP-1311**

Chemoradiotherapy followed by surgery in patients with locally advanced cervical carcinoma


**Purpose or Objective:** To evaluate pathological response and clinical outcomes in women with locally advanced cervical cancer treated with radiochemotherapy and surgery in a tertiary hospital.

**Material and Methods:** In this retrospective analysis we have included 59 patients with cervical cancer (FIGO stages IB2-IVA) who were treated between December 2004 and July 2015 with concurrent chemoradiation therapy (CRT) followed by surgery. The patients were treated with pelvic external beam radiotherapy at 46-50.4 Gy, 1.8-2 Gy/day. Based on CT or PET CT if aortic nodes were demonstrated, extended external beam radiotherapy was performed. We boosted nodes or parametria if they were affected (60-68 Gy, 2 Gy/day). After four weeks of treatment, patients received brachytherapy from 15 to 26 Gy in 3-6 fractions with 2D planification or 3D planification (n=28), with a total tumour dose between 85 and 90 Gy. Concurrent chemotherapy with weekly platin and in some cases oral fluoropirimidine was administrated. Overall treatment time did not exceed 8 weeks. All patients completed surgery between 4-15 weeks after CCRT.

**Results:** The median age was 52 years (range 30 and 77). Squamous cell carcinoma was the most common subtype (81%). All patients received hysterectomy. 7 patients (12%) underwent lymphadenectomy. In global, 32 patients (54%) had a complete response, 20 (34%) a partial response and 7 (12 %) patients had residual microscopic disease in the pathologic analysis. With a median follow up of 53 months (range from 2 to 128 months) overall survival was 85% and disease free survival 81%

**Conclusion:** Our results show that CCRT followed by surgery gets excellent outcomes with acceptable toxicity and may reduce local recurrences. Besides it enables assessment of the pathological response.

**EP-1312**

Measurement of GTV delineation uncertainty for centrally recurrent gynaecological cancers

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**Purpose or Objective:** To quantify the magnitude of clinician uncertainty in GTV delineation for patients with recurrent gynaecological cancers.

**Material and Methods:** GTV delineation uncertainty was retrospectively investigated in patients previously treated in our institution for centrally recurrent gynaecological cancer. In order to record clinician delineation uncertainty, clinicians were asked to draw 3 outlines per GTV; an inner GTV (GTV_I) corresponding to the innermost boundary the GTV is likely to have, an outer GTV (GTV_O) corresponding to the outmost boundary the GTV is likely to have and a clinical GTV (GTV_C) outlined in accordance with local treatment protocols. For GTV_C, each observer submitted a confidence score from 1 to 5, with 1 being no confidence in drawn and 5 complete confidence. For each patient, the 3 GTV’s were delineated on a co-registered CT-MR, using a local rigid soft tissue registration, as well as on MR images only in order to identify how the co-registered CT information affects the decision process. Paired T Tests (p) were used to test for significance and Pearson correlation coefficient (r) for correlations.

**Results:** To date, 18 recurrences from 17 patients were investigated by a single observer. For all 17 MR only contours and for 15 out of the 17 CT-MR contours, the GTV_O and GTV_C were identical. GTV_C ranged from 6.3 to 192.9cm³ for CT-MR contours and from 5.5 to 180.1cm³ for the MR only contours, with a mean ± standard deviation of 53.3±44.7cm³ and 39.3±40.4cm³ respectively. The reduction in GTV_I relative to GTV_C was 19.6±12.4cm³ (p<0.01) for CT-MR contours and 13.3±9.8cm³ (p<0.01) for MR only contours. For GTV_C, MR only contours were consistently smaller than CT-MR contours by 14.0±11.4cm³ (p<0.01). For GTV_I, MR only contours were smaller for 13 out of the 17 cases, with differences of 7.9±7.7cm³ (p<0.01). The 3D difference in the centre of mass (COM) between GTV_O and GTV_C was 2±2mm for the CT-MR contours and 2±1mm for the MR only contours. Scoring of GTV_C was significantly lower (p<0.01) for CT-MR contours relative to MR only contours, with scores of 2.8±0.6 and 3.6±0.7 respectively.

**Conclusion:** Uncertainty exists in defining the boundary of the GTV for this patient cohort resulting in uncertainty in
both the volume and centre of the GTV. The process of using co-registering 
MR-CT images increases the uncertainty and 
leads to larger volumes when compared to GTV delineation 
using MRI only. Data from additional observers will help 
quantify the magnitude of GTV delineation uncertainties. The 
limitation of having outlines from a single non-expert 
observer will be addressed in the final publication.

EP-1313
Short course post operative IMRT on vaginal vault of 
endometrial tumor at low-risk of recurrence
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Purpose or Objective: To evaluate long-term clinical results after intensity modulated radiotherapy technique (IMRT) on vaginal vault in post-operative low-risk endometrial cancer patients.

Material and Methods: Patients enrolled in two sequential trials (June 2006-October 2014) were analysed. A radiopaque methacrylate vaginal applicator was placed in the vagina. Patients were planned in supine position and immobilized using a vacuum cushion. Each patient was instructed to follow a protocol of controlled bladder filling and rectal emptying. Three radiopaque markers (1 mm diameter) fixed on the applicator allowed to improve visualization on portals imaging. Radiotherapy was delivered on the upper two thirds of the residual vagina (CTV), daily identified by the radiopaque markers. A 5 mm isotropic margin was added to the CTV in order to define the planning target volume (PTV). A 7 beams step and shoot IMRT technique was used by means of Plato Sunrise and Ergo++ treatment planning systems. 25Gy/3Gy per fraction in the first trial and 30Gy/6Gy in the second one were the doses delivered to PTV. Toxicity was scored by the CTC-AE v.3.0 scale.

Results: 23 patients (median age 63 years, range 49-88; stage IA: 69.6%, IB: 21.7%, II: 8.7%; grading G1: 3; G2: 17; G3: 3) were included in this analysis. Seven patients received 25Gy/3Gy and 16 received 30Gy/6Gy per fraction. Proctitis and dysuria were the most common toxicities. Twelve patients (52.2%) developed late mild toxicity (G2: 1 rectal bleeding and 1 atrophic skin with plaque lesions). The most common late toxicity was G1 vulvar telangiectasia (26%), while 3 patients developed G1 vaginal stenosis (Table 1).

With a median follow-up of 52 months (range 4-103) no vaginal recurrence was observed (5-year local control: 100%), while 4 patients developed pelvic or distance relapse (5-year disease-free survival: 86.4%). Five-year overall survival was 100%.

Conclusion: Endovaginal brachytherapy studies reported 0-5.2% late severe toxicity. Most toxicities were vaginal and urethral stenosis or rectal vaginal fistula, not observed in our study. In conclusion postoperative IMRT on vaginal vault showed promising clinical long-term results.

EP-1314
External beam boost for cancer of the cervix in patients unable to receive brachytherapy
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Purpose or Objective: The current study aims to evaluate the outcomes in patients treated with radical radiotherapy for cervical cancer who received external beam radiotherapy (EBRT) boost in place of intracavitary brachytherapy (ICBT).

Material and Methods: We performed a multicenter retrospective study on the patients with cervical cancer treated with external beam boost as a substitution of ICBT during the period of January 2005 through October 2012 in 11 participating radiation oncology centers in Korea. Treatment outcome, prognostic factor, and toxicity were evaluated.

Results: Seventy-five patients were identified. The median age of the patients was 58 years (range: 33-92 years). The clinical stages were I in 6, II in 34, III in 18, and IVA in 17 patients. Concurrent chemotherapy was performed to 64 patients (85.3%). Radiation doses were median 46 Gy (range, 40-54 Gy) for whole pelvis and 24 Gy (range, 9-35 Gy) for tumor boost. Three-dimensional radiotherapy (in 24 patients) or intensity-modulated radiotherapy (in 51 patients) was used for tumor boost. On images taken 3-6 months after radiotherapy, 46 patients showed complete response (CR), 24 had partial response, and 2 were found to have progressive disease. The median follow-up time was 33 months. Disease progression was found in 30 patients (40.0%). Among these patients, 21 (28.0%) showed local progression with a median time to progression of 29 months (range, 3-101 months). The 5-year local progression-free survival (LPFS) rate was 70.0%. On uni- and multivariate analyses, treatment response at 3-6