The purpose of this study was to assess characteristics, treatment outcomes and complications in patients with locally advanced or recurrent gynecological malignancies treated with interstitial brachytherapy using MUPIT.

Materials and Methods: We performed a retrospective review of all patients with gynecological malignancies treated with MUPIT in a single institution between January 2005 and May 2014. Cases without data or follow up were excluded. Information recorded were demographic and clinic characteristics, previous use of RT (external or BT), dose rate of interstitial BT, local control rate, late toxicity and mortality rate. Categorical variables are presented as frequencies and proportions, and continuous variables as the mean, median, and range. Local recurrence-free survival (LRFS) and overall survival (OS) after MUPIT treatment were estimated using the Kaplan-Meier method.

Results: Forty six patients were identified. The median age was 64 years (range, 28 - 85). Cervical and endometrial cancers were the most common primary site, with 20 and 16 cases respectively. The indications of interstitial BT were treatment of local recurrence (31), primary tumor (14) and metastases (1). Forty patients received external RT or BT before interstitial BT. High dose rate BT was used in 37 cases. Median LRFs was 76.2 months (CI 95% 61.6 - 90.7) and the median survival time was 82 months (CI 95% 67.5 - 96.5). There have been no cases of Grade IV late toxicity. Proctitis and pelvic pain were the most common grade III complications (4 patients).

Conclusions: Interstitial BT using MUPIT applicator is an effective treatment which obtains high rates of local control despite the bad prognosis of pelvic recurrences. Secondary effects are few, and manageable.

EP-1267
Defining a standard method for functional bone marrow sparing with IMRT for cervical cancer
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Purpose/Objective: Bone marrow sparing using intensity-modulated radiotherapy (IMRT) could reduce haematological toxicity from radical chemoradiation for cervical carcinoma. One challenge is to determine the location of functioning bone marrow rather than attempt to spare the whole bony pelvis. On FDG-PET the areas of higher activity correlate with bone marrow rather than attempt to spare the whole bony pelvis. On FDG-PET, to analyse the pattern of SUV activity within the pelvis. On FDG-PET, to analyse the pattern of SUV activity within the pelvis.

Materials and Methods: The FDG-PET scans from 10 patients treated for cervical cancer were assessed. Structure sets consisting 6 absolute SUV thresholds (0.5, 1.0, 1.5, 2.0, 2.5 and 3.0) were created. The distribution of SUV activity within each pelvic subregion and the whole bony pelvis was analysed. The maximum SUV value within the bony pelvis (SUVmax) was defined as the highest level with a volume > 1cc. Volumetric data for SUVmax, SUV >75%Max (SUV75) and SUV >50%Max (SUV50) were compared, measuring the contribution to each region and to the total activity.

Results: The absolute SUV values within the pelvis varied between patients whereas relative values were more comparable. A reproducible pattern of distribution was evident in all patients using SUV75. The highest activity is seen within the lumbar spine, sacrum, posterior iliac alae and pubic bone contributing 86.67% total activity. For SUV75, the SUV range was 1.0 - 2.5 with a mean volume of 98.9cc (Range 19.99 - 196.0cc, SD 50.3), which is 6.9% (range 1.7 - 12.9, SD 3.2) of the mean total pelvic volume.

Conclusions: There is a reproducible pattern of functional bone marrow on FDG-PET within the pelvis. Guidelines for contouring a standard avoidance structure on the planning CT scan have been generated which encompass the areas of highest activity. Bone marrow avoidance should be assessed further in dosimetric and clinical studies.

EP-1268
Biological treatment response and hypoxia monitoring of cervix cancer using multiparametric 3T-MRI and 18F-FMISO
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Purpose/Objective: To monitor changes in tumour microenvironment including hypoxia of cervix cancer patients undergoing chemoradiation with positron emission tomography and multiparametric 3T-magnetic resonance imaging (MP-PET/MRI) using T2-weighted, T1-weighted, dynamic-contrast-enhanced (DCE) MRI, diffusion-weighted imaging (DWI) and 18F-fluoromisonidazole (18F-FMISO).

Materials and Methods: Seven patients underwent 18F-FMISO-PET/CT and MP-MRI at baseline; 2 and 5 weeks (w) after treatment start and 3 months after treatment end. Data were registered, fused and analyzed using Mirada RTx software (Mirada Medical Ltd, Oxford,UK). Gross tumour volume (GTV) was contoured by an experienced radiation oncologist on PET/MRI data sets. The volume of GTV was analysed for size, EH-kinehtics, diffusivity and 18F-FMISO-avidity using SUVmax and SUV-normalized to gluteal muscle uptake. At follow up, cervix was contoured, since all patients showed clinically complete remission.

Results: Median GTV volume was 43.9cc at baseline, 22.4cc after 2w (20-25Gy) and 7.7cc after 5w (40-45Gy). Mean ADC values were 1.02x10-3mm2/sec increasing to 1.18x10-3mm2/sec after 2w and to 1.27x10-3mm2/sec after 5w and were 1.37x10-3mm2/sec at 3 months. All GTVs showed mean initial-enhancement (IE) followed by a plateau with an increasing IE at 2w and wash-out at 5w. At follow-up, the mean IE was 120% followed by a persistent enhancement. The mean 18F-FMISO SUV-norm was 3.1 at baseline and decreased to 2.3 at 2w and 2.0 at 5w and follow-up.

Conclusions: There are morphological and functional changes in tumor diffusion, perfusion and hypoxia during treatment which can be non-invasively monitored with MP-MRI/PET. The
magnitude of response is dependent on time points of evaluation. The predictive power of these changes on long term treatment outcome is object of ongoing prospective study.

EP-1269
From datasets to predictive models in cervical cancer: an ontology to mine data for large data-base
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Purpose/Objective: The scenario in cancer research is currently progressively moving on the analysis of established large database, realized by crossing and combining multiple data. These data must be analyzed by ad-hoc computer softwares to produce models that can predict the treatment outcomes in a reliable way. In order to make possible the integration and analysis of data from different cancer centers and cancer registries, to elaborate predictive models from large datasets there is the need of an ‘ontology’, a kind of dictionary that standardizes the medical terminologies.

Materials and Methods: We defined the ontology evaluated by a multi-professional technical commission composed by a mathematician, an engineer, a doctor with experience in data storage, a programmer and a software expert.

Results: More than 200 clinical, instrumental and imaging variables were cataloged and stored in three different levels. The first level (Registry Level) includes patient-related variables (age, sex, ethnicity, height, weight, etc.) that can be easily used for epidemiological analyzes. The second level (Procedure Level) includes data on the clinical presentation and pathology of the tumor, therapeutic procedures and their side effects. The third and final level (Research Level) will provide for the storage of data in advanced searches. In our ontology we preferably used concepts from existing and mature terminological systems (e.g. NCI Thesaurus, CTCAE, SNOMED-CT). We used field types as text, number, date, table, files. The chosen standard file formats were ‘DICOM’ and ‘TXT files’ for data treatment. The toxicity was stored with CTC4 scale and the RTOG scale (for back comparison with retrospective studies).

Conclusions: A formal ontology is necessary to obtain a standardized and organized dataset. This allows to create a system to share and to analyze data from large multi-centers database. These data can be used to elaborate predictive models to tailored treatment in daily clinical practice.

Electronic Poster: Clinical track: Paediatrics

EP-1270
Volumetric modulated arc therapy in high-risk neuroblastoma's treatment. Single institucional experience
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Purpose/Objective: Descriptive analysis of high-risk neuroblastoma’s treated with volumetric modulated arc therapy (VMAT) based in ’SIOP-Europe 2011 high-risk neuroblastoma’ guidelines.

Materials and Methods: Based in International Neuroblastoma Staging System (INSS), we classify high-risk neuroblastoma those in stage 2, 3, 4 y 4S plus N-myc amplification, or stage 4 over one year-old. From september 2010-2014 seventeen patients were treated with VMAT. 76.4% were boys and 23.6% girls, with a medium age of 37 months. N-myc amplification was positive in 47%. With INSS criteria, we noted:

<table>
<thead>
<tr>
<th>Stage (based in INSS)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>76.4%</td>
</tr>
<tr>
<td>3</td>
<td>11.8%</td>
</tr>
<tr>
<td>2</td>
<td>5.9%</td>
</tr>
<tr>
<td>4S</td>
<td>5.9%</td>
</tr>
</tbody>
</table>

After induction chemotherapy (COJEC), tumor exeresis and autologous blood marrow transplantation, all patients considered eligible for participation in this study were treated with VMAT (21 Gy maximum dose, fractioned over in 14 sessions, 1.5 Gy each one) over the primary tumor area.

Results: After medium follow-up of 23 months (8-41), 41% are alive without tumor, 11.7% are alive with tumor, 23.5% have died because the tumor, 17.6% have died because an intercurrent cause, and 5.8% are dead by an unclearly cause. The radiotherapy tolerance was acceptable: 23.5% presented acute gastrointestinal toxicity grade 1-2 related to treatment. No chronicle toxicity has been noted.

Conclusions: The N-myc amplification is clearly associated with major relapse risk and dead related with progression. This analysis revealed that VMAT in high-risk neuroblastoma’s treatment contributes to locoregional control with acceptable tolerance. There are no enough studies that compare VMAT with other techniques in high-risk neuroblastoma’s treatment. It is important the long follow-up of these patients to evaluate second neoplasms incidence, locorregional control and increase survival.

EP-1271
Development of focused microwave hyperthermia of pediatric brain cancer
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Purpose/Objective: Development of focused microwave hyperthermia of pediatric brain cancer

Materials and Methods: Based in International Neuroblastoma Staging System (INSS), we classify high-risk neuroblastoma those in stage 2, 3, 4 y 4S plus N-myc amplification, or stage 4 over one year-old. From september 2010-2014 seventeen patients were treated with VMAT. 76.4% were boys and 23.6% girls, with a medium age of 37 months. N-myc amplification was positive in 47%. With INSS criteria, we noted: