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*

**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, 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, and table, files. The chosen standard file formats were `DICOM` for image 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.

**EP-1270**

*Volumetric modulated arc therapy in high-risk neuroblastoma's treatment. Single institucional experience*

**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 45 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:

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**Anatomical location**

- Adrenal gland:
  - 64.7%
- Abdominal:
  - 17.6%
- Bilateral adrenal gland:
  - 5.8%
- Cervical:
  - 5.8%
- Thoraco-abdominal:
  - 5.8%

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 death 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*

**Purpose/Objective:** Development of focused microwave hyperthermia of pediatric brain cancer

**Materials and Methods:** We defined the ontology evaluated based in International Neuroblastoma Staging System (INSS), we classify high-risk neuroblastoma those in stage 2, 3, 4 y 45 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:

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Purpose/Objective: Cancer is the most common cause of death at ages 1-16. Approximately 300 children annually develop a malignancy in Sweden and one third of these are brain tumors. Modern therapy cures 75% of all children struck with cancer. However, the tough therapy, including radiotherapy, has both acute and long-lasting, effects. Even low doses of ionizing radiation to the brain can cause intellectual impairment as well as perturbed growth and puberty. Hyperthermia has gained a reputation of effective radio- and chemo-sensitizer, which has minimal side effects. Our hypothesis is that the focused microwave hyperthermia will allow a reduced radiation dose with maintained treatment outcome and no added toxicity. A novel antenna applicator for microwave hyperthermia allowing treatment of deep brain tumors has been designed. The goal of this study is to investigate the feasibility of focused heating deep inside the head.

Materials and Methods: The number and position of antennas was determined by using the homogeneous SAM (Specific Anthropomorphic Mannequin) head model. The focusing abilities of the resulting applicator were then investigated using a 13-year old patient model. Specific absorption rate (SAR) and temperature distributions were computed for five realistic tumors located at various sites. Both pre-operative and post-operative situations were considered.

Results: The applicator consists of 16 antennas placed around the head in a helmet-like set-up and operates at a frequency range of 430-900 MHz. The antennas are attached to a parametric water bolus and aligned with the head shape. The results show considerable target coverage in terms of SAR in the target region with a remarkably low SAR in critical tissues in both pre- and postoperative cases. The postoperative situation showed more favorable heating of the target volume as exemplified by temperature distribution in medulloblastoma shown in Figure 1. The achieved median temperature was 42°C while for the preoperative cases, target temperatures were up to 3 degrees lower due to relatively high perfusion of the target.

Conclusions: The newly designed system is capable of selective intracranial heating in postoperative scenarios. For preoperative applications, further improvements in heating techniques are currently investigated.

EP-1272
Dose painting with Volumetric Modulated Arc Therapy (VMAT) can reduce kidney dose in abdominal neuroblastoma
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4The Christie NHS Foundation Trust, The University of Manchester Manchester Academic Health Science Centre, Manchester, United Kingdom

Purpose/Objective: For high risk abdominal neuroblastoma, traditional paediatric radiotherapy dogma dictates that an irradiated vertebral body (VB) should be fully included within the planning target volume (PTV) to ensure even dose distribution and avoid asymmetric growth. However, clinical experience indicates that beyond a threshold VB dose which abolishes or minimises growth, VB dose inhomogeneity is less relevant. Our objective was to assess whether dose painting using VMAT with a simultaneous integrated boost (SIB) can improve renal sparing.

Materials and Methods: Five cases of lateralised disease previously treated with fixed-fields were replanned with dual arc VMAT using conventional (VMAT-conv) and SIB (VMAT-SIB) techniques. PTV21 was the original, unadjusted PTV (clinical target volume +1cm). Adjacent VB were taken as those ≤1cm from PTV21. For VMAT-conv, 21 Gy in 14 fractions was prescribed to PTV21 and adjacent VB. For VMAT-SIB, 21 Gy was prescribed to PTV21, but adjacent VB were constrained to < 20% dose gradient, or >15 Gy minimum. Organ at risk (OAR) dose constraints were from the SIOPEN HR-NBL-1 protocol. Kidney doses were reduced iteratively to control