Materials and Methods: 30 lesions from 23 malignant astrocytomas (2 AAs and 21 GBMs) were enrolled. Before irradiation, Met-PET was performed in all cases. In each ROI, maximum uptake of Met was determined relative to a corresponding contralateral region (Tmax/Nave). Among the 23 patients, 10 were treated by 3D-CRT with conventional fractionation (40Gy/20Fxs for FLAIR-high area with boost of 20Gy/10Fxs for enhanced lesion), while the remaining 13 were treated by hypofractionated high-dose IMRT. In the IMRT, 3-layered PTVs were contoured (PTV-1: enhanced lesion with 5mm margin, PTV-2: 15mm surrounding the PTV-1,PTV-3: FLAIR-high area) and different doses (68Gy for PTV-1, 40Gy for PTV-2 and 32Gy for PTV-3) were delivered by 8 fractions. Concurrent and adjuvant temozolomide was administrated in all cases. After treatment, MRI was performed with an interval of 1 or 2 months. If the recurrent tumor was observed, Met-uptake at the recurrent point and delivered dose at the same point in the treatment plan of irradiation were retrospectively calculated. The delivered dose was standardized using biologically effective dose (BED, alpha/beta=10). The ratio of Met-uptake/BED was compared with tumor control using logistic regression analysis, and optimal threshold was calculated from ROC curves. The patients were divided into two groups using this threshold and progression-free survival was compared.
Results: Among the 30 lesions, 16 recurrences were observed within one year after irradiation, while 9 lesions were well controlled for more than one year. Five lesions without recurrence were excluded because the follow-up period not reached one year. Met-uptake/BED was significantly correlated with the control of the lesion (p=0.020). The optimal threshold of Met-uptake/BED was calculated as 0.029. The progression-free survival time with low Met-uptake/BED (20.2m) was significantly longer than the others (4.4m, p=0.004). MGMT-methylation status also showed borderline significance, but the independent significance of Met-uptake/BED was ascertained with multivariate analysis (p=0.007). Required dose to control lesions could be decided upon the Met-PET using the following formula: BED= Met-uptake/0.029.
Conclusions: Required BED to control tumor was significantly correlated with the Met-uptake, and new treatment plan based upon Met-uptake was proposed.

EP-1007
The nature of the failures in the complex treatment of ependymomas of the brain in children.
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Purpose/Objective: To improve results of treatment of ependymomas of the brain in children.
Materials and Methods: In 1999 - 2011the children's department treated 129 children with ependymoma of the brain. All patients received after subtotal or partial removal of the tumor. 13% of patients on admission revealed metastases in the spinal cord. All patients received local or craniospinal radiotherapy with chemotherapy by vincristine. 84 (65%) children of radiation therapy was initiated within 4 to 7 weeks after surgical resection, and 45 (35%) - by 7 weeks after surgery. Daily single dose of 1.8-2Gr/d, total focal dose tothe primary tumor area is 55Gr, with craniospinal irradiation 35Gr the entire volume of CSR.
Results: At follow-up in 53% of patients had local recurrence and 11% had metastases in the brain and spinal cord. There were significant differences in overall survival in patients who received radiation therapy in terms of 4 to7 weeks and 7 weeks later after surgery. The probability of death was in the 1.721 (HR) times lower than in group 1 (P = 0.028, 95% Cl: 1.061-2.792), than in the second. Analysis of cases of recurrence showed that the main risk factor for recurrence was the volume of a surgical intervention: in the absence of post-operative MRI residual tumor recurrence rate was 17% and 83% of its stock.
Conclusions: Patients appropriate radiation therapy no later than 4-7 weeks after surgery. Accumulation of contrast material in the area of operation is undoubtedly a poor prognostic factor. The high frequency of local recurrence of the tumor demonstrates the need for modification techniques local irradiation in the presence of radiographic evidence of residual tumor.

EP-1008
Whole brain virtual simulation: a time-efficient, parotid-sparing technique without inter-observer variability
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Purpose/Objective: Whole brain radiotherapy (WBRT) is frequently employed in the palliation of brain metastases. Despite the introduction of CT-based simulation WBRT planning remains subject to both intra- and inter-observer variability. There is increasing recognition of the parotid glands as non-target organs-at-risk (OARs) in delivering WBRT. Quality of life is of prime importance in the palliative setting. Salivary gland dysfunction has the potential to adversely impact on quality of life. The purpose of this planning study was to develop a time efficient,user-friendly technique to minimise parotid dose without compromising target volume coverage in WBRT.
Materials and Methods: Thirteen patients underwent CT-based simulation with orfit immobilization. Using the Varian Eclipse (v8.0) TPS, the clinical target volume (CTV) was delineated by auto-segmentation of the brain. The planning target volume (PTV) was defined by adding a 5mm margin. Both parotid glands were contoured as OARs. Opposed lateral 6MV beams without collimator rotation were used and MLCs were automatically conformed to the PTV with an empiric 8mm margin. Dose calculation was performed for each patient using this virtual technique and also using a conventional simulation technique with collimator rotation. In this way each patient acted as his/her own control. We then compared parotid dose-volume statistics, target coverage and homogeneity.
Results: Using the virtual simulation technique, the mean dose for the combined parotid glands was reduced to 6.4Gy, compared with 10.9Gy using the conventional technique (p=0.026). The combined parotid V10, V25 and V30 were significantly reduced using the virtual simulation technique.

	Virtual Simulation N=13	Conventional Simulation N=13	P Value
Parotid Dose-Volume Statistics			
V 10 (%)	23.1	40.9	p=0.019
V 25 (%)	5.7	16.1	p=0.03
V 30 (%)	0.6	5.5	p=0.002
D Min (Gy)	0.7	1	p=0.006
D Max (Gy)	30.8	31.4	p=0.016
Mean Parotid Doses			
Right (Gy) [IQR]	7.3 [5.3-10.2]	11.2 [8.7-15.2]	p=0.022
Left (Gy) [IQR]	6.2 [4.3-10.8]	10.6 [9.2-13.2]	p=0.042
Combined (Gy)[IQR]	6.4 [4.9-11]	10.9 [9.5-14.5]	p=0.026
PTV Coverage			
V_{PTV} *95 (%)*	99.6	99.9	p=0.02
V_{PTV} *107 (%)*	5.3	7.7	p=0.058
V 107 (cc)	97.1	141.1	p=0.09

There was no compromise in PTV coverage with the V95 over 99% using both techniques. Notably the virtual simulation technique also improved homogeneity as the V_{PTV}107% was reduced (5.3% vs. 7.7%, p=0.058), although this finding was of borderline significance.
Conclusions: This study suggests that significant reductions in radiation dose to the parotids and improved PTV homogeneity can be achieved with this virtual simulation technique. This technique is time-efficient, eliminates inter-observer variability and may reduce the risk of salivary gland dysfunction in palliative patients.

EP-1009
Conventional and stereotactic radiotherapy for WHO grade II/III meningiomas.
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Purpose/Objective: To clarify the clinical significance of conventional and stereotactic radiotherapy for WHO grade II-III meningiomas.
Materials and Methods: Clinical results of conventional and stereotactic radiotherapy for WHO grade II/III meningiomas treated between 1999 and 2011 were retrospectively reviewed. The patients' group included 28 patients with 37 treatment sessions (3 sessions for 2 patients, 2 sessions for 5 patients, and other 21 patients were treated once). The median age of the patients at treatment were 70 years (range: 13-83 years). The patients experienced a median of 2 times (range: 1-5 times) of surgeries before radiotherapy. Pathological diagnoses at the most recent surgery were atypical meningiomas (WHO grade II)in 30 treatment sessions and anaplastic meningiomas (WHO grade III) in 7 sessions. Other subtypes of WHO grade II-III meningiomas were not treated in our institution within the period. Treatment sessions included 27 stereotactic radiosurgeries (SRSs) by

gamma knife, one fractionated stereotactic radiotherapy (SRT) by linac, and 9 conventionally-fractionated 3-dimensional conformal radiotherapies (3DCRTs). All but one patient had gross residual or recurrent tumor at the time of radiotherapy. Median doses were 18 Gy (range: 12-20 Gy) at tumor margin for SRS, and 60 Gy (range: 54-60 Gy) for 3DCRT. SRT dose was 36 Gyin 6 fractions at isocenter.
Results: Intracranial recurrences were observed after 28 treatment sessions in 20 patients, and 9 patients died with a median follow-up of 17.7 months (range: 2-65 months). Local control rates at 1 year and 2 years were 60.9% and 22.2%, respectively. Atypical hisotologies and higher dose treatments (BED_3> 125Gy) appeared better local control, but the differences were not statistically significant (*p* values were 0.072 and 0.097 respectively). Among 5 patients with intracranial recurrences after linac radiotherapy, 4 patients had recurrences from high dose regions, and marginal recurrence was seen in another patient. Among 23 recurrent patients with gamma knife, 2, 6, and 9 patients experienced central, marginal, and distant recurrences, and data on recurrence sites were not available in other 6 patients. The patterns of recurrence were significantly different between linac and gamma knife groups (*p*=0.006).
Conclusions: Our data suggested that it require high dose to the gross tumor and prophylactic dose around the tumor for a good local control of atypical or anaplasitc meningioma. Treatment results might be improved by combined treatment strategy of 3DCRT and stereotactic irradiation boost for atypical and anaplasitc meningiomas.

EP-1010
Intensity-modulated radiation therapy (IMRT) for total body irradiation (TBI): A dosimetric comparison
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Purpose/Objective: TBI is an important part of conditioning regimens in patients undergoing hematopoietic cell transplantation (HCT). IMRT coupled with image-guided radiation therapy produces highly conformal dose distributions in the target volumes and reduces the dose to critical organs. We will plan IMRT for TBI to quantify the dosimetric gains when compared to traditional techniques.
Materials and Methods: Four patients treated at our institution were chosen and 4 patients' head-to-thigh computed tomographic images were used in this study. We defined the target as the body volume without the total lung and kidneys for myeloablative regimens and the body volume for nonmyeloablative and reduced intensity regimens. A traditional 3D plan along with an IMRT plan was computed for each patient. The planned doses were 2Gy/1fr., 12Gy/6fr., 4Gy/2fr. and 4Gy/2fr.. The traditional and the IMRT techniques used opposed lateral fields and helical tomotherapy, respectively.
Results: Homogeneity index (HI) was 0.12 (range, 0.07-0.20) for IMRT plans and 0.34 (range, 0.25-0.40) for traditional 3D plans. The total lung and kidney average doses were 8.1Gy and 10.4Gy, respectively, for IMRT plan and 10.3Gy and 11.7Gy, respectively, for a traditional plan in myeloablative regimens.
Conclusions: IMRT for TBI has a dosimetric advantage in both target coverage and critical organ sparing over traditional beam arrangement.

EP-1011
Therapeutic effects of whole brain radiotherapy with carboplatin in management of brain metastasis
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Purpose/Objective: To determine the efficacy of Whole Brain Radiotherapy (WBRT) with carboplatin as radiation sensitizer in metastatic brain disease in our adult population.
Materials and Methods: Forty two patients with metastatic brain disease having ECOG performance status (PS) 3 or less with normal haematological and biochemical profile were treated with WBRT with 6MV Photon beam on linear accelerator using parallel opposed lateral beams to a dose of 30 Gys in 10 fractions. Carboplatin was administered in a dose of 150 mg/m^2 on day 1 and 6 of WBRT. Improvement in PS and radiological response on CT scan/MRI brain before and 30 days after the WBRT using RECIST criteria was evaluated.
Results: Out of 42 patients, 38 (90%) showed improvement in PS, 4 (10%) showed either no improvement or worsening of PS (p ? 0.001). Seventeen (41%) patients had complete response,19 (45%) had partial response, 3 (7%) showed stable disease and 3 (7%) had progressive disease. None of the patient showed grade 3/4 toxicity during treatment.
Conclusions: WBRT with carboplatin as radiation sensitizer is effective in palliation of patients with metastatic brain disease. Large scale randomised controlled trials are needed before making changes in routine clinical practice.

ELECTRONIC POSTER: CLINICAL TRACK: HEAD AND NECK

EP-1012
Head and neck imrt treatments: six years experience
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Purpose/Objective: Head and neck patients have been treated with IMRT in the radiotherapy department of our hospital since 2007, after a complete renewal of equipment. In a first phase direct planning has been used followed by inverse optimization after the learning curve has attained stability. ICRU 83 recommendations have been smoothly incorporated. During this period the registration process for treatment outcome assessment has also been restructured with the development of a digital platform enabling the comprehensive registration of both early and late effects and tumour response parameters. An overview of the clinical results that were electronically recorded in this platform since the middle of 2011 will be presented.
Materials and Methods: From the treated patients the response to RT of 268 has already been documented in the electronic RT health system. Tumour cases were divided as: larynx (21.3%); oropharynx (20.9%); oral cavity (18.3%); nasopharynx (14.6%); hypopharynx (8.6%); pharyngeal-laryngeal (8.6%) and other pathology (7.8%). Mean age was 57±12.6 years and mean prescribed dose was 65.6±4.9Gy. Direct optimization was used in 31.6% of the clinical cases and inverse IMRT in 50.4%. The remaining 18% corresponded to simpler clinical cases where 3D-CRT with less than 10 beam incidences have been sufficient to reach the treatment objectives in terms of conformality. The mean follow-up was 8 months (ranging from 0 days to 5 years) corresponding to a weekly periodicity during treatment followed by 3 monthly spaced visits during 2 years and then every 6 months. Complications for salivary glands, mucous membrane, esophagus, larynx, pharynx, mandible, skin, pain, ear, teeth and weight loss were reported through the digital platform on the basis of RTOG and CTCAE v3.0 guidelines.
Results: For a follow-up of 24 months in patients with stage I,II (19.4%) and III,IV (80.6%) local regional control was 86%, was disease free survival was 86% and 79% and overall survival rate was 100% and 84%, respectively. For salivary glands no complications with grade (G) larger than 2 were reported. Maximum incidence of G2 complications was 41% for the seventh week of treatment which was reduced to 12%for a follow-up of 2 years. Mucositis was reported with G2 and G3 mostly during treatment (46%) that prevailed 6 months after treatment just for 4 patients (9%). Time evolution of esophagus, larynx and pharynx complications showed a similar pattern with just residual G3 cases and with G2 maximum incidence at the end of the treatment.
Conclusions: The electronic patient information system developed and in use clinically is a very useful tool during the medical appointment for fast and systematic registration of patient response to RT. The comprehensive nature of this database enabled easy statistical assessment of patient treatment outcome and has further potentialities for radiobiological studies.

EP-1013
Effect of HDR interstitial brachytherapy boost in oral cavity squamous cell carcinomas
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Purpose/Objective: To study the effect of HDR Interstitial Brachytherapy boost to EBRT in early stage T1/T2 and with concurrent chemoradiotherapy in T1 to T3 with N1/N2a/N2b or T3N0 squamous cell carcinoma of buccal mucosa, anterior 2/3rdtongue and floor of mouth in local control in adults as very few trials and review literatures have been reported in this.