In the 3 group 2 pts died 24 and 18 months after diagnosis from disease progression, 1 pt is in complete remission with 59 mnth of follow up.
Conclusions: TMZ did not result in a better outcome when compared with polychemotherapy in pts with newly diagnosed paediatric anaplastic astrocytoma. Although aggressive treatment seems to provide sustained remissions in some patients, the optimal management is still to be defined.

4118 POSTER

Prospective Randomized Trial of Hypofractionated Conformal Radiotherapy for Pediatric Diffuse Pontine Glioma

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Background: Children with diffuse pontine glioma has dismal outcome even with addition of chemotherapy, radiosensitized or using hyperfractionated radiotherapy.
Patients and Methods: Fifty four children, ages 3−15, were prospectively randomized either to receive: 1. Hypofractionated radiotherapy (Hypo) 39 Gy/13 fractions/2.5 weeks or, 2. Standard conventional 55.8 Gy/31 fractions/6 weeks. Patients' demographic and radiologic data were not significantly different in the two groups.
Results: Tolerance to radiotherapy was similar in the two groups. Time to symptoms and signs alleviation and the need to restart CNS dehydration were also not significantly different in both groups. The median survival were 7.3 months (95% CI: 3.5–10.7) and 9.5 months (7.9–11.2) for Hypo and conventional group respectively. Median time to progression was 6.4 months (2.0–10.8) and 7.3 months (5.8−8.5) for Hypo and conventional group respectively. The one-year overall (OS) was 35.8±10.8% and 26.9±10.1%, while the 2-year OS was 22.4±10.2% and 21.5±9.4% for hypo and conventional group, respectively. The one-year progression-free survival (PFS) rate was 22.7±9.9% and 21.4±9.0%, while the 2-year PFS was 11.1±9.1% and 21.4±9.0% for the hypo and conventional group, respectively. None of these differences was statistically significant.
Conclusion: Hypofractionated radiotherapy is as tolerable and effective as conventional fractionation with nearly similar OS and PFS rates. It has the advantage of being rapid with less burden on the patient, his family and on the treatment machines.

4119 POSTER

Hematopoietic Stem Cell Transplantation With Total Body Irradiation Conditioning in Childhood Acute Lymphoblastic Leukemia Patients With Relapsed or High Risk Group

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Background: This study retrospectively analyzed the patient characteristics and treatment outcomes of childhood acute lymphoblastic leukemia (ALL) patients treated with total body irradiation (TBI) conditioning followed by hematopoietic stem cell transplantation (HSCT).
Material and Methods: Between 1994 and 2008, 119 childhood ALL patients were treated with HSCT using TBI conditioning regimen. Patients were at high or very high risk group (73.1%) or relapsed after first complete remission by chemotherapy (51.3%). The dose of TBI was 200 cGy per fraction, twice a day up to 1200 cGy for 3 consecutive days. The type of HSCT was allogeneic (81.8%) or autologous (1.7%). The donors of allogeneic HSCT were human leukocyte antigen (HLA)-identical siblings (44.5%) or unrelated matched persons (35.3%). The cell source was bone marrow (66.4%), peripheral blood (16.8%) and cord blood (16%). Disease free survival (DFS) and overall survival (OS) were estimated by the Kaplan–Meier method, and late complications were assessed including the development of second malignancy.
Result: Patients were aged from 1 to 14 years (median 6). Median follow-up was 8 years (range, 2−14). Successful engraftment was achieved in 87.4% of patients. Acute and chronic GVHD developed in 68.9% and 21.8% of patients, respectively. Recurrence rate was 10.1% at bone marrow, 5% at central nervous system (CNS), and 5% at other extramedullary site. 5-year CNS relapse rate was 8.3%, and there was no significant benefit of prophylactic cranial irradiation (PCI) ($p = 0.789$). The 5-year DFS and OS rate were 77.2% and 53.9%, respectively. Age at diagnosis and the experience of an engraftment failure were significant prognostic factors for unfavorable DFS. Relapse after chemotherapy, umbilical cord blood stem cell source, unrelated matched donor, the presence of HLA mismatch and the experience of engraftment failure significantly decreased OS. Multivariate analyses showed that age at diagnosis and the experience of engraftment failure were significant predictors for OS ($p = 0.025$ and $p = 0.004$, respectively). Late complications were cataracts in 9 patients, endocrine disorders in 37 patients and bone related problems in 9 patients. No secondary malignancy was observed.
Conclusion: Our study showed that HSCT with TBI-based conditioning is a still good option for pediatric ALL patients who were at high risk group or experienced a relapse. The results achieved relatively high rate of engraftment and survival on long term follow up.

4120 POSTER

Low Bone Mineral Apparent Density in Childhood Survivors of Medulloblastoma

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Background: To detect the difference in bone mineral apparent density (BMAD) of the lumbar spine in childhood survivors of medulloblastoma (MB) and healthy peers.
Material and Methods: 47 childhood survivors of MB and 56 healthy peers were included in the study. Treatment protocol for MB included surgical treatment, chemotherapy and craniospinal irradiation. Bone mineral content (BMC, g) and bone mineral density (BMD, g/cm^2) of the L_1-L_4 spine region were measured with the densitometry device Lunar Prodigy GE. To minimize the effect of bone size on BMD value, we calculated BMAD for each lumbar vertebral body by dividing BMC per vertebrae volume. For analysis, arithmetical mean of the BMAD of the L_1-L_4 was used (BMAD L_1-L_4, g/cm^3). To detect the difference in BMAD L_1-L_4 in healthy and survivor's groups, regression analysis and estimation of the Fisher's criterion were used, with p value <0.05 considered significant.
Results: The mean (SD) follow-up at study was 4.8(2.2) years for boys and median (range) 4.6 (2.5−7.1) years for girls.

	Girls		Boys	
	Healthy, n = 22	Survivors, n = 20	Healthy, n = 34	Survivors, n = 27
Age at study, years	13.0 (5.0)	13.8 (4.5)	15.0 (6.0)	14.1 (6.0)
BMAD L_1-L_4, g/cm^3	0.415 (0.087)	0.398 (0.061)	0.392 (0.059)	0.357 (0.057)

Correlation coefficients (r) of the BMAD L_1-L_4 with chronological age were the following: healthy girls, r = 0.847; survivors girls, r = 0.325; healthy boys, r = 0.673; survivors boys, r = 0.458. There was a significant difference in BMAD L_1-L_4 both in the group of survivors girls and healthy girls (F = 6.294, p = 0.004) and in the group of survivors boys and healthy boys (F = 3.471, p = 0.04).
Conclusion: Obtained results denote that during long-term follow-up the decreased BMAD of the L_1-L_4 spine region is observed both in boys and girls survivors of medulloblastoma.

4121 POSTER

Carcinomas in Adolescents − Single Centre Experience

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According to U.S. SEER epidemiology data, the incidence of cancer is approximately 40% higher among patients aged 15−19 years than in younger children. Types of cancer in adolescents differ from the ones in children under 15 years of age, however epithelial tumours (carcinomas) are still very rare.
Between 2005–2009, 248 adolescents and young adults aged 15−19 years were treated at our department: 190 pts with solid tumour (1 tumour duplicity) and 58 pts with acute leukemia. Following diagnoses were documented: 20× NHL, 42× MH, 37× CNS tumour, 19× MMT, 22× bone sarcoma, 23× GCT, 12× other rare cancer, 47× ALL and 11× AML. In 16 pts, carcinoma (ca) was diagnosed: 3× thyroid ca, 2× ca of tongue, 2× nasopharyngeal ca, 1× hepatocellular ca, 1× adrenal cortical ca, 1× renal cell ca and 1× tubal ca. Carcinomas including thyroid cancer represent 8.3% of all solid tumours and 6.4% of all cancer in adolescents. In the same 5-year period, 8 pts in the age of 0−14 were treated for carcinoma at our department. Therefore epithelial cancer in adolescents represents 67% (16/24) of total carcinomas in our pts. Thyroid cancer was documented in only 1.2% (3/248) adolescents compared to SEER data presenting 8%

pts aged 15−19 with thyroid cancer. Malignant melanoma occurred in 2% (5/248) adolescents. Low incidence of malignant melanoma in our group of pts does not correspond with SEER data presenting 8% pts aged 15−19 with malignant melanoma. In our opinion, such discrepancy exists due to inconsistent referral of some pts in adult oncology and endocrinology departments.
Carcinomas represent 8.3% of all solid tumours and 6.4% of all cancer in total of 248 pts aged 15−19 years. Epithelial cancer was 2x more frequent in adolescents than in pts under 15 years of age. Low incidence of thyroid cancer and malignant melanoma in our group of pts may be explained by treatment in adult oncology centers in part of adolescents.
MZ0FNM2005

4122 POSTER

Application of NKX2, STEAP1 and CCND1 Genes Expression for Bone Marrow Involvement Detection in Patients With Ewing Family Tumours

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Background: Ewing family tumours in children are highly aggressive diseases characterized by frequent distant metastases. The most common metastatic sites are lungs, bones and bone marrow (BM). The aim of study was evaluation of *NKX2*, *STEAP1* and *CCND1* genes expression for BM involvement detection in Ewing sarcoma (ES) and primitive neuroectodermal tumours patients (PNET).
Material and Methods: Gene expression was estimated by multiplex quantitative real-time RCR in 59 BM samples obtained from ES and PNET patients with detected fusion gene transcripts (*EWS1-FLI* or *EWS1-ERG*) and in 8 BM samples of patients without malignancies.
Results: *NKX2* expression was not detected in normal BM, although *STEAP1* and *CCND1* expression was revealed in all BM samples from patients without malignancies. 17 BM samples from ES/PNET patients were considered true positive in case of tumour cells presence in BM smears or detection of fusion gene transcript by nested PCR. Expression of *NKX2* was detected in 16 samples, *STEAP1* and *CCND1* − in 17 positive samples. In negative BM samples mRNA *NKX2* was detected in 2 cases, while *STEAP1* and *CCND1* expression was noted in all 42 negative samples. The best diagnostic test performance values assessed by ROC-analysis were obtained for *NKX-2*. Positive predictive value (0.889), negative predictive value (0.976), diagnostic sensitivity (0.941), specificity (0.952) and overall correct prediction (OCP, 0.949) for this marker were high. OCP values for *STEAP1* and *CCND1* were relatively low (0.695 and 0.763), diagnostic sensitivity (0.824 and 0.588) and specificity (0.643 and 0.833 respectively) were also low. The only positive BM sample with absence of *NKX2* expression was obtained at the time of ES diagnosis. In this sample there were no tumour cells in BM smear but fusion gene transcript *EWS1-FLI* was detected. Simultaneous analysis of BM samples obtained from two another sites revealed expression both of *NKX2* and *EWS1-FLI* but microscopically these samples were negative.
Conclusions: *NKX2* revealed the best diagnostic test performance values for BM involvement detection in patients with Ewing sarcoma family tumours both at the diagnosis and during treatment. *STEAP1* and *CCND1* showed remarkably low diagnostic characteristics and their application for marrow disease detection is inappropriate.

4123 POSTER

"The Breathing Tree Project" Biofeedback and Stress Mitigation in Children With Cancer

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Background: The high increase in the percentage of the survival rate of childhood cancer has led experts in the field to devote their attention not only to the healing of children with cancer, but also to guarantee the highest possible quality of life during and after this experience.
The international research literature seems to indicate that hospitalization can present anxiety and stress in children which as a consequence requires good coping skills.
The present study aims to evaluate the effectiveness of biofeedback training in reducing anxiety levels in a group of children suffering from cancer.
Biofeedback is considered to be an efficient method for stress mitigation in children.
Material and Method: *Hypothesis:* We hypothesized that the application of five weekly sessions of biofeedback training has a significant effect in reducing levels of anxiety experienced by a group of children suffering from cancer diseases. We hypothesized also that this effect is maintained with a follow-up treatment a month after the end of training.
Participants: Children and adolescents aged 6−18 who have experienced at least one hospitalization will be included in this study. Participants should be aware of their diagnosis for at least a month, and the whole process of research must be completed before the stop therapy.
Assessment tool: to assess the anxiety levels of participants will evaluated on the Test of Anxiety and Depression in children (TAD).
Training: The biofeedback training will be carried out using an instrument consisting of three sensors, which are applied to the fingers and connected to a PC that collects the following parameters: heart rate variability and skin conductance, and a software that provided a series of exercises that offer a very pleasing visual stimuli that may lead to a mood change.
Procedures: Study participants will be chosen among patients followed by the paediatric haematology-oncology ward of Brescia's Civil Hospital. Participants will be given a TAD test as an initial assessment, then training sessions start. At the end of the five appointments, the TAD will be re-administered as a final evaluation.
After one month of completion of the training, the TAD will be repeated as a follow up to assess the maintenance of the effectiveness of training.
Expected results: It is expected that training of biofeedback has a significant effect in reducing levels of anxiety experienced and that this effect is maintained until follow-up.

4124 POSTER

Robotic Stereotactic Radiotherapy in the Management of Pediatric Patients With Benign and Malign Lesions

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Background: We evaluated our therapeutic results with robotic stereotactic radiotherapy (SRT) in the management of pediatric patients.
Material and Methods: Between June 2007 and August 2010, 30 pediatric patients were treated with robotic SRT in our department. The median age was 9.5 years (range, 3−16 years). Twenty-five patients had lesion in cranial location, and five patients had extracranial disease. There were 19 patients with central nervous system tumours, 5 with arteriovenous malformation (AVM), 1 with histiocytosis, 2 with sarcoma, 1 with neuroblastoma, 1 with malignant rhabdoid tumour, and 1 with germ cell tumour. The median target volume was 16.6 cm^3 (range, 0.3–1233 cm^3). The median marginal total dose was 25 Gy (range, 8−30 Gy), and the median marginal isodose line was 79% (65−90%). Robotic SRT delivered with CyberKnife® (Accuray Inc, Sunnyvale, CA). The median number of beams was 179, conformity index was 1.6, and homogeneity index was 1.3. Three patients were treated with a single fraction, and 27 patients were treated with a fractionated stereotactic radiosurgery. Nine patients (30%) did require general anesthesia during robotic SRT.
Results: The median follow-up time was 8 months (range, 1−41 months). Complete response was observed in 5 patients, partial response was seen in 5 patients, stable disease was observed in 13 patients and remaining 7 patients had progressive disease. Eleven patients died due to disease. One patient with anaplastic astrocytoma developed brain necrosis as a late complication in the fifth months of follow up. None of the patients died due to treatment related complications.
Conclusions: Our initial results with robotic SRT in pediatric age group are promising. Our SRT scheme was generally well tolerated, and general anesthesia was not required in most of the patients. However, long term follow-up of these children is required to see late effects of SRT in pediatric population.

4125 POSTER

Nimotuzumab and Vinorelbine Concomitantly to Radiation and as Maintenance for Diffuse Pontine Glioma in Childhood − Promising Results on a Series of 13 Patients

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Background: Prognosis for diffuse pontine glioma of childhood is owful with median PFS and OS around 6 and 9 months, respectively. After joining a previous trial with nimotuzumab and radiation and continuing for a total of 37 patients from January 2006 to June 2009 according to this new combination, we obtained a median PFS of 7 months and a median OS of 11 months, i.e. thus entirely consistent with best literature data and those reported previously by ourselves (Massimino 2008). All treatment