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