9.0 in Ewing's sarcoma, 6.8 in osteosarcoma, 3.5 in neuroblastoma, 3.4 in germ cell tumor, 3.6 in synovial sarcoma. The sensitivity, specificity, negative predictive value and positive predictive value of FDG-PET/CT staging were 92%, 80%, 50% and 99%, respectively. The sensitivity and specificity of conventional imaging were 91% and 66%. There were four false-negative cases on FDG-PET/CT: bone metastasis of rhabdomyosarcoma, bone metastasis of neuroblastoma, Ewing's sarcoma at cranial bone, and rhabdomyosarcoma at lower leg. The reason of false negative was mainly due to the small size of the tumors. FDG-PET/CT was more accurate than conventional imaging regarding staging of patients with pediatric solid tumors.
Conclusions: The FDG-PET/CT was found to be a useful method with staging and restaging of pediatric solid tumors. It was especially useful to detect multiple disseminated metastases.

1412 POSTER

Ovarian tissue cryopreservation for girls and adolescents with childhood cancer

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Background: Impairment of ovarian function and loss of fertility are long-term adverse effects of cancer treatment and related to the use of high-dose alkylators or abdominal irradiation. For females, ovarian tissue cryopreservation (OTC) is currently the only available means of potentially preserving gonadal function and fertility.
Aims: To report our experience with OTC for female patients with childhood cancer.
Patients and Methods: From November 2000 OTC has been offered to patients before high risk of ovarian failure cytotoxic treatments. The patient and both parents were informed of the risks of the planned treatment for subsequent fertility, the ovarian tissue preservation procedure and the experimental nature of OTC, before informed consent was obtained. The project was approved by the institutional review board. Ovarian tissue harvesting was programmed to take place, if possible, immediately before the sterilizing treatment. Ovarian tissue was collected by means of laparoscopy with three incision points. The whole ovary was excised and the cortical fragmented and cryopreserved. One sample of ovarian cortex was randomly selected for histological analysis.
Results: 23 patients underwent OTC. Diagnoses were Hodgkin's lymphoma (n = 8), Ewing's sarcoma (n = 7), Osteosarcoma (n = 5), high grade Astrocytoma (n = 1), Limphoblastic lymphoma (n = 1), and extrarenal Rhabdoid tumor (n = 1). Cytotoxic therapies consisted of autologous bone marrow transplantation (n = 3), high dosages of alkylating agents (n = 18), and pelvic radiotherapy (n = 2). Mean age at OTC was 14 years (range 10 to 18). For 10 (43%) patients, OTC was performed after chemotherapy onset, because of disease severity (n = 4), relapse (n = 3), administrative or parental decision to delay (n = 3). No surgical complications occurred, except one minor surgical wound infection. The right ovary was usually preserved. In all cases histological examination of the non-preserved fragment was negative for tumor. Three patients have died from the disease (13%).
Conclusions: OTC is feasible for pediatric patients before aggressive chemotherapy and/or radiotherapy treatment protocols. Our experience suggests that it can be systematically offered to all female patients including prepuberal girls.

1413 POSTER

Prognostic influence of minimal residual disease detected by flow cytometry and peripheral blood stem cell transplantation by CD34+ selection in childhood advanced neuroblastoma

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Background: To determine whether neuroblastoma (NB) minimal residual disease (MRD) by flow cytometry (flow) in bone marrow (BM) could predict prognosis and whether tumor cell purging by CD34+ cell selection will impact on disease-free survival.
Methods: NB MRD in BM was evaluated by flow with CD45-FITC-/CD81-PE+/CD56-PECy5+ monoclonal antibodies cocktail. Peripheral blood stem cell (PBSC) was enriched via positive CD34+ cell selection by magnetic-activated cell separation system (MACS).
Results: In 31 patients with CD45-/CD81+/CD56+ cells by flow at diagnosis, eleven of them became negative after average 4 courses of chemotherapy. All of those 11 patients remained alive without evidence of disease. In twenty patients with positive MRD, thirteen of them relapsed and 1 patient died from disease (mean 25.8 months). There was with a significant difference between these two groups. MRD in BM was tested before PBSCT transplantation (PBSCT) for 19 NB patients. Fourteen was negative, four of them relapsed and 10 patients remained alive without evidence of disease. Another 5 patients with positive MRD, all of them relapsed (mean 17 months after PBSCT) with a significant difference between these two groups. Fourteen of 19 PBSC were purged with CD34+ selection procedure. Six of 14 relapsed (mean 18.43 months after PBSCT). Five patients did not purged for CD34+ selection, and 3 of them relapsed with no significant difference between these two groups.
Conclusions: Positive MRD in BM after average 4 courses of chemotherapy and before PBSCT is an unfavorable factor for stage IV NB. CD34+ selection purging for PBSCT may not improve the prognosis for children with neuroblastoma in advanced stage.

1414 POSTER

The relationship between nutritional status and IGF-I and IGFBP-3 in patients with childhood solid tumours

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Purpose: This study was designed to investigate the relationship between nutritional status and serum IGF-I and IGFBP-3 in children with solid tumors including lymphoma without brain tumor.
Methods: Between April 2003 and April 2006, 61 patients with newly diagnosed solid tumors (mean age 8.23±4.93 years) and a control group of 60 healthy children (mean age 8.27±5.12 years) were evaluated in means of anthropometric measurements [height, body weight, weight for height (WFH), mid upper arm circumference (MUAC), triceps skin fold thickness (TSFT), mid-arm muscle circumference (MAMC), body mass index (BMI)], biochemical parameters and serum levels of IGF-I and IGFBP-3. MAMC was calculated from MUAC and TSFT, where MAMC = MUAC − [3.14×TSFT(cm)]. Criteria for malnutrition are as follows; MUAC, TSFT, MAMC and BMI < 5%. A positivity of at least 2 of these criteria was accepted as malnutrition. Patients were divided into two different groups according to disease stages. Group I consisted of Stage I and Stage II patients, Group II consisted of Stage III and Stage IV patients.
Results: WFH and BMI of the patients were not significantly different than the control group ($p > 0.05$) but MUAC and TSFT of the patients were found to be lower than that of control group ($p < 0.05$). Measurements of TSFT, MUAC, MAMC and IGF-I levels were lower in Stage III and Stage IV patients than in patients with Stage I and Stage II ($p < 0.05$). The total malnutrition rate was found to be 31.1%. The IGF-I levels were significantly lower in the patient group than in the control group ($p < 0.001$). The lowest IGF-I value was found in cases with malnutrition. The IGF-I levels were correlated with TSFT ($r = 0.71$, $p < 0.001$), MUAC ($r = 0.590$, $p < 0.001$), and MAMC ($r = 0.41$, $p < 0.001$).
Conclusion: We concluded that in children with solid tumors besides TSFT, MUAC, MAMC measurements IGF-I measurements is of recognizable value for diagnosis of malnutrition.

1415 POSTER

Gonadal function and puberty assessment in pediatric survivors of a childhood cancer

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Background: Longer survival of children with cancer implies growing concern for late effects. Aim: To assess puberty and gonadal function in pediatric survivors, identifying risk factors for gonadal impairment and defining gonadal markers useful in pediatric ages.
Material and Methods: Childhood cancer survivors <19 years were prospectively evaluated and compared with a control group of healthy children. Type of cancer and treatment, pubertal development, basal FSH, LH, testosterone, estradiol and inhibin B were analysed. Adolescent boys had a seminogram done, and pubertal girls a pelvic ultrasound. Statistical analysis: Hormonal serum concentrations between Tanner stages were compared with Kruskal-Wallis test. Hormonal concentrations for each Tanner stage were compared between the study and control group by the Mann-Whitney U test. Student t test compared profile variables, and covariance analysis (age as covariable). Critical hormones' concentrations were calculates as the interquartile range for each hormone/pubertal stage/sex × 1.5. Variables associated with gonadal insufficiency were evaluated with Chi-square and with a logistic regression

(multivariant model). Statistical analysis was conducted with SPSS.12.0v, 5% significance.
Results: There were 126 survivors included (72 boys, 54 girls). Boys: 8% had delayed puberty. Tanner Stage I and II boys were significantly older than controls ($p < 0.04$). Stage II FSH, LH and testosterone, and stage III LH and testosterone were significantly higher. Fifteen boys (31.3%) had tubular insufficiency, significantly associated with older age at treatment (risk $\times 1.226$ per year, $p < 0.01$) and bone marrow transplantation (BMT), and 5 (10.4%) Leydig cells' insufficiency, significantly associated with radiotherapy (risk $\times 5.663$, $p < 0.01$) and BMT. Girls: 19% had advanced or precocious puberty. There were no differences in profile variables. For stage I, inhibin B was significantly lower than controls. Seven girls (16.7%) had partial ovarian insufficiency, significantly associated with radiotherapy (risk $\times 13.407$, $p < 0.01$), gonadotoxic chemotherapy (risk $\times 9.096$, but $p = 0.056$), BMT and central nervous system tumours.
Conclusions: Prepubertal age at the beginning of cytotoxic treatment does not protect against gonadal damage. All childhood cancer survivors must be carefully assessed during puberty. Gonadal insufficiency may be difficult to detect in the pediatric ages, and follow-up must continue during adulthood

1416 POSTER

Post-traumatic stress disorder and risk factors in parents of children with the diagnosis of cancer

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Background: Having a child with cancer and the long treatment period consisting of chemotherapy and/or radiotherapy is a strong risk factor for post-traumatic stress disorder (PTSD). In this study, we aimed to determine the prevalence of PTSD and analyze the risk factors in parents of children with cancer.
Materials and Methods: Hundred and four parents (56 mothers and 48 fathers) of children with cancer diagnosis receiving chemotherapy and/or radiotherapy were administered five questionnaires including a sociodemographic questionnaire, a traumatic events check list, the Structured Clinical Interview for DSM-IV (SCID) PTSD and Major Depressive Disorder (MDD) modules, and the self-rating instrument General Health Questionnaire-12 (GHQ-12). The parents' sociodemographic characteristics, traumatic experiences and psychiatric disorders, along with the characteristics involving the diagnosis and treatment of the children, which could pose as related factors in terms of PTSD and posttraumatic stress symptoms (PTSS) were investigated.
Results: The prevalence of PTSD and MDD was 34.6% (n = 36) and 37.5% (n = 39) respectively. PTSD symptom clusters were common in the parents of children with cancer. Reexperiencing (n = 50), avoidance/numbing (n = 52) and arousal (n = 52) symptom clusters were frequent in the total sample (48.07%, 50.0% and 50.0%, respectively). The statistically significant tendency to develop PTSD were found in the female gender, better educational status, death of a loved one, previous history of psychiatric disorder, having a child with poorer prognosis and the presence of radiotherapy in child's treatment.
Conclusions: Our findings suggest that a significant proportion of the parents of children with cancer experience PTSD and PTSS. The preventive and intervention strategies should be keep in mind especially for parents of children with cancer who are more vulnerable to PTSD.

1417 POSTER

Rétinoblastoma in children: report from a Morrocan Pediatric Oncology Unit

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Background: Retinoblastoma is the most common primary intraocular malignancy of childhood. It is relatively rare, with an incidence of one case per 23,000 live births, and accounts for about 3% of all cancers occurring in children younger than 15 years in the UK. It is an aggressive tumour that can lead to loss of vision, and in extreme cases death, although cure rates in developed countries can be in excess of 90%. In developing countries, where extraocular retinoblastoma is more prevalent primarily owing to delayed presentation of disease, the mortality rate of patients is higher than in developed countries.
The aim of this study is to assess the epidemiology, the clinical presentation and the management of retinoblastoma in Morocco.
Patients and Methods: This is a retrospective study about all cases of retinoblastoma in children less then 15 years old followed at the Pediatric Oncology and Hematology unit of Rabat – Morocco from January 2000 to December 2005. Overall survival and event free survival (EFS) were studied using the Kaplan-Meier method.
Results: Seventy seven patients were included in the study. The median age was 2 years old (range 2 months to 15 yo) and the ratio male/female was one. Leukokoria was the most common presenting sign followed by exophthalmia and the median delay of diagnosis was 5 months (range one to 24 months). Familial history of retinoblastoma or loss of vision in parents was found in eight patients and 13% had a history of consanguineous marriage. Retinoblastoma was unilateral in 59 cases, bilateral in 17 cases and one case had a trilateral retinoblastoma. Among 64 who had pathologic study, sclera and Optic nerve invasion were found in 23 patients. Twelve patients were metastases at time of diagnosis mainly in the central nervous system. Among the 77 patients, 64 were operated first, five patients had chemotherapy first, seven patients had palliative treatment and one patient refused treatment. Five cases of bilateral retinoblastoma had a conservative treatment for the second eye. In this study 40 patients were in complete remission with 22 months median of follow up, 18 patients abandoned treatment, 12 relapsed and seven patients died. The over all survival rate at 6 years was 82% and the event free survival rate was 45%.
Conclusion: In our study the diagnosis of retinoblastoma was delayed and extraocular retinoblastoma was more frequent than in developed countries studies. We found also a high rate of treatment abandonment (23%). Those results are the background for a new Moroccan national protocol which aims are to reduce the rate of advanced stages, to reduce the rate of treatment abandonment and to increase the EFS.

1418 POSTER

Post-operative radioiodine therapy in children – an effective tool for decreasing locoregional recurrence and treatment of distant metastases in differentiated thyroid cancer

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Aim: Surgical resection is the treatment of choice at the initial management of differentiated thyroid cancer (DTC) in children. However, there is little agreement concerning the need for postoperative radioiodine (^{131}I) treatment. Not all agree on the need on post-operative radioiodine application in childhood DTC. The aim of this retrospective study was to evaluate the impact of radioiodine therapy on prognosis of children with DTC.
Materials and Methods: 235 children (age 4 to 18; median 13.9) diagnosed either with papillary (82%) or follicular cancer (18%) were included into the study. During median follow-up of 82 months there were no cancer related deaths. Distant metastases and locoregional recurrences were recognised respectively in 44 (19%) and 32 (20%) children (9 thyroid bed, 20 lymph nodes and 3 both).
Results: Locoregional recurrence free survival was 90% and 84% respectively after 5 and 10 years of follow-up in the whole group of patients. Apart from surgery, in Cox multivariate analysis, ^{131}I therapy independently decreased the risk of thyroid bed and lymph nodes recurrence respectively by a factor of 11 and 3.
Of the 44 children with distant metastases, in 31 (70%) cases metastases were detected at the very early stage and were visible only on the basis of ^{131}I scintigraphic examination while the chest X-ray was normal. In 10 children both sintigraphic and radiological examination detected distant disease and in 3 metastases were not radioiodine avid and only radiological examinations were positive.
In children with radioiodine avid distant metastases complete remission (including Tg normalization) was achieved in 26/41 (63%) of children. The highest chances for complete remission had children with distant metastases diagnosed only in scintigraphy, 24/31 (77%) cases. In 10 children with metastases diagnosed both in scintigraphy and radiological examination, 2 (20%) had CR. The difference was statistically significant (Chi^2 $p < 0.05$).
Conclusions: Radioiodine applied after surgical treatment of childhood DTC is an effective treatment modality. As an routine adjunct to surgical treatment it significantly improves locoregional recurrence free survival and in case of distant metastases in more than 2/3 of children causes complete remission. Early treatment, when the small metastases are detected only in radioiodine scintigraphy, has the highest rate of complete remission.