

EP-1415

Cranial irradiation and sleep disorders in children with brain tumour: a case-control study

C. Pilotto¹, E. Coassin², E. Passone¹, M. Robazza¹, S. Birri³, E. Bidoli³, A. Nocerino¹, M. Mascarin²

¹AOU Santa Maria della Misericordia, Clinica Pediatrica, Udine, Italy

²Centro di Riferimento Oncologico, SOS di Radioterapia Pediatrica, Aviano, Italy

³Centro di Riferimento Oncologico, SOS Epidemiologia e biostatistica, Aviano, Italy

Purpose or Objective: Brain tumours as many other neurological diseases may cause sleep problems interfering with the delicate mechanisms of sleep regulation. The presence of a disturbed sleep may have material daily performance effects. In growing subjects this aspect may determine emotional and behavioral problems. The prevalence of sleep disorders (SD) in children with brain tumours is unknown. The main aim of this study is to compare the prevalence of SD in children affected by brain tumours and treated with radiotherapy to the prevalence of SD in children treated only surgically.

Material and Methods: A retrospective case-control study was performed from October 2014 to April 2015 in a Pediatric Department and in a Pediatric Radiotherapy Centre. "Cases" included patients 2 to 16 years old with a diagnosis of CNS tumour at least 3 months after treatment conclusion (surgery and radiotherapy and/or chemotherapy). "Controls" were children 2 to 16 years old with CNS tumours treated only surgically. Children's sleep quality was assessed with a questionnaire administered to parents (Child's Sleep Habits Questionnaire, CSHQ). The sleep was considered disturbed if at least one of the following events was present: sleep delay, sleep duration, sleep-related anxiety, night waking, parasomnias and respiratory disorders. The risk of SD was estimated by the Odds Ratio (OR) and their 95% confidence intervals (95% CI) through logistic regression models.

Results: We enrolled 14 cases and 14 controls, for a total of 28 subjects. 9 out of 14 children in "case" group were treated with surgery, radiotherapy and chemotherapy. Our results highlighted a prevalence of SD of 57.4% among cases and 42.9% in controls. A statistically significant difference between the two groups (OR= 1.78 CI: 0.40-7.94) was not reached.

Conclusion: Cranial irradiation is required to treat many brain tumours in children. Some studies involving only children with midline tumours show that high-dose cranial irradiation in midline site in childhood is associated to objective and subjective changes in the sleep-wake rhythm in adulthood. Our study failed to show a statistically significant difference in SD between the two groups, but there is evidence of a greater prevalence among children treated with radiotherapy. Limitations of the study include the small number of patients involved and the lack of irradiation details, as dose and site. We expect that a relationship between cranial irradiation and SD will be statistically confirmed increasing the number of involved patients. We hope to better define the relationship with irradiation dose and site, as brain tumour position and consequent irradiation may have a role on SD development.

EP-1416

Analysis of childhood brain tumours treated with radiosurgery/stereotactic fractionated radiotherapy

J. Paiva¹, T. Santana¹, V. Zaccariotti¹, J. Arruda¹, L. Oliveira¹, V. Araújo¹, L. Goulart¹

¹Hospital Araújo Jorge, Radiation Therapy, Goiânia, Brazil

Purpose or Objective: The aim of the study is to evaluate data from radiosurgery (RS) and fractionated stereotactic radiotherapy (FSRT) performed in patients from 0 to 14 years of age in Hospital Araújo Jorge, Goiânia, Goiás, Brazil, treated between 2000 to 2013.

Material and Methods: The authors retrospectively assessed medical reports of 65 patients from 0 to 14 years of age with diagnosis of brain tumours and who underwent RS/FSRT from 2000 to 2013. The analysis concerns age at diagnosis, primary location of the tumor, size of the tumor, risk assessment, and employment of either RS or FSRT.

Results: From the 65 records, 42 were included in the analysis for having all the information desired. Of those patients, 46.3% were male and 69.0% were diagnosed with malignant tumors. 29.3% of the patients were between 0 to 6 years, 31.7% between 7 to 10 years, and 39.0% between 11 to 14 years of age. The most frequent histopathological diagnoses were medulloblastoma (19.0%), arteriovenous malformation (14.3%), and glioma (11.9%). As for the treatment, 78.5% underwent to FSRT and 21.5% underwent to RS. The median total radiation dose prescribed dose was 54Gy for the FSRT and 18Gy for the RS. The most frequent prescription dose curves were 90% and 95%, respectively, whilst the conformity index for the RS varied from 1.23 to 2.04. It resulted in 42.9% of the patients having partial response to the performed treatment and 78.6% not having distant disease progression. The overall survival was 58.1 months for patients from 0 to 6 years, 69.3 months for those from 7 to 10 years, and 90.2 months for those in the 11 to 15 years range (p=.0037).

Conclusion: The results show a 13 years experience on treating pediatric tumors with RS/FSRT of that single institution. High precision conformal stereotactic techniques with RS/FSRT employing conservative margins than conventional radiotherapy in childhood tumors appears to be safe based on our experience. Long term prospective trials are required to test their real potential in sustaining local control and minimising treatment related acute and late morbidity.

EP-1417

ANDANTE: second cancers from neutrons following proton therapy: preliminary epidemiological results

K. Perstorfer¹, L. Walsh¹

¹Bundesamt für Strahlenschutz Federal Office for Radiation Protection, AG-SG 1.3, Neuherberg, Germany

Purpose or Objective: Survivors of childhood cancer generally have an increased risk of developing secondary cancers associated with the treatment for the first primary cancer. Proton therapy represents a highly effective treatment technique for some types of childhood cancers but scattered radiation from secondary neutrons is an unwanted by-product.

Material and Methods: The ANDANTE project investigates the relative risk of neutrons compared to photons for tumorigenesis, as a function of dose and energy. The approach is multidisciplinary, including physical measurements and modeling, molecular biology, radiobiology and epidemiology. Based on stem cells irradiated in vitro with either photons or neutrons, a corresponding predicted model of the relative risk of cancer induction from photons or neutrons following pediatric radiotherapy is developed and tested on clinical data, leading to a proposal for a prospective epidemiological study to validate the relative risk of neutrons on the tumorigenesis in humans. The progress on the epidemiological aspects of this current work is reported here.

Results: In order to validate the dose-risk model developed earlier in the project, a feasibility study with clinical data from the Loma Linda University Medical Centre (LLUMC) was performed. A cohort of 242 patients was constituted in August 2013. Those patients were treated between 1991 and 2013, diagnosed with arteriovenous malformation (AVM) (n=108) or low grade astrocytoma (n=134) before the ages of 30 years, and were followed up later. All variables for statistical analyses are available but data extraction has not been finished yet. Results of this feasibility study will provide a basis for the development of the prospective