to tumor recurrence (or progression) ranged from 3 months to 7 years and was shorter in subtotally resected patients. Twelve patients had local recurrence: 2 had cranial recurrence with spinal disease, and 2 developed leptomeningeal disease. While 4 patients (with brain stem invasion) succumbed to complications following reoperation, the remaining patients survived from 2 to 17 years after their second surgery. Patients whose tumors were totally resected at their second surgery had the best survival. One patient survived 3 reoperations for locally recurrent disease over 5 years. One patient, treated as an infant with chemotherapy, developed leukemia. A patient treated with radiation therapy developed a chondrosarcoma of the skull. Locally recurrent ependymoma can be successfully treated with reoperation. Ependymomas are less likely to recur than anaplastic ependymomas. Secondary tumors sometimes develop with prolonged survival. Excellent long-term survival can be achieved in some patients.

14. THE USE OF RECOMBINANT FACTOR VIIA (RFVIIA) TO CONTROL INTRAOPERATIVE BLEEDING IN PEDIATRIC BRAIN TUMOR PATIENTS

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Brain tumors are the most common solid tumors of childhood. Tumor resection may be complicated by significant blood loss due to anatomic location or increased vascularity of the tumor. Advances in neurosurgery, neuroanesthesia, and hemostatic techniques have improved survival, but blood loss continues to be an issue for some patients. This abstract describes the use of rFVIIa (NovoSeven®, Novo Nordisk, Denmark) to control intraoperative bleeding in five pediatric patients undergoing neurosurgical resection of brain tumors. The use of rFVIIa was first considered when Patient 1 (see table) developed life-threatening blood loss unresponsive to neurosurgical techniques and blood product replacement. Within 30 minutes of rFVIIa (118 mcg/kg) administration, all bleeding ceased and the tumor was successfully resected. rFVIIa was subsequently administered to 4 pediatric patients undergoing surgical resection of brain tumors (2 of whom had multiple procedures). Overall, rFVIIa provided excellent hemostatic control, was well tolerated, and resulted in no obvious adverse events.

Patient #	Age; Months	Diagnosis	Blood Loss (cc/kg)	rFVIIa Administered (mcg/kg)	Hemostatis?
1	24	Choroid plexus carcinoma	509.80	118 (to control bleeding)	Yes
2	204	High-grade glioma	5.01	275 (to control bleeding)	Yes
3 (a)	3	Meningeal sarcoma	139.30	98: 2 doses (to control bleeding)	No
(b)	3.5		32.20	98 (prophylaxis)	Yes
(c)	5		29.11	93 (prophylaxis)	Yes
4 (a)	2	Choroid plexus carcinoma	18.90	97 (prophylaxis)	Yes
(b)	5		13.70	74 (prophylaxis)	Yes
5	156	Anaplastic oligodendroglioma	25.70	102 (to control bleeding)	Yes

At our institution we currently recommend that rFVIIa be considered for pediatric brain tumor patients undergoing surgical resection if life-threatening bleeding occurs, unresponsive to conventional interventions. Unreconstituted rFVIIa should be available in the operating room for such situations. If the child is <15 kg and has evidence of a highly vascular tumor or has previously experienced massive blood loss, a prophylactic dose of 90mcg/kg rFVIIa may be administered at the time of tumor excision. Recent studies have shown successful use of 30mcg/kg rFVIIa for hemostasis in pediatric patients with coagulopathic disorders. Clearly, additional studies are warranted to assess dosing strategy.

15. SLEEP DISTURBANCES IN CHILDREN WITH BRAIN TUMORS

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Sleep is a complex neurological process that is controlled by and benefits the brain. Sleep can be disturbed by a number of CNS insults. Children with brain tumors may develop difficulties with some aspect of sleep due to irreversible brain injury from the tumor and treatment. Comprehensive sleep studies on brain tumor patients may define a specific sleep abnormality for which treatment could be directed. A retrospective chart review was performed on all brain tumor patients tested for sleep disturbances by our institution's sleep clinic. Between 1994 and 2001, 10 patients with brain tumors were evaluated by polysomnogram (PSG). In addition, a multiple sleep latency test (MSLT) was performed on 8 patients and actigraphy on 2 patients. Tumor types included 3 medulloblastomas, 3 brain stem tumors, 1 optic chiasm glioma, 1 craniopharyngioma, 1 pineoblastoma, and 1 hypothalamic glioma. The referrals were made for daytime sleepiness (9/10), sleep apnea (3/10), continuous movement during sleep (1/10), and snoring (2/10). All of the children demonstrated a clinically significant problem based on the results of the PSG, MSLT, and actigraphy: 6/10 excessive daytime sleepiness (1 optic chiasm glioma, 1 brain stem tumor, 1 pineoblastoma, 1 craniopharyngioma, 1 hypothalamic glioma, 1 medulloblastoma) with 3 of the 6 meeting the criteria for symptomatic narcolepsy; 3/10 moderate to severe central apnea (1 brain stem tumor, 1 medulloblastoma, 1 craniopharyngioma); 1/10 nocturnal seizures (optic chiasm glioma); and 1/10 continuous movement during sleep (medulloblastoma). Following the sleep study, 2 central apnea patients started nocturnal positive pressure ventilation, and 1 began nocturnal oxygen with clinical improvement in sleep. Four of 6 patients with excessive daytime sleepiness were prescribed a stimulant, and all showed clinical improvement. Pediatric brain tumor patients with daytime sleepiness often have definable sleep abnormalities. The most common sleep disorders diagnosed in this series were excessive daytime sleepiness and central apnea. All 6 patients with excessive daytime sleepiness had evidence of hypothalamic/pituitary injury, and 2 of the 3 patients with central apnea had tumors localized to the posterior fossa. Further sleep studies in brain tumor patients may elucidate mechanisms by which the brain affects sleep and assist in the development of new interventions.

16. ANALYSIS OF NEUROCOGNITIVE SEQUELAE IN BRAIN TUMOR SURVIVORS.

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Introduction: Neurocognitive sequelae due to brain tumors and their treatment have been known in the last decades, when survival after these diseases improved. Rehabilitation of these sequelae in the pediatric population is feasible; however, in order to begin a rehabilitation program, we need to know the patient status after treatment. Measures of that are not well established in the pediatric populaton. Materials and Methods: Patients with any type of brain tumor diagnosed and treated in our institution in the last 10 years were prospectively studied. A complete neurological examination was performed, followed by two types of tests: the Streng Difficulties Questionnaire (SDQ) and Wechsler scales. The SDQ was answered by parents (n = 10) or by patients (n = 12). The following Wechsler scales were used: WIPSI from 4 to 6 years, WISC-R from 5 to 15 years, and WAIS over 16 years. Results: From December 2001 up to February 2002, 27 patients have been completely studied. Fourteen patients were male and 13 female, median age at the study of 11 years (range: 6–19 years) and pathological diagnosis of 14 PNET and 8 low-grade gliomas and 5 more rare brain tumors. Thirteen were located in the cerebellum. Ten patients were treated according to SIOP-PNETIII and 5 according to SIOP-LGG. Eleven patients had both radio and chemotherapy, 7 had only radiotherapy, and 3 only chemotherapy. Verbal IQ: 4 high, 13 average, 4 low. Manipulative IQ: 2 high, 14 average, 5 low. Total IQ: 3 high, 14 average, 4 low. We found meaningful differences between verbal and manipulative IQ in 14/21 patients (67%). SDQ was answered in 22 cases. Most of the patients considered themselves or were considered by their parent normal in the following items: emotional and behaviour (15/22, respectively), hyperactivity (14/22), peer relations (15/22), and prosocial behaviour (21/22). Conclusions: Although the sample is small and the study is ongoing, preliminary analysis shows that Wechsler scales and SDQ offer general information about the neurocognitive status of our patients. In order to develop a neurocognitive rehabilitation program, more refined measures and sequential studies are needed.

17. SIMULTANEOUS OCCURRENCE OF PRIMARY GLIOSARCOMA AND PRIMARY MALIGNANT MENINGIOMA IN THE SAME PATIENT

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Gliosarcoma and pediatric meningiomas are rare malignancies of the central nervous system. These malignancies are usually seen after radiation therapy or in association with neurofibromatosis (NF). Simultaneous development of histologically different primary brain tumors aside from phakomatosis or previous irradiation is rare. We report a patient who had gliosarcoma and malignant meningioma, with no history of either irradiation or phakomatosis. A 2-year-old female child presented with right-sided motor weakness. Neurological examination on admission revealed right hemiparesis. She had no stigmata or family history of NF or other phakomatosis. MRI demonstrated two distinct tumors. The first was localized to the left frontal lobe and measured 43x43 mm. The other one was found to be originating