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BRAIN TUMORS

MOTOR DEFICITS AFTER CEREBELLAR TUMOR RESECTION

Cognitive and motor performance after resection of a cerebellar tumor was studied in 22 patients (age range 10-28 years) at University of Minnesota, MN. Surgical lesions were located in the vermis in 16 cases and the cerebellar hemispheres in 6. The nucleus fastigius (NF) and nucleus interpositus (NI) were involved bilaterally in 12 of the 16 vermal lesions. The dentate nucleus on one side was affected in 8 of the 12. Postural stability and vestibular equilibrium tested by dynamic posturography were impaired in 14 (64%) of the 22 patients when compared to 14 healthy controls. Deceleration in the arm pointing task was prolonged in 54% of cases. Digit span memory was not different from controls in 18 of the 22 patients. Visual memory span was reduced by 30% in 6 patients who had received radiation and/or chemotherapy after surgery. Age at surgery, time since surgery or volume of lesion did not predict motor or cognitive recovery. Brain imaging analysis showed that patients with abnormal postural sway had lesions involving the NF and NI. Lesion volume did not correlate significantly with any of the measures of motor function. In contrast, the site of the lesion and specifically, involvement of the deep cerebellar nuclei, were the important factors in lasting motor impairments. The NI, NF and dorsomedial portions of the dentate nuclei were involved in 10 of 12 patients with abnormal deceleration times. Patients operated on at a young age do not necessarily recover faster or more completely than older children and adolescents, and those with tumor resection involving deep cerebellar nuclei at any age are likely to have sustained motor impairment. (Konczak J, Schoch B, Dimitrova A et al. Functional recovery of children and adolescents after cerebellar tumour resection. *Brain* May 2005;128:1428-1441). (Respond: Dr Jurgen Konczak, Human Sensorimotor Control Laboratory, School of Kinesiology, University of Minnesota, 400 Cooke Hall, 1900 University Ave SE, Minneapolis, MN 55455).

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COMMENT. Working memory of long-term survivors of childhood cerebellar tumors is not affected following surgical resection, provided they have not received radio- or chemotherapy. In contrast, postural imbalance and incoordination are sustained when deep cerebellar nuclei have been involved, and the failure to recover motor function post-surgically is not dependent on the age of the patient or the size of the lesion. The site of the lesion, specifically involvement of the nuclei fastigii, interpositus, and dentatus, is correlated with incomplete recovery of motor function following cerebellar tumor resection. The authors of the above study comment that a more comprehensive battery of tests may have uncovered cognitive deficits in their patients.

Long-term cognitive sequelae after cerebellar astrocytoma surgery, without additional radio- and chemotherapy, were reported in a series of 23 children studied in the Netherlands (Aarsen FK et al. **Neurology** 2004;62:1311-1316; **Ped Neur Briefs** 2004;18:39-40). Neuropsychological testing at 1-8 years after tumor resection and 6-22 years of age showed significantly weaker performances in sustained attention, executive functioning, visual-spatial function and memory. A high percentage required special education, reflecting the severity and persistence of cognitive deficits.

The cerebellum has 3 functional zones, medial, intermediate, and lateral (Jansen, Brodal, 1940). The medial zone contains the vermis and nuclei fastigii, concerned with control of posture and locomotion. Damage to the intermediate zone, containing the nucleus interpositus and dorsomedial dentate nucleus, causes tremor. The anterior portion of the lateral cerebellar hemisphere and the dentate nucleus are involved in motor control, while the posterolateral portion governs motor planning, language development and memory function. In the current Minnesota study, one third of the tumors were medulloblastomas, and the lateral hemispheres concerned with cognitive function were less involved than vermal structures.

EEG AND MRI IN IDENTIFYING TUBEROUS SCLEROSIS LESIONS FOR EPILEPSY SURGERY

The role of surface EEG and MRI in the identification of epileptogenic tubers for surgical resection in patients with tuberous sclerosis (TSC) was studied at the Cleveland Clinic, OH. Localized and concordant preoperative MRI and EEG abnormalities were found in 9 of 17 patients (median age 12 years; range 2 months to 31 years), and resection of a localized tuber provided seizure freedom in 8 (89%) patients. Of 8 patients with less well-localized or non-concordant MRI and EEG, only 3 (38%) were seizure free and 5 had persistent seizures following surgery. Overall, 11/17 (65%) patients became seizure free following surgery. The response was not correlated with age at time of surgery or type of surgery (temporal resection vs frontal/multilobar resections). TSC is not a contraindication to epilepsy surgery. (Lachhwani DK, Pestana E, Gupta A et al. Identification of candidates for epilepsy surgery in patients with tuberous sclerosis. **Neurology** May (1 of 2) 2005;64:1651-1654). (Reprints: Dr Deepak K Lachhwani, Section of Pediatric Epilepsy and Pediatric Neurology, The Cleveland Clinic Foundation, 9500 Euclid Ave, S-51, Cleveland, OH 44195).

COMMENT. Surface EEG and MRI are effective in localizing epileptogenic tubers for epilepsy surgery in tuberous sclerosis. Patients with concordant EEG and MRI