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SEIZURE DISORDERS

OUTCOME OF HEMISPHERECTOMY FOR EPILEPSY

The clinical course and outcomes of 33 children with refractory epilepsy and hemiplegia are evaluated following hemispherectomy at Great Ormond Street Hospital, London, between 1991 and 1997, with particular reference to the underlying pathology, freedom from seizures, change in hemiplegia, cognitive function, and behavior. Median age at surgery was 4.25 years (range 0.33-17 years). Median follow-up period was 3.4 years (range 1-8 years). Underlying pathology was classified in three groups: Group 1 *developmental* in 16 (10 hemimegalencephaly, 2 polymicrogyria, 2 focal cortical dysplasia, 1 diffuse cortical dysplasia, and 1 microdysgenesis); Group 2 *acquired* in 11 (6 middle cerebral artery infarct, 3 post encephalitis or trauma, 1 hemiconvulsion-hemiplegia epilepsy, and 1 perinatal ischemia); and Group 3 *progressive* in 6 (4 Rasmussen encephalitis, 2 Sturge-Weber syndrome). In the total group at follow-up, 52% had become seizure free following surgery, 9% had only rare seizures, 30% had a greater than 75% reduction in seizures, and 9% had a <75% reduction or no improvement in seizure frequency. Seizure outcome was significantly better in the progressive pathology group than in the other 2 groups: a >75% reduction in seizure frequency was obtained in 100% of the progressive group compared to 88% of the developmental pathology group and 91% of the acquired group. Of 10 with hemimegalencephaly, only 2 became seizure free. Antiepileptic medications had been discontinued in 16 patients, and the remainder had seizures controlled with a median of 1 drug, a significant reduction compared to pre-operative levels. Hemiplegia was unchanged following surgery in the majority (22 out of 33 cases); it improved in 5 and worsened in 6. Fine finger movements deteriorated in 5. Visual fields deteriorated in 13 and were unchanged in 17. Cognitive improvement occurred in 4 (12%) children, and behavior improved in 17 (51%) and deteriorated in 5 (15%).

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None showed cognitive deterioration or loss of language. Serious postoperative complications occurred in 3 patients <18 months of age. There were no perioperative deaths. (Devlin AM, Cross JH, Harkness W et al. Clinical outcomes of hemispherectomy for epilepsy in childhood and adolescence. Brain March 2003;126:556-566). (Respond: Dr JH Cross PhD FRCPCH, Neurosciences Unit, Institute of Child Health, The Wolfson Centre, Mecklenburgh Square, London WC1N 2AP, UK).

COMMENT. Hemispherectomy in childhood and adolescence for refractory seizures associated with hemiplegia has a low operative mortality and morbidity, and a greater than 50% likelihood of complete seizure control. Seizure outcome and cognitive performance are better in patients with progressive pathologies (Rasmussen or Sturge-Weber syndromes) and acquired lesions (cerebral infarct) than in those with underlying developmental pathology (hemimegalencephaly).

Behavioral disorder is a common complication of epilepsy with hemiplegia. In most reports, hemispherectomy results in improved behavior and decrease in temper outbursts and aggressiveness (see Progress in Pediatric Neurology I, PNB Publishers;pp132-133). Early surgery has been suggested to avoid the developmental and behavioral deterioration that may occur with time. In the present series, 5 patients showed postoperative deterioration in behavior, with temper tantrums, aggression and mood swings, while seizures were controlled.

Hand function in children with hemiplegic cerebral palsy was evaluated in 31 children at the Neurological Institute, Milan, Italy (Fedrizzi E, Pagliano E et al. Dev Med Child Neurol Feb 2003;45:85-91). In those with low scores at outset, improvement over time was more marked with grip than spontaneous hand use. During therapy, spontaneous hand use in bilateral manipulation must be monitored from an early age, and grip assessment alone is insufficient.

Impaired dexterity and corticospinal tract dysgenesis were studied in 16 patients, aged 8-19 years, with congenital hemiplegia at Universite catholique, Brussels, Belgium (Duque J, Olivier E et al. Brain March 2003;126:732-747). Structural damage of corticospinal tracts was estimated by MRI measurements of cerebral peduncle cross-sections. Impaired dexterity results from an abnormal synergy between fingertip forces during manipulation of an object. The corticospinal tracts play a critical role in the temporal coordination between different muscles during dextrous hand movements, both in the hemiplegic and nonparetic limb.

Cerebral lateralization and cognitive deficits were studied in 56 children with congenital hemiparesis at Tartu University Clinics, Estonia. (Kolk A, Talvik T. Pediatr Neurol Nov 2002;27:356-362). Left-handedness was present in 41% of hemiparetic children and in 72% of those with a left hemisphere lesion. Children with ipsilateral to brain lesion handedness had minimal or moderate cognitive dysfunction, whereas those with handedness contralateral to the lesion showed diffuse cognitive deficits. Handedness and psychological assessment are reliable indicators of cerebral reorganization after early brain insult.

The Melbourne Assessment is a valuable tool for measuring upper limb function in children with hemiparetic cerebral palsy and correlates with the Pediatric Evaluation of Disability Inventory. (Bourke-Taylor H. Dev Med Child Neurol Feb 2003;45:92-96).