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LANGUAGE DOMINANCE

FUNCTIONAL MRI STUDY OF LANGUAGE DOMINANCE

Functional magnetic resonance imaging (fMRI) was used to determine the pattern of receptive language lateralization in 11 healthy children (7 girls, 4 boys; mean age, 8.5 yrs) at Children's National Medical Center, George Washington School of Medicine, DC. All were right-handed, with strong preference for the right hand, and all had high average-to-superior intelligence. Functional and structural MR images were obtained during silent naming of objects presented auditorily in a descriptive phrase (eg. "long yellow fruit" for "banana"). Strong activation occurred bilaterally, with greater activation in the left hemisphere, especially in superior and middle temporal gyri. Group analysis also revealed other areas of activation, including the left cuneus, left inferior temporal gyrus, prefrontal area, and left fusiform and lingual gyri. Individual scans showed additional activation in the left frontal lobe. Asymmetry indices showed lateralization to the left inferior frontal gyrus, middle frontal gyrus, and the Wernicke area. (Balsamo LM, Xu B, Grandin CB et al. A functional magnetic resonance imaging study of left hemisphere language dominance in children. Arch Neurol July 2002;59:1168-1174). (Reprints: William D Guillard MD, Department of Neurology, Children's National Medical Center, 111 Michigan Ave NW, Washington, DC 20010).

COMMENT. Hemispheric lateralization and left hemisphere language dominance for auditory comprehension is present in healthy children at 8 years of age, similar to that of adults.

Language dominance in partial epilepsy patients is identified using an fMRI reading task, also at the Children's National Medical Center, Washington, DC (Gaillard WD, Balsamo L, Xu B et al. Neurology July (2 of 2) 2002;59:256-265). Of 30 patients, ages 8 to 56 years, with temporal lobe epilepsy, 25 were left dominant, 2 right, one bilateral, and 2 undetermined. Results of intracarotid amobarbital Wada test and fMRI agreed in most patients.

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The editor is Pediatric Neurologist at Children's Memorial Hospital and Northwestern University Medical School, Chicago, Illinois. PNB is a continuing education service designed to expedite and facilitate review of current scientific information for physicians and other health professionals. Fax: 312-943-0123.

The Wada test and its possible replacement with fMRI are discussed in an editorial. (Abou-Khalil B, Schlagger BL. Is it time to replace the Wada test? Neurology July (2 of 2) 2002;59:160-161). Only "when a paradigm or battery of fMRI paradigms can be validated for identification of language regions that should be excluded from excision, and for postoperative memory function, We are almost there."

DEVELOPMENTAL DISORDERS

DEVELOPMENTAL LANGUAGE DISORDER AND POLYMICROGYRIA

Neuroimaging studies were conducted in 15 children (11 boys), ages 4 to 14 years, with primary complaint of language delay, in a study at the Department of Neurology, University of Campinas, Brazil. Six with severe developmental language disorder (DLD) had diffuse perisylvian polymicrogyria (PMG): they did not speak or had mixed phonologic-syntactic deficit syndrome. Six with PMG restricted to posterior parietal regions had milder DLD, a phonologic programming deficit syndrome (excessive use of jargons). The clinical manifestations of DLD associated with polymicrogyria vary in relation to the extent of the cortical abnormality. (Guerreiro MM, Hage SRV, Guimaraes CA et al. Developmental language disorder associated with polymicrogyria. Neurology July (2 of 2) 2002;59:245-250). (Reprints: Dr Marilisa M Guerreiro, Department of Neurology, PO Box 6111, 13083-970 Campinas, SP, Brazil).

COMMENT. Polymicrogyria involving perisylvian or temporoparietal regions may be associated with developmental language disorder (DLD) or developmental dyslexia. The complete perisylvian syndrome is manifested by pseudobulbar palsy, cognitive deficits, epilepsy, and MRI evidence of cortical abnormalities. In the above study, patients diagnosed with DLD and polymicrogyria had normal or borderline cognitive function and no history of epilepsy. A subtle form of posterior parietal polymicrogyria can present with DLD and represents a mild form of perisylvian syndrome.

MOTOR DEVELOPMENT AND HANDEDNESS

NORMAL GRIP STRENGTH IN YOUNG CHILDREN

Norms for grip strength of children aged 4 to 16 years were determined in a study of 530 Swedish children at the Department of Rehabilitation, Umea University, Sweden. Peak grip strength over a 10 sec period and sustained grip strength averaged across the 10 secs were measured using an instrument Grippit dynamometer, with adjustable handles and digital display. A standardized position for the child was followed as recommended by the American Society of Hand Therapists. Up to 10 years of age, boys and girls showed increases in strength with age that were parallel; after 10 years, boys were significantly stronger than girls (55% higher at 16 years). Grip strength was strongly correlated with weight, height, and especially, hand length. Right-handed children were significantly stronger (up to 10%) in the dominant hand, while left-handers showed no difference between hands. Sustained grip strength was 80-85% of peak grip strength; it was lower in younger children. These norms for peak grip strength were slightly lower than the USA and Australia 1980s data, probably related to differences in instruments used and age groupings of children in the studies. (Hager-Ross C, Rosblad B. Norms for grip strength in children aged 4-16 years.