# PEDIATRIC NEUROLOGY BRIEFS
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**J. GORDON MILLICHAP, M.D., F.R.C.P., EDITOR**

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## CONGENITAL DEVELOPMENTAL DISORDERS

### LONG-TERM OUTCOME OF IDIOPATHIC MACROCEPHALY

The neuroradiological, developmental, and psychological, long-term sequelae of 41 infants (30 boys, 11 girls) diagnosed with macrocephaly (an occipito-facial head circumference [OFC] >95$^{th}$ centile) at a family health service visit between 1985 and 1986 were studied at the Royal Alexandra Hospital for Children and other centers in Sydney, Australia. After initial presentation at a mean age of 8 months (range 3-30 months), all participants received CT or MRI of the head and neurologic examinations at a mean age of 3 years (range 9-87 months). Fifteen of the original 41 patients who gave consent were re-examined at a mean age of 18 years (range 17-20 years). Neurologic exams were normal initially and at follow-up, and OFCs had normalized, relative to adult growth charts, and were proportionate to heights for boys or girls. MRI images re-evaluated in 9 participants showed regression of orbito-frontal extradural collections and a normal or slightly enlarged ventricular space compared to infant examinations in all except one. None had developed an increase in intracranial pressure. Clinical interviews in 15 participants revealed half with reading or arithmetic difficulty in school, 2 had motor delay, and 2 were speech delayed. Neuropsychological testing in 9 showed that 6 had normal intellectual ability and 3 were in the low average to borderline range; 3 had attention problems, and 6 had a high rate of omission and/or commission errors. (Muenchberger H, Assaad N, Joy P et al. Idiopathic macrocephaly in the infant: long-term neurological and neuropsychological outcome. **Childs Nerv Syst** October 2006;22:1242-1248). (Respond: Dr Heidi Muenchberger, School of Human Services, Griffith University, Brisbane, Australia).

COMMENT. Previous follow-up studies of infants with idiopathic macrocephaly have shown variable results regarding neurological, radiological and psychological outcome, some showing normalization of the head circumference within 18-24 months, and some

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with persistence of radiological abnormalities in the long-term. The present study shows in a small number of macrocephalic infants followed to young adulthood, an initial orbito-frontal collection of extradural fluid and enlarged subarachnoid space will regress and normalize, in the absence of a co-existing developmental disorder or hydrocephalus. Idiopathic macrocephaly may be considered a normal variant, radiologically, but neuropsychologically, individual variations can be expected, with impairments in visuo-motor skills and attention. Early investigation of cognitive function, and monitoring of behavioral and academic performance may be indicated in infants diagnosed with idiopathic macrocephaly.

## EARLY DETECTION OF CORPUS CALLOSUM GROWTH IMPAIRMENT IN PREMATURE INFANTS

The effect of preterm birth on the serial growth of the corpus callosum and cerebellar vermis and the earliest time of detected impairment were studied by cranial ultrasonography in 61 very low birth-weight (VLBW) infants (<33 weeks gestation; <1500 gms) admitted to a single regional level III NICU from 1998 to 2000 at Christchurch Hospital, New Zealand. Sonograms were performed twice, >7 days apart, in the first 2 weeks of life, at 6 weeks, and at term equivalent. The length of the corpus callosum and vermis was measured on midline sagittal images, and growth rates calculated in mm per day. The relation between corpus callosum growth rates and neurodevelopmental outcome at 2 years of age was examined. The corpus callosum elongated at a normal rate of 0.21 mm/day from birth to 2 weeks but slowed to 0.11 mm/day in weeks 2-6. A reduction in growth rate of the corpus callosum was detected by 6 weeks in 96% of infants of 23-33 weeks' gestation, and it persisted to term equivalent in the majority. Some improvement in growth rate of the corpus callosum occurred in 15% of infants after 6 weeks, but only in VLBW infants born after 28 weeks gestation. Retardation in growth of the vermis was correlated with corpus callosum growth impairment. Motor delay and cerebral palsy at 2 years of age were associated with under-development of the corpus callosum between 2 and 6 weeks after birth. (Anderson NG, Laurent I, Woodward LJ, Inder TE. Detection of impaired growth of the corpus callosum in premature infants. **Pediatrics** September 2006;118:951-960). (Respond: Dr Nigel G Anderson, Department of Radiology, Christchurch Hospital, Riccarton Avenue, Christchurch 8001, New Zealand).

COMMENT. Corpus callosum white matter injury occurs at the time of birth in almost all infants born prematurely at 23-33 weeks' gestation. The impairment in growth of the corpus callosum and also the vermis of the cerebellum is detectable by bedside ultrasound by 6 weeks of age or earlier, if the damage occurs prenatally. Neuroprotective strategies such as mild hypothermia are best implemented in the NICU as soon after birth as possible. VLBW infants with reduced growth of the corpus callosum detected at 2 to 6 weeks after birth are at increased risk of psychomotor developmental delay and cerebral palsy.

**Allometric scaling of brain growth of preterm infants** on serial MRIs was used to demonstrate a deficit in cortical surface-area expansion relative to brain volume with increasing prematurity (Kapellou O et al, reviewed by Allin M. **Lancet Neurology** Oct 2006;5:812-813). Slower rates of cortical surface-area growth correlated with developmental delay at 2 years of age, especially in boys. An abnormal subcortical white-matter