

- Letter to the Editor

Grade 3 to 4 Intraventricular Hemorrhage and Bayley Scores Predict Outcome

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To the Editor.—

We applaud the recent article by Hack et al,¹ who make 2 very important points that cannot be overemphasized. The first point, that the Bayley scales are a poor predictor of eventual cognitive outcome, has been known to evaluators of normal populations. Thus, overly pessimistic predictions can arise when early cognitive performance is used as the sole marker of outcome.

In contrast, the second point, that low Bayley scores combined with severe abnormalities on cranial ultrasound are reliable early markers of poor cognitive outcome, is demonstrated by the data from Hack et al. Severe abnormalities were defined as grade 3

to 4 intraventricular hemorrhage (IVH), ventriculomegaly (VM), or periventricular leukomalacia (PVL). In contrast to PVL, the incidence of grade 3 to 4 IVH has not changed during the past 10 years. Review of data for infants of <1500-g birth weight from both the Vermont Oxford Network and the National Institute of Child Health and Human Development Neonatal Research Network suggest that the incidence of grade 3 to 4 IVH was 6.8% to 11% in 1993 and 10% to 12% in 2003.^{2,3}

Serial neurodevelopmental studies such as those reported by Hack et al provide ample evidence that grade 3 to 4 IVH is a major predictor of adverse outcome at school age. In the cohort of infants born at 600 to 1250 g who are enrolled in the Indomethacin IVH Prevention trials,^{4,5} mortality, cerebral palsy (CP), and mental retardation (MR) are all more common in children with grade 3 to 4 IVH (see Table 1). More than 50% of the neonates with grade 3 to 4 IVH died, 40% had PVL, 80% had VM, and 50% required a VP shunt. At 12 years of age, 60% of the children with grade 3 to 4 IVH had CP, 70% had MR, and 92% required special services. In contrast to the children with no history of IVH or grade 1 to 2 IVH in our cohort who had improving test scores over time, infants with grade 3 to 4 IVH had worsening test scores over time.⁶

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TABLE 1.

Data From the Indomethacin IVH Prevention Trial

Examination of data for the most recent year available, 2003, reveals that there were 4091063 live births in the United States.⁷ Of these infants, 57275 (1.4%) weighed <1500 g, and data from the Vermont Oxford Network and the National Institute of Child Health and Human Development Neonatal Research Network suggest that 5800 of those infants experienced grade 3 to 4 IVH. The survival rate for these infants is reported to be 75%, and our data demonstrate that 70% of those survivors (3045 infants) will experience MR secondary to grade 3 to 4 IVH. Because the most recent data from the Centers for Disease Control and Prevention report lifetime care costs of \$1.01 million for a child with MR,⁸ the care costs for prematurely born infants with grade 3 to 4 IVH would exceed \$3 billion. This figure is twice that of the yearly budget of the National Institute of Neurologic Disorders and Stroke and more than one eighth that for the National Institutes of Health as a whole.^{9,10} With the increasing survival of very low birth weight preterm infants, these data suggest that grade 3 to 4 IVH continues to represent one of the major pediatric public health problems of our time.

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