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Intraventricular hemorrhage in preterm infants: proposal of a new strategy

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Introduction: In preterm infants, 75% of germinal matrix/intraventricular hemorrhage (GMH/IVH) occur by 72 hours, and > 95% by 1 week after birth. Intraventricular blood clots, fibrosing arachnoiditis, and subependymal gliosis may alter CSF dynamics, causing obstruction or hindering resorption. We present our experience with long-term external ventricular drainage (EVD) as an early surgical option to reduce ventriculoperitoneal (VP) shunting.

Methods: We studied 87 preterms (gestational age: 28.4 weeks average; birth weight: 1252 g average). Ventricular size was assessed with transfontanellar ultrasound (US). Post-hemorrhagic hydrocephalus (PHH) was defined as a bifrontal diameter 4 mm > 97th centile, with evidence of IVH. Surgery was performed at 4 days of IVH onset (age: 8 days average, range 4 to 17 days). An EVD was placed using a neonatal skull mini-screw, allowing complete isolation of the catheter from the skin. The EVD was kept in place for 33.4 days on average, and was removed with CSF protein <100 mg/dL, normal intracranial pressure for 48-72 hours, and no evidence of ventricular dilatation.

Results: 95.5% of patients survived, whereas 4.5% died from unrelated causes. 81% of survivors were shunt free. Of 16 patients who eventually received a ventriculoperitoneal shunt, 13 (81%) were treated with EVD after age 10 days. CSF culture was normal in 98.8%; only one (1.2%) had CSF infection due to sepsis. Mechanical EVD obstruction occurred in 2 (2.3%). Neurological development at 3 years was normal in 25%; mild to moderate delay occurred in 50%, and severe delay/cerebral palsy in 25%. Epilepsy occurred in 18%, strabismus in 31%, and visual dysfunction in 31%.

Conclusions: Early (ie, before age 10 days), long-term EVD is a safe technique that prevents hydrocephalus and dramatically reduces the incidence of permanent shunting and long-term morbidity, while minimizing the risk of CSF infection.