Periventricular-intraventricular hemorrhage case series

Behmanesh et al. introduced a novel noninvasive technique of intracranial pressure monitoring in children with open fontanelles. Within this study, they described the first clinical implementation and results of this new technique in the management of children with hydrocephalus caused by intraventricular hemorrhage (IVH). In neonates with posthemorrhagic hydrocephalus (PHH), an Ommaya reservoir was implanted for initial treatment of hydrocephalus. The ICP obtained noninvasively with the new device was measured before and after CSF removal and correlated to cranial ultra-sonographies. Six children with a mean age of 27.3 weeks and a mean weight of 1082.3 g suffering from PHH were included in this study. We performed an overall of 30 aspirations due to ventricular enlargement. Before CSF removal, the mean ICP was 15.3 mmHg and after removal of CSF, the mean ICP measured noninvasively decreased to 3.4 mmHg, $p = 0.0001$. The anterior horn width (AHW), which reflects the early expansion of the ventricles, was before and after CSF removal 15.1 mm and 5.5 mm, respectively, $p < 0.0006$. There was a strong correlation between noninvasively measured ICP values and sonographically obtained AHW, $r = 0.81$. Ultimately, all children underwent ventriculoperitoneal shunt procedures. This is the first study providing proof for a noninvasively ICP-based approach for management of posthemorrhagic hydrocephalus in newborn children [1)].

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271 patients admitted to Malaga University Hospital with GM hemorrhage. The following data were recorded: gestational age, gender, twin birth, head circumference at birth, weight at birth, and Papile grade. Severe obstetrical (abruption, chorioamnionitis, pregnancy-induced hypertension, tocolytic treatment) and neonatal disorders (respiratory distress syndrome, neonatal infection, coagulation disorder, patent ductus arteriosus, necrotizing enterocolitis) were also recorded. Symptomatic hydrocephalus was diagnosed in the event of a progressive increase in head circumference and ventricular indices requiring shunting.

Of the 271 patients, 139 (51%) developed posthemorrhagic ventriculomegaly; 47 patients (17%) developed symptomatic hydrocephalus and needed shunt implantation. They found a significant relationship between the development of symptomatic hydrocephalus and Papile grade, lower gestational age, lower birth weight, twin birth, and neonatal infection.

Awareness of risk factors for the development of hydrocephalus in newborn infants with GM hemorrhage should be emphasized in order to enable an early diagnosis of ventriculomegaly and symptomatic hydrocephalus and thus make a correct therapeutic decision [2)].

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Behmanesh B, Gessler F, Dubinski D, Quick-Weller J, Cattani A, Schubert-Bast S, Seifert V, Konczalla J, Freiman TM. First clinical experience with the new noninvasive transfontanelle ICP monitoring device in management of children with premature IVH. Neurosurg Rev. 2019 May 11. doi: 10.1007/s10143-019-01105-4. [Epub ahead of print] PubMed PMID: 31079320.
2)
Romero L, Ros B, Arráez MA, Ríus F, González L, Martín A, Carrasco A, Segura M. Analysis of risk factors for hydrocephalus development in newborn infants with germinal matrix hemorrhage. Minerva Pediatr. 2015 Oct;67(5):401-6. PubMed PMID: 26377778.