

**Combined endoscopic third ventriculostomy and choroid plexus cauterization as primary treatment for infant hydrocephalus: a prospective North American series**

**Clinical article**

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*Abbreviations used in this paper:* CPC = choroid plexus cauterization; ETV = endoscopic third ventriculostomy; ETVSS = ETV Success Score; MMC = myelomeningocele; PHH = post-hemorrhagic hydrocephalus; PIH = post-infectious hydrocephalus; VP = ventriculoperitoneal.

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**Abstract**

**OBJECT**

Combined endoscopic third ventriculostomy with choroid plexus cauterization (ETV/CPC) enhances the likelihood of shunt freedom over ETV alone, and thus avoidance of shunt-related morbidity, in hydrocephalic infants. To date, virtually all published reports describe experiences in Africa, thus hampering generalization to other parts of the world. Here, the authors report the first North American prospective series of this combined approach to treat hydrocephalus of various etiologies in infants.

**METHODS**

A prospective series of 50 boys and 41 girls (mean and median ages 4.7 and 3.2 months, respectively) with hydrocephalus underwent ETV/CPC performed by the senior author at Boston Children's Hospital from August 2009 through March 2014. Success data were analyzed using the Kaplan-Meier method and Cox proportional hazards model.

**RESULTS**

The 91 patients treated included those with aqueductal stenosis (23), myelomeningocele (23), posthemorrhagic hydrocephalus (25), Dandy-Walker complex (6), post-infectious hydrocephalus (6), and other conditions (8). Using Kaplan-Meier survival analysis, 57% of patients required no further hydrocephalus treatment at 1 year. Moreover, 65% remained shunt free to the limit of available follow-up (maximum roughly 4 years). A Cox proportional hazards model identified the following independent predictors of ETV/CPC failure: post-infectious etiology, age at treatment

younger than 6 months, prepontine cistern scarring, and prior CSF diversion. Of patients with at least 6 months of follow-up, the overall ETV/CPC success at 6 months (59%) exceeded that predicted by the ETV Success Score (45%). Complications included 1 CSF leak and 1 transient syndrome of inappropriate antidiuretic hormone secretion, and there were no deaths.

## **CONCLUSIONS**

ETV/CPC is an effective, safe, and durable treatment for infant hydrocephalus in a North American population, with 1-year success rates similar to those reported in Africa and equivalent to those for primary shunt placement in North America. These findings underscore the need for prospective multicenter studies of the outcomes, quality of life, and economic impact of the procedure compared with primary shunt insertion.