Editorial

Treatment of hydrocephalus in adults

HAROLD L. REKATE, M.D.

Pediatric Neurosciences, Barrow Neurological Institute, Phoenix; and University of Arizona School of Medicine, Tucson, Arizona

WHEN THE FLOW OF cerebrospinal fluid (CSF) is obstructed at or beyond the outflow of the fourth ventricle, hydrocephalus develops. After hydrocephalus is treated, the size of the ventricles decreases, and an inflammatory state leads to fusion of the ependyma of the sylvian aqueduct and isolation of the fourth ventricle. This process leads to dilation of the fourth ventricle as well as signs and symptoms of brainstem dysfunction. It can also lead to syringomyelia.

Typically, the problem of an isolated fourth ventricle is found in the context of premature newborns with posthemorrhagic hydrocephalus whose course is complicated by secondary ventriculitis. The cases presented in the article by Upchurch and colleagues represent the much more rare occurrence of this problem in adults. These authors have successfully managed this problem by placing a shunt containing a “standpipe” that allows CSF to flow between the fourth and more superior ventricles. This procedure involves a two-port technique and a steerable endoscope.

Enthusiasm for the use of steerable endoscopes has waned during the past decade. The advantage gained by being able to steer the end of the endoscope is often lost by the typically inferior optics of these systems and their inability to be linked directly to the guidance systems. It is also absolutely necessary to withdraw the endoscope in its straightened application to avoid cutting the brain. However, it is impossible to see the back of the endoscope while in the fourth ventricle; therefore, straightening it can lead to distortion of the aqueduct.

The technique used at my institution involves a single bur hole anterior to the coronal suture. The ventricle is cannulated with a peel-away sheath. The endoscope and sheath are advanced through the foramen of Monro and directed with the linked guidance system to the aqueduct and into it if no obstruction is present. The sheath is then directed into the mouth of the aqueduct. The endoscope is withdrawn, and the ventricular catheter is placed down through the peel-away sheath. A shunt passer registered with the Stealth Station Image Guidance System (Med-

tronic) is used to direct the catheter into the aqueduct. Added holes have already been precut in the catheter to make certain that there would be continuous flow from the fourth to the third ventricle.

Is it necessary to place a shunt through the aqueduct, or is it sufficient to open the web across the aqueduct and allow CSF to flow from the fourth into the lateral ventricle? There have been early successes when the web is open, but late failures are common. A stent leads to more sustained improvement when the aqueduct is opened by aqueductoplasty.¹ Directing the catheter down the aqueduct and not toward the brainstem or aqueduct promotes longer function without the catheter penetrating the substance of the brainstem.

Reference

1. Fritsch MJ, Kienke S, Medhorm HM: Endoscopic aqueductoplasty: Stent or not to stent? *Childs Nerv Syst* 20:137–142, 2004

RESPONSE: It was at an international hydrocephalus meeting many years ago when I first heard Dr. Rekate mention the concept of a multiperforated transventricular catheter for the treatment of compartmentalized hydrocephalus. When technically possible, this treatment approach offers many advantages over the more cumbersome direct posterior fossa approaches. There is obviously more than one way of placing such a catheter endoscopically, and ultimately the decision of what approach, technique, and equipment to use depends on the anatomy of the ventricular system and the experience of the surgeon. I appreciate Dr. Rekate’s thoughtful comments and am indebted to him for helping me better understand the pathophysiology and management of hydrocephalus.

MARVIN BERGSNEIDER, M.D.
LOS ANGELES, CALIFORNIA

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Abbreviations used in this paper: