The Use of Controlled Overpressure Cisternography to Localize Cerebrospinal Fluid Rhinorrhea

The problem of intermittent cerebrospinal fluid (CSF) rhinorrhea following head injuries of varying degrees can still be perplexing to neurosurgeons in some instances, particularly when the patient complains of water dripping from his nose intermittently and yet does not show observable spinal fluid in the nasal passages on repeated examination. The obvious danger is that acquired meningitis from the fistulous tract into the contaminated nasal sinuses may produce additional damage.

Many neurosurgeons feel that significant CSF rhinorrhea after head injury is usually associated with a certain degree of hydrocephalus, which produces a pressure elevation under circumstances favoring continuation of the fistula and its CSF leak. The leak, however, may be activated only when the patient coughs or strains, producing a pressure increase within the head. If hydrocephalus is present, the mean pressure at homeostatic or normal levels may be close to the accepted norm, whereas the pulsatility of CSF at that homeostatic level is still above normal. This elevation is reflected in a very reduced accommodation to Valsalva maneuvers: these will send the pressure much higher than under normal circumstances due to the loss of compensatory mechanisms in hydrocephalus. The hydrocephalus may otherwise be relatively asymptomatic.

The report by Magnaes and Solheim (see pages 109–111), concerning the use of overpressure cisternography to localize rhinorrhea, presents an intriguing application of clinical physiology to this problem. Although they have used this new technique in only four patients, the results are, at least, encouraging. If hydrocephalus is present, however, certain dangers must be pointed out since the hydrocephalic brain is intolerant of pressure increases of the magnitude they describe. An infusion rate of artificial CSF at 5 ml per minute is dangerously high if any degree of hydrocephalus exists. During such an injection, careful clinical observations must be maintained since subjects with hydrocephalus can show conscious level changes very rapidly with even small pressure changes. Of course, a CSF leak should become more obvious under the pressures produced.

Whether a pressure of 800 mm H₂O is necessary to demonstrate a fistula is problematic. The concept is worth considering, but the technique probably should be modified for patient safety. The safety factor will undoubtedly become a more serious consideration as experience is gained with this technique.

A slower rate of injection, such as 0.5 ml/min with a variable pressure endpoint determined strictly by the condition of each patient, might be worth consideration. During the period of infusion, continuous pressure measurements can be recorded by the CSF infusion test of Katzman to determine whether hydrocephalus is present. Simultaneously a radionuclide image of the brain should be obtained to determine whether in fact transependymal absorption of CSF is also occurring. These two factors, besides the observation of radioactivity in nasal packs or the nasopharynx, would give a wide spectrum of information from a single effort.

The technique as described has certain inherent dangers: yet the dangers are probably less than leaving the patient with an intermittent CSF rhinorrhea, provided that proper clinical care and recognition of possible effects of this test are realized.

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