Use of Micropaque Barium in the Radiographic Visualization of Brain Abscesses

Case Report

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K a h n 6 reported the radiographic visualization of encapsulated abscesses of the brain by the injection of colloidal thorium dioxide in 1939. The phagocytic uptake of colloidal thorium dioxide particles by macrophages in the abscess capsule allowed the surgeon to follow changes in the size and location of an abscess during its definitive treatment.

Over the past 28 years Thorotrast has been regarded as an indispensible adjunct to the treatment of brain abscess at the University Medical Center. Unfortunately, Thorotrast is radioactive, emitting mainly alpha particles with a half life of 1.4 × 10⁵ years. Thorotrast has been implicated in the genesis of various types of tumors and in the production of a delayed cauda equina neuritis when injected into the subarachnoid space. 4,6 Because of these dangers, Federal Food and Drug regulations state that "the use in man of drugs containing thorium dioxide is justified only when this drug has a unique clinical usefulness and there is substantial evidence of limited life expectancy by reason of disease or advanced age." 7 Requests for use of thorium dioxide drugs may be approved upon a Food and Drug Administration Investigational New Drug Application.

Recently, micropulverized barium sulfate under the trade name Steripaque has been introduced in England as a substitute for Thorotrast. The particles of this non-radioactive material range in size from 0.1 to 1.0 μ. Like Thorotrast, the particles are phagocytized by macrophages of the abscess capsule and can be visualized by x-ray. Sterile micropaque (Steripaque) is not yet commercially available in this country. Micropaque as used for gastrointestinal radiography was sterilized and mixed with Betadine in a 1 to 4 suspension and used as a contrast medium in the following case.

Case Report

An 11-year-old boy was admitted to the University Medical Center on April 27, 1966, with acute pain in the right ear, nausea, vomiting, and vertigo of 2 weeks duration. There had been intermittent foul drainage from the right ear since infancy and a gradual decrease in ipsilateral hearing over a long period of time. He veered to the right while walking. The symptoms failed to respond to penicillin and chloromycetin.

Examination. On admission, the child was examined by the otological and neurosurgical services. An audiogram showed that he was totally deaf in the right ear and had no caloric response on that side. A cholesteatoma could be seen through a superior perforation of the right tympanic membrane. Pupillary responses were normal; there was no papilledema. Nystagmus with a quick left component was present on left lateral gaze. There were no sensory changes of the face or cornea, and facial nerve function was normal. He tended to fall toward the left when he closed his eyes; however, rapid alternating movements, finger-to-nose testing, and heel-to-shin testing were normal.

First Operation. On April 29, cholesteatoma and granulation tissue were removed through a right radical mastoidectomy by Doctor Paul S. Dasher. In spite of antibiotics the patient did poorly postoperatively and developed progressive signs of increased intracranial pressure, ataxia, and meningeal irritation. The spinal fluid was sterile, with 120 white blood cells and a pressure of 240 mm of water.

Second Operation. On May 6, a burr hole was placed superior to the right ear. Exploration with a ventricular needle failed to pene-
Fig. 1. Lateral (left) and anteroposterior Towne (right) radiographs of cerebellar abscess (arrow) immediately after tapping and instillation of Micropaque-Betadine suspension (May 6, 1966).

Fig. 2. Lateral (left) and anteroposterior Towne (right) radiographs of abscess (arrow) on 3rd postoperative day (May 9, 1966). Abscess was tapped once again after these films showed enlargement of abscess cavity.

Fig. 3. Lateral (left) and anteroposterior Towne (right) radiographs of cavity (arrow) at follow-up (June 3, 1966). Neurological examination was normal.