Abnormal Rapid-Sequence Imaging In a Patient with Subdural Empyema: Case Report

Naris Rujanavech, Adel G. Mattar, and R. Edward Coleman
Mallinckrodt Institute of Radiology, St. Louis, Missouri

Static brain images in a patient with subdural empyema showed findings similar to those of a subdural hematoma. The rapid-sequence study, however, showed increased peripheral activity on the affected side. Since this finding suggested an inflammatory process, further neuroradiologic evaluation and immediate surgical treatment were undertaken. The significance of the rapid-sequence study in subdural empyema has not been reported previously.


Increased activity in a cerebral radionuclide rapid-sequence study has been associated with several conditions, such as arteriovenous malformations, some primary and metastatic brain tumors (1), and cerebral infarcts with abundant perfusion (2,3). We have recently studied a patient with subdural empyema whose rapid-sequence study and whose static images showed increased activity in the region of empyema.

CASE REPORT

A 19-year-old man was admitted for evaluation of seizures. Two weeks before admission, he had developed bilateral headaches. A few days after the onset of headaches, he was seen in an emergency room, where radiographs revealed frontal sinusitis; he was treated as an outpatient with antibiotics and analgesics. The headaches persisted and he developed vomiting, sweating, and chills. He subsequently had a generalized seizure and was admitted.

Physical examination revealed a temperature of 38°C, pulse of 80/min, and blood pressure of 130/90 mm Hg. The rest of the physical examination, including the neurologic system, was normal. Laboratory data included a white blood count of 7,700/mm³, with a normal differential. Lumbar puncture yielded a clear colorless fluid with 62 mononuclear cells/mm³, 38 polymorphonuclear cells/mm³, protein of 111 mg/dl, sugar 70 mg/dl, and no organisms on smear or culture. Polytomes of the paranasal sinuses revealed bony destruction at the inner table of the left frontal sinus. An electroencephalogram showed nonfocal and nonlateralizing slow bursts anteriorly and temporally. Computed cranial tomography (CCT), with and without contrast, was interpreted as normal. An anterior rapid-sequence study after intravenous administration of 15 mCi of ⁹⁹ᵐTc-pertechnetate (Fig. 1) showed increased activity at the right convexity region compared to the left. The static images (Fig. 2), obtained 45 min after injection, also revealed increased activity over the right convexity, the abnormality being visualized only in the anterior and posterior images. A second CCT, performed after the radionuclide brain imaging and 3 days after the first CCT, showed marked ventricular shift with an area of decreased density overlying the frontal and right parietal regions. The first CCT, in retrospect, did show some contrast enhancement in the frontal area. A right carotid arteriogram showed an extracerebral fluid collection overlying the right cerebral hemisphere and an epidural fluid collection in the frontal area.

A right frontotemporal craniotomy was performed. A small epidural abscess was found, confined to the frontal area just above the frontal sinus. The subdural space was opened and pus was found extending posteriorly over the convexity. The organism was identified as an anaerobic streptococcus.
DISCUSSION

Epidural abscess is a rare entity, usually iatrogenic in origin, which has also been reported to result from osteomyelitis of the skull secondary to frontal sinus infection (4). The patient described in this report had a small epidural abscess confined to the frontal area. This abscess was unlikely to explain the abnormalities seen on the rapid-sequence study and static images.

Subdural empyema comprises 13–25% of all localized intracranial bacterial infections (5–8) and is usually confined over one hemisphere (7,8). Most commonly, subdural empyema is related to the intracranial spread of infection from the paranasal sinuses (5,6,8,9). The cerebrospinal fluid findings are variable but generally unremarkable unless the condition is associated with meningitis (5,8,10). The mortality is relatively high if recognition and surgical drainage are delayed (5,6,11). The diagnosis of subdural empyema by radionuclide brain scanning has had variable success (8,12,13). Commonly the images show an area of increased activity over the convexity, simulating the pattern seen with subdural hematoma. In our case, however, the rapid-sequence study showed increased activity on the affected side, suggesting that this abnormality was not a subdural hematoma. This increased activity was probably related to increased blood flow in the area of inflammation, since increased blood flow and vascularity have long been associated with acute inflammation (14). The radionuclide study prompted further neuroradiologic evaluation and surgery, with subsequent relief.

REFERENCES


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For additional information contact Paul E. Christian, Division of Nuclear Medicine, University of Utah Medical Center, 50 North Medical Drive, Salt Lake City, UT 84132; tel. (801) 581-2121.

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