Nonsurgical treatment of subdural empyema

Case report

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The nonsurgical treatment of a case of interhemispheric subdural empyema is reported. At the time of diagnosis, the patient had a mild decrease in consciousness and only moderate focal neurological deficits. Computerized tomography (CT) confirmed the limited (interhemispheric) extent of the intracranial infection. After drainage of the nasal sinuses and antibiotic treatment, the patient recovered, although the lesion was initially increased in size on CT scanning.

KEY WORDS • subdural empyema • antibiotic therapy

S UBDURAL empyema is a rare and serious intracranial infection, and immediate neurosurgical treatment is considered imperative.1-3,5,8,11 Recently, however, we successfully treated a patient with a subdural empyema with antibiotic therapy only, after the nasal sinuses had been drained. We are aware of only one other report of this nonsurgical treatment.5

Case Report

This 21-year-old man had a history of recurrent sinusitis. The present illness started with a headache and high fever. His general physician diagnosed sinusitis and antibiotic therapy was given without result. The headache became worse and on the 9th day of the illness the patient suffered a generalized seizure, after which he did not speak. After admission to another hospital he had four more generalized seizures. On the 10th day of his illness, he was transferred to our hospital.

Examination revealed a young man who did not speak and stared directly ahead. He localized to painful stimuli in the face but did not carry out instructions. Extreme neck stiffness was present. His temperature was 38.7°C. No other abnormalities were found on general physical and neurological examination. Opaque sinuses were the only abnormal finding on computerized tomography (CT) scanning of the brain.

Laboratory investigations on admission revealed a white blood cell count of 16.0 × 10⁹/liter. There was an increase in neutrophils which showed a shift to the left. The sedimentation rate was 63 mm after 1 hour. Opening pressure at lumbar puncture was 18 cm H₂O; the cerebrospinal fluid was clear, and contained 63 erythrocytes/cu mm, 18 leukocytes/cu mm (86% neutrophils, 13% lymphocytes, 1% monocytes), 0.81 gm protein/liter, and no microorganisms on Gram staining. Phenytoin (100 mg three times daily) was given.

On the 11th day the patient began to speak again, but with a disturbance of immediate recall, dyscalculia, amnestic dysphasia, and slightly inappropriate behavior. Electroencephalography showed markedly slow activity in the left temporal area, and moderately slow activity in the right temporal and right parieto-occipital areas. Also on the 11th day, a repeat CT scan revealed a subdural empyema lying along the falx (Fig. 1), and intravenous antibiotic therapy was begun (ampicillin, 2 gm/4 hrs; chloramphenicol, 1 gm/6 hrs; and flucloxacinil, 2 gm/4 hrs). The ear, nose, and throat surgeon diagnosed a pansinusitis on the left which was punctured and drained. Cultures were sterile for bacteria and viruses. As the clinical condition of the patient remained stable, it was decided not to operate.

From the 15th day on, the patient's temperature remained below 38°C. Neurological examination showed no abnormalities except for slightly inappropriate behavior, which was no longer observed after the 19th day. However, CT scans on the 17th day (Fig. 2) showed a slight expansion of the parafalcine empyema and a
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**FIG. 1.** Contrast-enhanced computerized tomography scan obtained on the 11th day showing a hypodense area with an enhanced border along the falx. No significant midline shift or intracerebral abnormalities were present.

**FIG. 2.** Contrast-enhanced computerized tomography scans obtained on the 17th day. *Left:* Some expansion of the lesion seen in Fig. 1 can be discerned. *Right:* A small ring-shaped lesion with perifocal edema is present in the left frontal lobe.

**FIG. 3.** Contrast-enhanced computerized tomography scan at 7 weeks after the onset of illness showing no abnormalities, except for a slight asymmetry of the frontal horns.

new lesion in the left frontal lobe. The first signs of improvement on the CT scans were seen on the 22nd day, and after 7 weeks there were no more abnormalities on CT except for a slight asymmetry of the frontal horns of the lateral ventricles (Fig. 3). Antibiotic therapy was stopped after 6 weeks. Eight weeks after admission and 9½ weeks after the onset of illness, the patient was discharged in good health. Six months after the start of his disorder, he had no symptoms except for rapid fatigue on exertion.

**Discussion**

Nonsurgical treatment is contrary to the accepted rule that a subdural empyema should be operated on as soon as the diagnosis is made or seriously suspected. The purpose of neurosurgical treatment is to decrease the toxic and inflammatory influences on the brain and its blood supply and to diminish the mass effect of the subdural pus. Even sterile pus in the subdural space may have toxic effects on the brain. 4

Two main factors prompted us to withhold neurosurgical treatment from this patient. First, he was in comparatively good neurological condition when the diagnosis was made. His level of consciousness was only mildly impaired and he showed mainly nonfocal neurological deficits (namely, apathy, inappropriate behavior, disturbed immediate recall, amnestic dysphasia, and dyscalculia). These signs indicated a limited intracranial extent of the infection. The CT scan showed a limited collection of pus along the falx, which confirmed this. The two children who were conservatively treated by Rosazza, *et al.*, 6 were also in reasonably good neurological condition, with the empyema also limited to the interhemispheric fissure. Second, our patient's rapid clinical improvement and the normalization of his temperature provided a strong argument for continuing medical treatment. A rapid clinical response was also seen in the two previously described patients. 6

Despite the clinical improvement in our patient, subsequent CT scans showed a temporary increase in the subdural collection and a small transient ring-shaped lesion with edema in the left frontal lobe, consistent with a developing cerebral abscess. 7,9,10

Under certain conditions, therefore, nonsurgical treatment of patients with a subdural empyema seems to offer favorable possibilities. The requirements are that the patient is clinically in stable condition with normal or only slightly disturbed consciousness and shows no major focal neurological deficits. The extent of the intracranial lesions on CT scanning should be limited without a major midline shift. This is particularly important in subdural empyemas in the interhemispheric fissure, because of the difficulty of both the
surgical approach to the interhemispheric fissure and the establishment of adequate drainage from this area.

Continuation of medical treatment is warranted if the patient shows a rapid clinical improvement and if the fever subsides within a few days. Even if CT scanning shows a temporary increase in the local collection, surgical treatment is not always necessary as long as the patient remains in a good clinical condition. It is not certain how long the antibiotics should be continued, but it seems reasonable to stop the treatment when CT scanning ceases to show signs of intracranial infection. It is also unknown if nonsurgical treatment results in a more favorable outcome than neurosurgical intervention. Immediate neurosurgical treatment is still indicated in patients with impaired consciousness, major focal deficits, or marked mass effect on CT scans.

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References


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