Infratentorial subdural empyema: clinical and computerized tomography findings

Report of three cases

BERNARDO BOROVICH, M.D., ELIZABETH JOHNSTON, M.D., AND EDGARDO SPAGNUOLO, M.D.

Department of Neurosurgery, Institute of Neurology, Hospital de Clinicas, Faculty of Medicine, Montevideo, Uruguay

Infratentorial subdural empyemas are rare. The authors report three cases encountered between 1979 and 1988, representing a 3% incidence among all subdural empyemas. The common source was an ear infection. Clinical presentation encompassed a systemic febrile illness, headaches, and a stiff neck. Only one patient had an inconspicuous focal neurological deficit that suggested a cerebral location. Initial diagnosis was acute meningitis in each case. A lumbar puncture was ordered in all three cases but was actually performed in two without developing tonsillar herniation. Cerebrospinal fluid analysis confirmed the diagnosis of meningitis in one but was normal in the other. Computerized tomography allowed a precise diagnosis and localization of the pathology. All three patients received aggressive antibiotic therapy plus suboccipital craniectomy and aspiration of pus; catheter drainage was performed in two. Cultures were positive in one case and negative in the others. Two patients were cured without sequelae; the third patient was moribund at surgery and died. Although it is known that subdural empyemas may localize in the posterior fossa, only one previous report was found. Infratentorial subdural empyema may sometimes be an unrecognized companion of acute meningitis and is cured with antibiotic therapy alone.

KEY WORDS • otitis • central nervous system infection • subdural empyema

While the subdural accumulation of pus over the cerebral hemispheres has been the subject of numerous publications, infratentorial subdural empyemas (SDE's) have merited only one abbreviated description. We have encountered three cases of infratentorial SDE, and record our experiences with these patients.

Case Reports

Case 1

This 17-year-old boy had previously been treated for left-sided chronic otitis. He presented at his local hospital complaining of headaches, abdominal pain, and fever of 1 month's duration. He was diagnosed as having appendicitis, and a normal appendix was removed at surgery. During the next few days he developed otalgia and examination revealed a stiff neck. He was transferred to the Institute for Infectious Diseases where a lumbar puncture was performed. Cerebrospinal fluid (CSF) analysis revealed 1100 lymphocytes, 340 neutrophils, a protein level of 170 mg/100 ml, and a glucose value of 20 mg/100 ml. Culture of the fluid was negative. A diagnosis of purulent meningitis was made, and penicillin and gentamicin were prescribed. Thereafter, a left mastoidectomy was performed and culture of the pus grew *Pneumococcus* and *Proteus*. In spite of treatment, the patient's mental status slowly deteriorated over the following weeks, and he was transferred to the Neurological Institute.

A computerized tomography (CT) scan revealed a left subtentorial and cerebellopontine angle collection with evident mass effect. On the day of admission, a left suboccipital craniectomy was performed and the pus was drained. Cultures revealed the same *Pneumococcus* and *Proteus* growths as those recovered from the ear. After surgery the patient made an uneventful recovery.

Case 2

This 35-year-old man had been treated for right chronic otitis for years. One month prior to the present
admission, he suffered an acute meningitis that quickly cleared with antibiotic therapy. He presented for consultation complaining of 1 day of headaches and fever.

Examination revealed fever, abundant suppurative from the right ear, and a stiff neck. The patient was hospitalized in the Ear, Nose, and Throat (ENT) Department of the Military Hospital and an emergency anthrotomy was done. Over the following hours he became increasingly drowsy and was transferred to the Department of Neurosurgery. A lumbar puncture yielded normal CSF, and a CT scan showed a subtentorial supracerebellar collection to the right of the midline.

As the lesion was thought small enough to be amenable to medical therapy, the patient was started on a 4-week course of intravenous antibiotics, which was followed by symptomatic improvement. By the end of this course his neurological symptoms had recurred. A second CT scan showed no difference from the first study (Fig. 1). A suboccipital craniectomy was then performed, and a large subtentorial empyema was drained; the culture was negative. During the initial postoperative period the patient improved again, but fever, headaches, and drowsiness reappeared 2 weeks later. A third CT scan revealed recurrence of the empyema. At reoperation, the pus was drained and small rubber drains were left in place for washing and antibiotic instillation. This was followed by lasting improvement, and the patient was discharged asymptomatic 100 days after admission.

Case 3

This 58-year-old man had been treated for years for chronic otitis. Ten years prior to the present admission he suffered an acute meningitis. During the 5 days before admission he had been complaining of increasing otorrhea, fever, and headaches, and became increasingly drowsy. Examination revealed only lethargy, neck stiffness, and bilateral ear infection. He was admitted to the ENT Department and a course of penicillin and chloramphenicol was instituted. In spite of this treatment, the patient’s status worsened and a right upper limb paresis developed. Neurosurgical evaluation was sought, and an emergency CT scan showed a bilateral subtentorial collection with marked mass effect. Emergency operation included external ventricular drainage, drainage of the subtentorial pus, and a bilateral mastoidectomy. By the end of the operation the patient was in a state of septic shock and, in spite of intensive treatment, he died 24 hours after surgery.

Discussion

Subdural empyema is a relatively unusual condition representing approximately 20% of all intracranial suppurations. Although pus may localize anywhere in the subdural space, an infratentorial accumulation of pus is mentioned only sporadically. In a literature search we found only one abbreviated description of this entity. Hitchcock and Andreadis reported a patient (their Case 1) presenting a combined supratentorial and infratentorial SDE and a cerebellar abscess with clinical symptoms related to the supratentorial location.

Our incidence of infratentorial SDE was 3% among all SDE’s. Bhandari and Sarkari reported an incidence of almost 10%. The clinical presentation was similar in our three cases. Medical history showed chronic otitis, complicated in two patients by acute meningitis. The duration of symptoms before diagnosis ranged from 5 days to 1 month. On admission all of the patients were systemically ill, had acute exacerbation of their chronic otitis, and complained of headache. On examination the relevant signs were drowsiness and a stiff neck. The initial diagnosis was of acute meningitis in all three patients. Lumbar puncture was actually performed in two and luckily they did not develop tonsillar herniation. Analysis of the CSF confirmed the clinical diagnosis in Case 1; in Case 2 the CSF was normal. In Case 3 lumbar puncture was postponed until a cranial CT scan was obtained, and in the end was not performed. In Cases 1 and 2 a mastoidectomy preceded the craniectomy; in Case 3 it was carried out concurrently. The CT appearance of the empyema was uniform: a homogeneous lentiform area of decreased density under the tentorium and above the cerebellum, surrounded by a thick, rim-like enhancing area (Fig. 1). Positive cultures were obtained only in Case 1 and revealed Pneumococcus and Proteus.

Management comprised systemic antibiotic therapy combined with drainage of the pus through a suboccipital craniectomy. Subdural catheters were placed for instillation of antibiotics in Case 2 after simple drainage failed, and external ventricular drainage was employed in Case 3. In all cases the subdural collection proved at operation to be much larger than had been supposed at

Fig. 1. Enhanced computerized tomography in Case 2. A: Axial view showing an area of decreased density with a densely enhanced membrane above the vermis and the medial region of the right cerebellar hemisphere. There is moderate ventricular enlargement. B: Coronal view showing the infratentorial supracerebellar location of the pus.
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CT. In Cases 1 and 3 surgery was undertaken immediately upon diagnosis. In Case 2 surgery was deferred in the hope that systemic antibiotic therapy would suffice. Infratentorial SDE appears to be a complication of chronic otitis causing acute deterioration. The clinical presentation is that of an acute meningitis, and in Case 1 both entities were concomitant. Due to the real danger of tonsillar herniation, we strongly recommend obtaining a CT scan prior to performing a lumbar puncture in all patients with clinical meningitis.

It is possible that infratentorial SDE would be diagnosed more frequently if CT were more readily available and routinely demanded in cases of meningitis. Computerized tomography was reliable in diagnosing and localizing the lesion, especially when coronal views were available (Fig. 1). Infratentorial SDE may be rapidly fatal if not recognized and managed promptly, but this does not mean that surgery should be undertaken immediately upon diagnosis. We believe that in some cases medical therapy alone might be tried first. This approach has been employed in cases of supratentorial SDE, in patients without or with only moderate mass effect, and was attempted unsuccessfully in our Case 2.

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References


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Address reprint requests to: Bernardo Borovich, M.D., Department of Neurosurgery, Instituto de Neurología, Hospital de Clínicas, Montevideo, Uruguay.