Brain abscess in infants and children

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Abstract Forty-four consecutive patients with brain abscesses, aged between 1 month and 16 years, were reviewed. The cause of abscess was meningitis in 36% of the cases, otitis in 27%, head injury in 16%, congenital heart disease in 9%, other in 5%, and undetected in 5%. Thirty patients had a single abscess and 12 had multiple abscesses. Multiloculated abscess was present in 2. Total excision was accomplished in 22 patients. Three patients underwent needle aspiration. Drainage of the abscess was performed in 13. Secondary excision was needed in 5 patients. One patient was treated nonsurgically. Streptococci, staphylococci and Proteus mirabilis were the microorganisms recovered in cultures. Overall mortality was 20% (9 patients). Mortality was significantly higher in patients under 2 years of age than in those older. Of 15 patients who were comatose at the time of admission, 6 died. Etiology, diagnostic method, and treatment modalities were not found to be significant factors in terms of predicting mortality.

Key word Brain abscess

Introduction

In spite of improved microbiological techniques for culturing and identifying microorganisms, more effective antibiotics, advanced radiological tools such as computed tomography (CT), magnetic resonance imaging (MRI), and real-time ultrasound, and the use of CT-guided stereotactic and microsurgical techniques, the management of brain abscess is both a perplexing and a controversial problem. In 1893, Macuwén [14] reported a survival rate of 80% (8 of 10) following surgical drainage of temporal abscesses. In 1926, Dandy [8] advocated aspiration through a burr-hole. Abscess excision was first advocated by Vincent et al. [29] in 1937. There have been many methods of surgical treatment of brain abscesses since then.

Patients and methods

Forty-four consecutive patients treated for intracranial abscess from 1970 to 1992 were reviewed. We evaluated each patient in terms of age, sex, presenting symptoms and signs, etiology, treatment modality, outcome, and microbiological findings. Diagnosis was by radiographic studies, surgical observation, or pathological examination of the surgical specimen. All patients were treated with appropriate antibiotics as determined by culture and sensitivity testing. Otherwise, empirical antibiotic therapy was administered.

Results

There were 44 children, aged between 1 month and 16 years (Fig. 1). Males in this series represented 59% of the cases. Angiography was the diagnostic tool in 12 patients. Thirty patients were diagnosed by CT scanning. In one case both MRI and CT scanning were carried out. Twelve
of 13 patients under 2 years old ($\chi^2 = 3.5665$, $df = 1$, $p > 0.05$) and all patients with multiple or multiloculated abscesses were diagnosed by CT scanning ($\chi^2 = 7.700$, $df = 1$, $p < 0.01$), while brain abscess in one infant was diagnosed by angiography (Fig. 2).

Presenting symptoms included headache, vomiting, seizure, fever, and reduced level of consciousness (Table 1). Signs determined at the time of diagnosis were papilledema in 20 patients, hemiparesis and state of coma in 15, cerebellar signs in 6, aphasia in 3, and extrapyramidal signs in 1. Fourteen patients had cranial nerve involvement (abducens nerve in 5, facial nerve in 4, and oculomotor nerve in 3; Table 2).

The cause of abscess was meningitis in 36% of the cases, otitis in 27%, head injury in 16%, congenital heart disease in 9%, and other causes (esophageal dilatation and pulmonary infection) in 5%. In two patients (5%) no identifiable cause of abscess was found (Table 3). Meningitis was predominant in patients under 2 years of age and otitis was the most frequent cause of meningitis in children aged between 11 and 16 years. However, the etiologies among age groups were not significantly different ($\chi^2 = 14.4264$, $df = 12$, $P > 0.05$).

White blood cell (WBC) counts ranged from 4900 to 40000/mm$^3$ (mean 1299.7/mm$^3$). Erythrocyte sedimentation rate (ESR) was obtained in only 17 patients and ranged from 7 to 125 mm/h (mean 61.4 mm/h).

Fifty-nine abscesses were detected in 44 patients. Thirty patients had a single abscess and 12 had multiple abscesses. Multiloculated abscess was present in 2. Frontal, parietal, and temporal lobes were the predominant locations of the abscesses (Table 4). Sixty-six percent of the abscesses were located in the left cerebral and cerebellar hemispheres.

Total excision of the cerebral abscess was accomplished in 22 patients. Three patients underwent aspira-