ORIGINAL ARTICLE

Diagnosis and Management of Brain Abscesses in Children

by

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Abstract

During 4 years, 20 patients with brain abscesses were hospitalized in the Departement of Child Health, Dr. Cipto Mangunkusumo General Hospital, Jakarta. Of those 20 patients, 11 were males and 9 were females. The youngest patient was 2 months old and the oldest was 12 years old. The important signs and symptoms in making diagnosis were the sign of infection, increased intracranial pressure, and focal neurological disorders. Laboratory examinations were of little value in establishing the diagnosis of brain abscess. By performing head CT Scan the diagnosis of brain abscess will be confirmed accurately. Of the 20 patients, 15 (75 %) suffered from single abscess and 5 (25 %) suffered from multiple abscesses. The results of treatment by surgical intervention were better than nonsurgical treatment. The high mortality of the nonsurgical patients was caused by the severity of the disease due to the ignorancy of their parent.

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Introduction

Brain abscess is a localized suppurative process within the brain parenchyma caused by a wide variety of bacteria, fungsi, and protozoa [1].

Before the use of computed tomography (CT) the diagnosis of brain abscess in children was very rare in our department. Now CT scan has rapidly become the principal diagnostic test in establishing the diagnosis of brain abscess, by virtue of its accuracy in determining the location, size, and pattern of contrast enhancement of a lesion. With CT scan the stage of evolution of a brain abscess can be determined with reasonable accuracy by serial scans after contrast infusion. On the basis of CT appearance, criteria are evolving which determine the best method of treatment for a given brain abscess [2].

Since brain abscess often leads to significant morbidity and mortality, early diagnosis is very important to improve the outcome [3].

Predisposing factors and sources

In most clinical series, the majority of brain abscesses arised by direct spread from paranasal sinus, middle ear, or mastoid infections [4]. Occasionally, skull defects which are either congenital or acquired provide a route for the spread of infection to the temporal lobe or cerebellum [5].

Brain abscesses also arised by hematogenous dissemination of infection from a primary site that is remote from the brain [6].

Trauma is also a well-known predisposing factor for the development of brain abscess [7].

Previous craniotomy is being encountered as a cause of brain abscess with increasing frequency [8], and the last predisposing factor of brain abscess is an immunocompromised condition [9].

Diagnosis

The diagnosis of brain abscess is suggested by the subacute development of headache, confusion, depressed consciousness, seizures, papiledema, nuchal rigidity, and focal neurological signs [10]. Magnetic resonance imaging (MRI) is the appropriate test during the cerebritic stage, and enchanced CT or MRI scans are the definitive tests in a mature abscess, showing a characteristic capsular ring.

The EEG may be normal or may display focal abnormalities in the region of the abscess.

Peripheral blood examination is usually of little value in establishing the diagnosis of brain abscess in children. The CSF is usually abnormal with increased pressure and pleocytosis, but lumbat puncture should be avoided in brain abscess because of the increased risk of herniation secondary to elevated intracranial pressure (ICP). Cultures are usually negative unless the abscess is leaking into the ventricular system [10,11].

Treatment

The treatment consists of medical management and surgical intervention. Medical management should be considered when abscess formation is still in the cerebritic stage, when there are multiple absceses, or when the abscess is located in a critical area [10].

The aim of this paper is to reevaluate the most important clinical signs and symptoms of brain abscess, the predisposing factors, the microorganisms, the accuracy of CT scan, and the best treatment.

Materials and methods

The evaluation was done on 20 patients with the diagnosis of brain abscess. The patients were hospitalized in the Departement of Child Health, Dr. Cipto Mangunkusumo General Hospital, Jakarta during 1986-1989.

This evaluation is a retrospective study about the most important clinical signs and symptoms, the predisposing factors, the microorganisms, the results of head CT scans, the choice of treatment, and the results of treatmnet in patients with brain abscess.

Results

Of the 20 patients 11 were males, and 9 were females. The youngest patient was 2 months old, and the oldest was 12 years old

hows the most important clinical signs and symptoms of the 20 patients. The most frequent symptom is fever. Sixteen of the 20 patients (80 %) suffered from fever. Other clinical signs and symptoms are headache in 11 patients (55 %), vomiting in 10 patients (50 %), seizures in 10 patients (50 %), depressed consciousness in 7 patients (35 %), abducens nerve paresis in 6 patients (30 %), papiledema in 8 patinets (40 %), papilatrophy in 5 patients (25 %), hemiparesis in 6 patients (30 %), tetraparesis in 6 patients (30 %), and nystagmus in 2 patients (10 %).

Table 2 shows the predisposing factor of the 20 patients.Hematogenous dissemination of infection from other site was found in 11 patients (55 %), direct spread from middle ear and mastoid infections in 7 patients (35 %), and complication of craniotomy in 2 patients (10 %).

Table 3 shows the microorganisms isolated from the brain abscess.

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Table1. *The most important clinical signs and symptoms of 20 patients with brain abscess*

Clinical signs and symptoms	No. of patients	%
Fever	16	80
Headache	11	55
Vomiting	10	50
Seizures	10	50
Depresed consciousness	7	35
Abducens nerve paresis	6	30
Papiledema	8	40
Papilatrophy	5	25
Hemiparesis	6	30
Tetraparesis	6	30
Nystagmus	2	10

Table 2. *Predisposing factors of the 20 patients*

Predisposing factors	No. of patients	%
Hematogenous dissemination	11	55
Direct spread from middle ear and mastoid infections	7	35
Complication of craniotomy	2	10
Total	20	100

Table 3. *Microorganisms isolated from brain abscess*

Streptococcus alpha hemolyticus
Strepcoccus viridans
Salmonella paratyphi C
Coliform bacteria
Preudomonas aeruginosa
Proteus spp.
Bacteroides spp.

Table 4. *Results of head CT scan on 20 patients*

Results	No. of cases	%
Single abscess	15	75
Multiple abscesses	5	25
Total	20	100

Table 4 shows the results of head CT scan. Of the 20 patients, 15 (75 %) suffered from single abscess, and 5 patients (25 %) suffered from multiple abscesses.

Table 5. *The mortality of the 20 patients*

Treatment	No. of cases	died	%	recovered	%
Surgery	9	2	10	7	35
Nonsurgery	11	8	40	3	15
Total	20	10	50	10	50

From Table 5 we can see the mortality of the 20 patients. Surgical intervention was done on 9 patients, and 2 of them died. On the other 11 patients surgical intervention was not done due to multiple abscesses or the patients died before this procedure performed. All the 20 patients were treated with the combination of ampicilin and chlorampohenicol (+ Metronidazole). The dose of ampicilin was 200-400 mg/kg/24 hours intravenously, and the dose of chloramphenicol was 100 mg/kg/24 hours intravenously. Dexamethasone was given to manage the increased intracranial pressure.

Eight of the 11 nonsurgical patients died. So the overall mortality of the 20 patients was 10 (50 %).

Discussion

From Table 1 we can see that the most frequent symptom is fever . The symptom of infection occurred in 16 patients (80 %). The other signs and symptoms were headache, vomiting, seizures, depressed consciousness, abducens nerve paresis, papiledema, and papilatrophy. All of these are the signs and symptoms of increased intracranial pressure. Hemiparesis, tetraparesis, and nystagmus are the focal neurological signs. So we suspect the patient shows the signs of infection, increased intracranial pressure, and focal neurological disorders. By performing head CT scan the diagnosis of brain abscess will be confirmed accurately.

Peripheral blood examination were of little value in establishing the diagnosis of brain abscess. Some patients showed moderate leucocytosis.

So the most important in making early diagnosis of brain abscess in children is early detection of the sign of infection (fever), increased intracranial pressure, focal neurological disorder, and the result of head CT scan.

From Table 3 we can see the microorganisms isolated from the brain abscess. Anaerobic bacteria were found very rare; this condition is different from the finding of Snyder (11). He found anaerobic bacteria in 70 % of brain abscess.

The results of the treatment can be seen in Table 5. The initial choice of antibiotic before the culture results available are the combinations of chloramphenicol and penicillin or nafcillin or methicillin (1,10,12). In our patients we chose the combination of ampicillin and chloramphenicol patients because we did not have intravenous penicillin. The results of treatment by surgical intervention were better than those by nonsurgical treatment. Seven (77.7%) of 9 patients recovered, while from the 11 nonsurgical patients only 3 patients (27.2 %) recovered. The high mortality of the nonsurgical patients was caused by the severity of

the disease due to the ignorancy of their parents.

Figure 1 shows the result of head CT scan of the patient with single abscess, and figure 2 shows multiple abscesses.

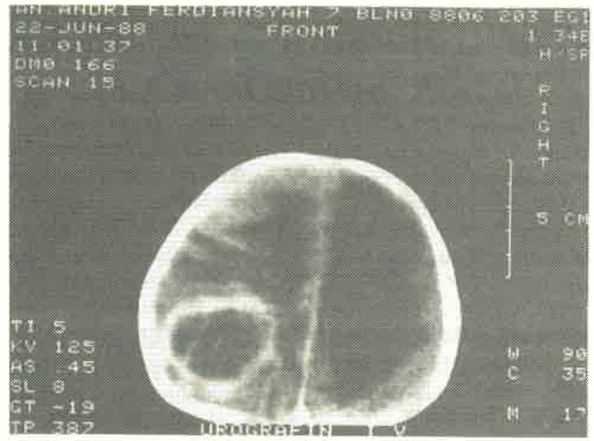

Figure 1. *Head CT scan patient with single abscess*

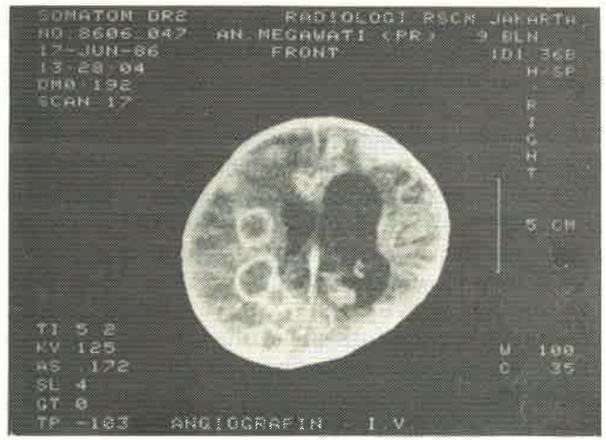

Figure 2. *Head CT scan patient with multiple abscesses*

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