Brain abscess; epidemiology, clinical manifestations and management: A retrospective 5-year study

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ABSTRACT

Background: Infections involving the cerebrum are true neurosurgical emergency that require rapid diagnosis and appropriate surgical and medical intervention to achieve good clinical outcome. Brain abscess is one of most common forms of intracranial pyogenic infections. Bacterial infections of the nervous system are often challenging for the treating physician.

Patients and methods: In this study we evaluated 41 patients with brain abscess in Loghman hospital during 2002-2009. Demographic features, predisposing factors, clinical manifestations, laboratory data and managements were evaluated.

Results: Totally, 53.6% of patients were 15-29, 26% were 30-49 and 17% were 50-70 years old. The most frequently encountered clinical manifestations were headache (92.6%) and nausea and vomiting (73.1%). Predisposing condition leading to brain abscess were sinusitis (9.2%), otitis (12%), CSF rhinorrhea (2.4%), mastoiditis (7.2%), neurosurgery (17%) and endocarditis (2.4%), and finally 20% had no risk factor. Mean duration of disease was 13 days. For 80% of patients surgical intervention was performed. Mortality rate was 12%. A total of 9.7% of patients admitted with diagnosis of brain abscess were finally diagnosed as acute demyelinating encephalomyelitis (ADEM).

Conclusion: In spite of improvement in diagnosis and treatment of patients with cerebral abscess, mortality is still high. Factors related to patient underlying diseases and the delay in commencement of antibiotic treatment were associated with increased mortality.

Keywords: Abscess; Brain; Intracranial; Management.

INTRODUCTION

A brain abscess is a focal, intracerebral infection that begins as a localized area of cerebritis and develops into a collection of pus surrounded by a well-vascularized capsule (1). Intracranial abscesses remain a significant health-care problem in developing countries. Despite advances in imaging and antibiotic treatment, brain abscess is still encountered occasionally. Various aerobic and anaerobic bacteria have been reported as causative agents of brain abscess (2). Accurate assessment of therapeutic response in patients with brain abscess is essential to direct appropriate therapy (3). Brain abscesses are mainly caused by either direct or indirect inoculation of gram positive bacteria including Staphylococcus aureus or Streptococcus species into the central nervous system.
In this study, we evaluated demographics, clinical manifestations and management of brain abscesses in our hospital.

PATIENTS and METHODS
The aim of this study was to evaluate epidemiological and clinical aspects of brain abscess. In this descriptive retrospective study we evaluated 41 patients who were admitted to Loghman hospital with diagnosis of brain abscess during 2002-2009. Demographic information, predisposing factors, clinical manifestations, laboratory data and management including medical and surgical interventions were evaluated.

RESULTS
In our setting, 53.6% of patients aged 15-29, 26% aged 30-49 and 17% aged 50-70 years. The mean age was 32 years old. Brain abscess was detected more commonly in men than women (75.6% vs. 24.4%). Clinical manifestations were as follow: headache (92.6%), nausea and vomiting (73.1%), meningeal signs (17%), drowsiness (12%), decreased level of consciousness (9.7%), fever (9.7%), urinary and fecal incontinency (7.3%), visual disturbance (7.3%) and chills (4.8%).

Abnormal laboratory indices were leukocytosis in 31%, ESR>40 in 73.3% and CRP 3+ in 73.3% of patients.

Predisposing conditions leading to brain abscess were sinusitis (9.2%), otitis (12%), CSF rhinorrhea (2.4%), mastoiditis (7.2%), previous neurosurgical procedures (17%) and endocarditis (2.4%). Totally, 20% of our patients had no risk factor. Mean duration of disease was 13 days.

All patients had undergone CT scan with and without contrast. Abscesses were located in frontal, parietal and temporal lobes.

Totally, 7.3% of patients were HIV positive. For 52% of patients surgical interventions were achieved. We prescribed a combination of intravenous ceftriaxone, metronidazole and vancomycin. Meanwhile, 7.3% of patients received pyrimethamin and sulfadiazine. Staphylococcus aureus, Pseudomonas aeruginosa and Klebsiella were the most commonly cultured organisms.

Mortality rate was 12%. Totally, 9.7% of patients admitted with the diagnosis of brain abscess, were finally diagnosed acute demyelinating encephalomyelitis (ADEM).

DISCUSSION
Brain abscess is a focal, intracerebral infection that begins as a localized area of cerebritis and develops into a collection of pus surrounded by a well-vascularized capsule (5). Infection involving the cerebrum is a true neurosurgical emergency that requires rapid diagnosis and appropriate surgical and medical intervention to achieve good clinical outcome. Microorganisms can reach the brain by several different mechanisms (6). The most common pathogenic mechanism of brain abscess formation is spread from a contiguous focus of infection, most often in the middle ear, mastoid cells, or paranasal sinuses (7). Other mechanisms of brain abscess formation are hematogenous dissemination to the brain (8) and trauma (9). Brain abscess is cryptogenic in about 20% of patients (10). The clinical course of brain abscess may range from indolent to fulminant (5). Common signs and symptoms of brain abscess are headache, mental status changes, focal neurologic deficits, fever, seizures, nausea and vomiting, nuchal rigidity and papilledema (11). Neuroimaging plays a crucial role in the diagnosis and therapeutic management of neurologic infections (12). With the advent of computed tomography and magnetic resonance imaging, it is now possible to detect an infectious process early in its course and follow the response to therapy (6). Recent advances in neuroimaging have resulted in a marked decrease in morbidity and death due to
brain abscesses. The advent of computed tomography-guided stereotaxy has reduced morbidity in patients with deep-seated abscesses. Empirical therapy is best avoided in the present era, particularly given the availability of stereotactic techniques for aspiration and confirmation of diagnosis (13). Early pus samples, obtained by biopsy or surgical resection, are needed to establish a certain bacteriological diagnosis and initiate appropriate intravenous antibiotics (14). In patients with a bacterial brain abscess of unclear pathogenesis, empirical therapy with vancomycin, metronidazole, and a third- or fourth-generation cephalosporin (cefotaxime or ceftriaxone, or ceftazidime or cefepime if *P. aeruginosa* is suspected) is recommended pending culture results (11). Despite advances in surgical techniques in the management of the brain abscess, long-term antibiotics are as crucial to cure as the initial surgical procedure itself (15). Most patients with bacterial brain abscess require surgical management for optimal therapy. The two procedures available are aspiration of the abscess after bur hole placement and complete excision after craniotomy (16). Decompression with stereotactically guided aspiration, antibiotic therapy based on results of pus culture, and repeated aspirations if indicated from results of periodic CT follow-up scans seem to be the most appropriate treatment modality for brain abscesses (17).

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**REFERENCES**


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