

Management of Brain Abscesses

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ABSTRACT

Objective To find the etiology and outcome of treatment of brain abscesses.

Study design Descriptive case series.

Place & Duration of study Department of Neurosurgery, Hayatabad Medical complex Peshawar, from October 2008 to January 2010.

Methodology This study was carried out on patients of brain abscesses of all ages and both genders. Patients having fungal brain abscess, amoebic brain abscess and tuberculous brain abscess were excluded. Brain abscess was diagnosed on contrast CT scan. Cases of early cerebritis were treated using parenteral antibiotics for six to eight weeks. Surgical treatment consisted of either burr hole aspiration with the help of brain cannula, re-aspiration or craniotomy and excision of abscess capsule. Therapeutic outcome was assessed with CT scan on follow up. Procedure related complications and mortality were also recorded.

Results A total of 73 patients were managed. The commonest age group was from 11-20 year. The mean age was 26.36 ± 14.1 year (range - 0.16 - 67 year). There were 46 (63.01%) male and 27 (36.99%) female patients. The majority of brain abscesses were supratentorial (n=65 - 89.04%). In 8 (11.96%) cases abscess was in infratentorial region. Contiguous focus of infection was responsible for brain abscess in 29 (39.72%) patients, Majority of patients presented with headache (n=30 - 41.09%) and vomiting (n=25 - 34.24%). Surgical drainage was performed in 70 (95.89%) patients where as 3 (4.11%) patients were treated conservatively. Initially only burr hole aspiration was done in all surgically treated patients. In 60 (85.71%) patients there was complete resolution. Craniotomy was done in 4 (5.71%) cases. There was no mortality in this study. Sixty one (87.14%) patients recovered without complications.

Conclusions Majority of the cases needed surgical intervention. Burr hole aspiration was effective initial surgical treatment. Cases of early cerebritis successfully managed with broad spectrum antibiotics.

Key words Brain abscess, Cerebritis, Burr hole, Craniotomy.

INTRODUCTION:

Brain abscesses constitute 8-10% of all intracranial space occupying lesions in the developing countries.^{1,2} These are potentially curable but at the same time pose therapeutic challenge as well.² Infections in contiguous structures are responsible for brain abscess in 40-50% of cases. In up to 25%

of cases there may be no clear predisposing factors.³ Other predisposing factors include cyanotic heart diseases and direct inoculation of bacteria into the brain during surgery or head injuries.⁴ According to some studies hematogenous causes accounts for 60% cases.⁵ A recent case series found that 37% of brain abscesses were associated with head penetration⁶

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The common presenting features are headache, vomiting, fits, fever, focal deficits, cranial nerve palsies, impaired consciousness and in some cases papilledema.⁵ CT scan brain (plain and contrast) is the usual investigation tool and in doubtful cases

MRI brain is performed. The treatment of brain abscess may be conservative or surgical and this depends upon stage, size, location and number of abscesses.^{7,8}

The purpose of this study was to find out various predisposing factors of brain abscesses and the outcome of its management. The results of the study help in designing various preventive and curative strategies so as to reduce morbidity and mortality from brain abscesses.

METHODOLOGY:

This descriptive study was carried out in Neurosurgery Department of Hayatabad Medical complex Peshawar, from October 2008 to January 2010. Patients of brain abscesses of all ages were included. However cases of fungal brain abscess, amoebic brain abscess and tuberculous brain abscess were excluded. Complete history was taken and thorough physical examination performed at admission. A diagnosis of brain abscess was considered definite, if one or more localized lesions with the following characteristics on brain imaging (CT appearance) found; hypodense center with a peripheral uniform ring enhancement following the injection of contrast material, or affected region surrounded by variable hypodense area of brain edema or nodular enhancement or area of low attenuation without enhancement.

Patients were treated conservatively or surgically depending on stage of the brain abscess. Cases of cerebritis were treated with parenteral antibiotics for six to eight weeks. Surgical treatment included either burr hole aspiration with the help of brain canula, re-aspiration or some time craniotomy and excision of abscess capsule. Patients were followed with serial CT scan brain, until the lesion disappeared. Therapeutic outcome was assessed with complete resolution or recurrence on follow up, development of procedure related complications or mortality. These findings were noted on the day of discharge and then one month and six month post operatively.

RESULTS:

During the study period 73 patients were managed. The commonest age group was from 11-20 year (n=20) with the mean age of 26.36 ± 14.1 year (range: 0.16-67 year). Twelve patients were under 10 year of age. There were 46 (63.01%) male and 27 (36.99%) female patients. In 65 cases (89.04%) the brain abscesses were supratentorial in location and rest were infratentorial. Major predisposing factor was contiguous focus of infection in 29 (39.72%) patients (Table 1).

Majority of patients presented with headache (n=30 – 41.02%) and vomiting (n=25 – 34.24%). Other features were seizures (n=19), altered level of consciousness (n=12) and cranial nerve palsies (n=12). Surgical drainage was performed in 70 (95.89%) patients where as 3 (4.11%) patients were conservatively treated as they were in early cerebritis phase. Amongst the surgical group, initially burr hole aspiration was done in all cases. In 60 (82.19) patients there was complete resolution on postoperative CT scan brain. Ten (13.70%) patients had recurrence after first burr hole aspiration. Second burr hole aspiration was performed in all recurrent cases. In 6 (8.22%) patients, abscess completely resolved after second burr hole aspiration. Craniotomy was done in 4 (5.48%) cases and these were the cases where abscess did not resolve following two attempts at aspiration.

Most of the patients made excellent recovery after burr hole aspirations without any complications. However there were some transient complications which were treated conservatively. These are listed in table III. No patient died during the procedure or in post operative period in this study.

Table I: Etiology of Brain Abscesses

Etiological Factors	No. of Patients (%)
Contiguous Focus of Infection	29(39.72%)
Hematogenous Sources	23 (31.5%)
Direct inoculation	13 (17.81%)
Cryptogenic	8 (10.95%)

Table II: Postoperative Complications

Complication	No of patients	Percentage
Seizures	03	4.28%
Meningitis	08	11.24%
CSF leakage	04	5.71%
Contusions	02	2.85%

DISCUSSION:

Although significant advances have been made in the diagnosis and treatment of brain abscess, it still can be fatal if not promptly treated. In majority of the patients, brain abscess arises as a result of some infection source in the body. Therefore every patient with brain abscess should be evaluated for a possible source of infection.⁹ In the current study, contiguous sources of infections were present in nearly 40% of the patients. The affected contiguous areas were either suppurative infection in the middle

ear or in sinuses. The overall picture of etiological factors is in line with the findings of previous workers.⁴

The clinical features are due to raised intracranial pressure, cortical irritation or focal neurological deficits. Fever may or may not be present. In the current study, common presenting symptoms were headache and vomiting. This is due to the fact that apart from the compressive effect of the abscess, there is usually surrounding edema as well, especially in the white matter. This causes increase in intracranial pressure causing headache, vomiting and papiledema. Similar clinical picture is reported in international literature.^{1,10}

Aspiration is the gold standard for treatment of brain abscesses as it is simple and can be easily performed via a burr hole even in critically ill patients at any stage of the abscess.^{1,10} In the present study, primary surgical treatment was the burr hole aspiration and craniotomy was done as a last resort when repeated aspirations failed. There are few indications for purely nonsurgical treatment of brain abscesses. Medical or nonsurgical treatment alone is indicated for patients with a single abscess smaller than 2 cm or in abscesses that are in the cerebritis stage of development.^{11,12} In the present study most of the patients presented when there was full blown large abscess. The reason for late presentation was probably due to the fact that their clinical picture was masked by other concurrent illness. Only three patients were successfully treated conservatively in this study population.

In the present study majority of the recurrent abscesses were dealt with repeated aspiration. In six patients abscess resolved after second aspiration. However craniotomy and surgical excision of abscess capsule is sometime necessary. Nationally and internationally, various recurrence rates are given, ranging from 3–25% after aspiration compared with 0–6% after excision.^{13,14} These results are similar to ours.

Most of the patients made excellent recovery after burr hole aspirations without any complication. The major complication seen in this study was meningitis. Eight patients responded well to broad spectrum antibiotics. CSF leak the another complication, responded to acetazolamide with patient in Trendelenburg position. Three cases resolved with this approach. In one case we put lumbar drain and CSF leak stopped. Our data is in accordance with other reported series; however the recurrence was slightly high. This may be due to non-availability of neuronavigation devices, which are sometimes

necessary for the localization of the lesion in deep seated areas.

CONCLUSIONS:

In majority of the cases brain abscess need surgical intervention. Burr hole aspiration remained a useful initial surgical procedure. Post operative complications like meningitis, CSF leak etc can be effectively managed without operation.

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