

Etiology of Brain Abscess in Patients Presenting to Neurosurgery Department of Lady Reading Hospital Peshawar

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ABSTRACT

Objective: To determine the etiology of brain abscess in patients presenting to Neurosurgery Department of Lady Reading Hospital, Peshawar.

Materials and Methods: This retrospective study was conducted in Neurosurgery Department, Lady Reading Hospital, Peshawar from March 2015 to February 2016. All patients admitted with brain abscess were included in the study while patients with meningitis, encephalitis, subdural empyema, and tuberculoma were excluded. Patient's age, gender, pre-operative symptoms and etiology of brain abscess were recorded on a designed Proforma from hospital charts.

Results: Out of 42 patients, males were 30 (71.42%) while females were 12 (28.58%). They were most common in first three decades, having total number of patients of 35 (83.33%) with the mean age of 30.15 ± 2 SD. The three most common pre-operative symptoms were fever, headache and vomiting. Most common sources of infection were otitis media 20 (47.61%) and congenital heart diseases 7 (16.66%). In 31 (73.80%) patients temporal and parietal lobes were involved.

Conclusion: Brain abscess is common in young to middle age population due to unhygienic status of ears with male predominance. Temporal lobe of the brain is most common site of abscess and majority of the patients present with nausea, vomiting, fever, signs of raised intracranial pressure and meningism.

Key words: Brain abscess, Etiology, Otitis media, Temporal and parietal lobes.

INTRODUCTION

Localized infection of brain parenchyma is called brain abscess.¹ Although many advancement has been made in medical fields but still it has great mortality and morbidity.² In advanced countries brain abscess is very rare nowadays because of good control of infections due to very impressive preventive strategies.^{3,4} In United States per annum rate of brain abscess is 1500 to 2500.⁵ In 1876 Macewen made the first diagnosis of a brain abscess in a child based on symptoms and the results of a neurological examination.¹⁵ Multiple factors are involved in increased morbidity and mortality of brain abscess just like compromised host immunity, diabetes mellitus, delayed hospitalization and unawareness of community.⁶

In order to decrease the mortality and morbidity

from brain abscess prompt diagnosis and treatment is needed.⁷ Main sources of brain parenchyma infection spread by hematogenous route, contiguous route from nearby structures and from penetrating trauma to the brain.^{8,9} Predisposing factors in children differs from that in adults due to difference in immunological response to infections and propensity of different types of infections in different ages.⁹ When infection in brain parenchyma is established then it leads to infarction of the brain, edema, mass effect and raised intra cranial pressure, as a result permanent neurological deficit and death can occur. Before the CT era since there were a lot of difficulties in diagnosis so it led to higher rates of permanent disabilities and deaths. Then with the advent of CT scan and newer formulations of antibiotics early diagnosis and treatment of brain abscess, was

made possible resulting in significant improvement in prognosis.¹⁰⁻¹² Nowadays with introduction of MRI for the diagnosis of brain pathologies the brain abscess can be diagnosed even in much earlier stages of its development than CT brain.⁴

Without appropriate treatment it will definitely extend, causing brain herniation by mass effect, or rupture into the ventricle to produce acute ventriculitis. In both instances, the outcome is usually catastrophic. Based on duration of abscess, size, location and signs and symptoms different treatment modalities are available like only medical treatment in the form antibiotics, analgesics and anti-epileptics or surgical treatment in the form of aspiration or excision of the abscess.¹¹⁻¹³

Rational of current study is to know about etiology of brain abscess in all those patients who presented to Neurosurgery Department of Lady Reading Hospital Peshawar. By doing this study it will provide us the statistics of brain abscess which will create the base for future researchers. Furthermore on comparison with local and international studies the difference in age, gender, pattern of presentation, and most common etiology will help us to direct our resources towards prevention and treatment of brain abscess in our set up and this will be a step forward to get rid of brain infections which are although preventable and treatable but can create a lot of morbidity and mortality.

MATERIAL AND METHODS

This retrospective study was conducted in Neurosurgery Department Lady Reading Hospital Peshawar from March 2015 to February 2016, 1-year duration. All patients admitted with brain abscess were included in the study while patients with meningitis, encephalitis, subdural empyema, and tuberculoma were excluded. Patient’s age, gender, pre-operative symptoms and etiology of brain abscess were recorded on a designed Proforma from hospital charts. Data was analyzed using SPSS version 16 and presented in tables and charts.

After taking consent from hospital research committee of Postgraduate Medical Institute, hospital records of all those patients who were admitted in Neurosurgery Department with brain abscess either treated conservatively or surgically was revived. All those patients who were fulfilling the inclusion criteria, data about their age, gender, pre-operative symptoms, site of brain abscess and etiology was collected and then it

was analyzed. Finally the etiology of brain abscess in these patients was determined.

RESULTS

In our study, out of 42 patients, males were 30 (71.42%), while females were 12 (28.58%), having ratio of 2.5:1. Majority of the patients were in the first three decades of life having frequency of 35 (83.33%) with the mean age of 30.15 ± 2 SD (Table 1).

Table 1: Age wise distribution of patients (n = 42).

Age of Patients	No. of Patients	Percentage of Patients
1 st decade	15	35.71
2 nd decade	11	26.19
3 rd decade	9	21.42
5 th decade	4	9.52
6 th decade	3	7.14

Table 2: Etiology of brain abscess (n = 42).

Etiology of Brain Abscess	Frequency	Percent
Otitis media	20	47.61
Penetrating trauma	4	9.52
Sinusitis	2	4.76
Odontogenic cause	4	9.52
Coronary Heart Disease	7	16.66
Chest infections	5	11.9
Total	42	100

Table 3: Site of brain abscess (n = 42).

Site	Number of Patients	Percentage of Patients
Frontal lobe	7	16.66
Parietal lobe	9	21.42
Temporal lobe	22	52.38
Occipital lobe	4	9.52

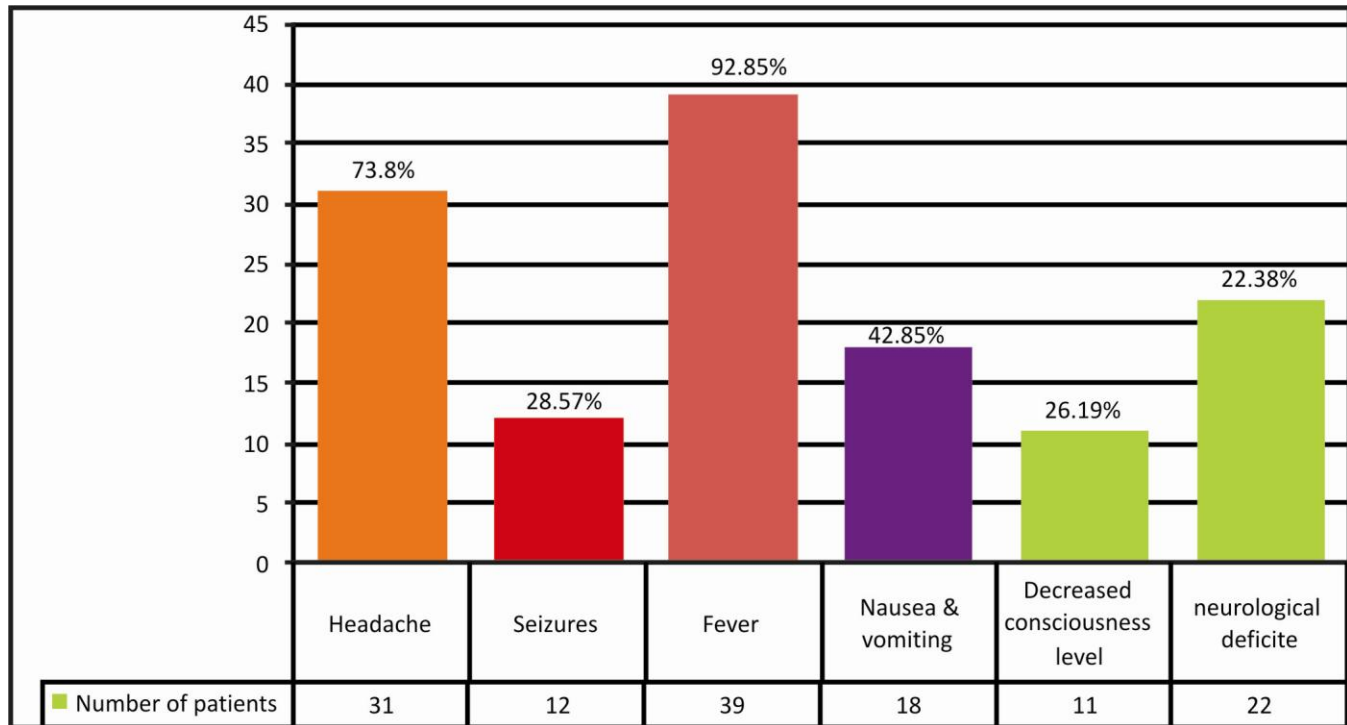


Fig. 1: Pre-operative symptoms of brain abscess (n = 42).

Based on etiology the most common etiology was otitis media, which led to 20 (47.61%) cases followed by congenital heart diseases with 7 (16.6%) cases (Table 2). Temporal and parietal lobes of the brain were the two most common sites with total number of 31 (73.80%) patients (Table 3), while mostly the patients presented with fever, headache and vomiting having proportions respectively of 39 (92.85%), 31 (73.80%) and 12 (28.57%) (Figure 1).

DISCUSSION

Since the widespread availability of CT and improvements in antimicrobial therapy, the diagnosis and treatment of brain abscess has improved significantly. Mortality has declined from 40% – 60% in the pre-CT era to 0 – 10% currently. However, brain abscess continues to carry a high morbidity and mortality. When we analyzed our results and compared with both local and international studies we found that there was a contrast and similarities among our results and others this is because the epidemiology of a disease, risk factors, outcome of a disease whether treated conservatively or surgically varies from setup to setup throughout the world.¹⁴⁻¹⁶

In our study males were 30 (71.42%) while fema-

les were 12 (28.58%) with males to females ratio was 2.5:1. They were most common in first three decades having total number of patients of 35 (83.33%) with the mean age of 30.15 ± 2 . Gadgil N et al¹ in his study has documented that it is more common in males as compared to the females having ratio of 3.71:1 while the mean age of presentation was 38 years nearly resembling our results. Other International studies^{17,18} also represent male predominance than females. In our study most common sources of infection were otitis media 20 (47.61%) and congenital heart diseases 7 (16.66%). Fischer et al¹⁹ has showed in series that otitis media is commonest predisposing factor for the brain abscess similarly. Babu LM and colleagues²⁰ has also shown otitis media (45%) is a commonest predisposing factor for brain abscess, which is in accordance to our study.

The site and number of brain abscess change with respect to its source. Since the most common etiology of brain abscess in our study was otitis media with total 20 (47.61%) patients, therefore temporal lobe involvement was the most common site having 22 (52.38%) followed by parietal lobe.

According to Lu Ch and colleagues²¹ commonest site of brain abscess involvement was frontal lobe of the brain, which is different from that of our study bec-

ause of difference of the source of infection. Pediatric age patients had brain abscess due to congenital heart diseases in majority of cases in our study. Keet PC and colleagues²² has also documented the most common pre-disposing factor in pediatric age 5 – 65% of brain abscess.

The most common pattern of presentation of brain abscess in our series were that of signs and symptoms of raised intracranial pressure and fever in which nausea and vomiting was noted in 18 (42.85%) cases, headache in 31 (73.8%) and fever in 39 (92.85%) cases. One study²³ documented fever 40 (61%), headache in 35 (53%) and nausea/vomiting in 24 (36%) are the three most common symptoms. Similarly in other International studies the most common symptomology was headache, vomiting and fever.²⁴⁻²⁸ Yang SY and colleagues²⁹, Lakshmi V et al³⁰ and ODonoghue MA et al³¹ has shown that signs of raised intracranial pressure were the leading symptoms of brain abscess which are in accordance to our series.

CONCLUSION

Brain abscess occurs mostly in early ages of life due to unhygienic conditions of ears leading to otitis media, with male predominance. Temporal and parietal lobes involvement are the most common sites of brain abscess. Patients mostly present with fever and signs and symptoms of raised intracranial pressure.

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