

# OTOGENIC BRAIN ABSCESS, OUR EXPERIENCE AT PESHAWAR INSTITUTE OF MEDICAL SCIENCES

Muhammad Tariq<sup>1</sup>, Muhammad Salim<sup>2</sup>, Muhammad Iftikhar<sup>3</sup>

## ABSTRACT

**Objective:** The objective of the study was to determine the clinical manifestation, management and outcome of otogenic brain abscess.

**Material And Methods:** The study was descriptive study conducted from 1<sup>st</sup> Jan 2013 to 31<sup>st</sup> Dec 2014 at Peshawar Institute of Medical Sciences, Peshawar. Total number of 32 patients having otogenic brain abscess of all ages and both sex were included in the study. Brain abscess of other origin were excluded from the study. The study was designed to determine the clinical manifestation, management and outcome of otogenic brain abscess.

**Results:** In our study 21 out of 32 patients were male with 71.9% patients less than 15 years of age. Clinical features like ear discharge, headache and vomiting were present in all 32 patients. Cerebral abscess was found in 19/32 patients (59.4%) while cerebellar abscess in 11/32 patients (34.4%). All the patients were treated with antibiotic coverage and abscess drainage via burr hole initially and excision of abscess cavity in three unresolved cases. later on all patients were referred to ENT unit for eradicating the primary source by mastoidectomy.

**Conclusion:** In spite of excellent antibiotic treatment, intracranial otogenic complications are still high as well as life threatening and needs multidisciplinary treatment strategy for better outcome.

**Key Words:** Otogenic brain abscess, mastoidectomy

## INTRODUCTION

Brain abscess is a localized suppurative process in the brain parenchyma<sup>1</sup>. Brain abscess accounts for about 1-8% of intracranial masses<sup>2</sup>. Although rare in developed countries, brain abscess is a serious, life-threatening emergency with high morbidity and mortality rate ranging from 7-60%<sup>3</sup>. Brain abscess starts as localized areas of cerebritis in the parenchyma and results in collections of pus enclosed by a well vascularized capsule<sup>4</sup>. Causes of brain abscess include direct extension from surroundings, haematogenous from distant organs and penetrating or surgical trauma<sup>5</sup>.

Otogenic brain abscess is one of a serious complication of suppurative otitis media<sup>6</sup>. It implies accumulation of pus in the brain tissue, developing after encephalitis caused by microorganisms originating from inflammatory process in the middle ear cavity<sup>7</sup>. In children otogenic causes constitute 25% of the abscesses, whereas in adults they constitute 50%<sup>8</sup>. Chronic otitis media with cholesteatoma and/or granulation tissue are

usually the main cause<sup>9</sup>. The most common cause of brain abscess is direct extension of infection through a bony defect, in the tegmen-antri in case of cerebral abscess or in Trautman's triangle in case of cerebellar abscess<sup>10</sup>.

Initially the patient presents with headache, fever/malaise and vomiting secondary to ear infection (usually granulation/cholesteatoma). Later on drowsiness, stupor and coma followed by even death. Other features of increased intracranial pressure include bradycardia and papilledema. Cerebral abscess in the dominant hemisphere often cause nominal aphasia, visual field defects (quadrantic homonymous hemianopia), facial weakness on the opposite side and paralysis of the upper and lower limbs. The focal features associated with cerebellar abscess are muscle weakness and incoordination on the same side of the lesion, ataxia (fall towards the side of the lesion), intention tremors, overshoot the mark on finger nose test, spontaneous nystagmus and dysdiadokinesis.<sup>11,12</sup>

CT-scanning is the best diagnostic tool available<sup>9</sup>. The first line of treatment is antibiotic, followed immediately by surgical evacuation of the abscess and cleansing the sources of infection<sup>7</sup>.

Brain abscess is still a serious, life-threatening disease and remains a potentially fatal entity<sup>3</sup>. It may lead to serious disability, or even death if misdiagnosed or managed improperly. However, the advent of modern neurosurgical techniques including CT guided brain biopsy and aspiration, better anaerobic culture techniques, newer generation antibiotics and modern

<sup>1</sup>Department of Neuro Surgery Peshawar Institute of Medical Sciences Hayatabad Peshawar

<sup>2</sup> Department of ENT PIMS Peshawar

<sup>3</sup> Department of General Surgery PIMS Peshawar

## Address for Correspondence:

**Muhammad Tariq**

Department of Neuro Surgery Peshawar Institute of Medical Sciences Hayatabad Peshawar

E-mail: tsafi@pimc.edu.pk

Cell: 0344-9831840

non-invasive neuro-radiological imaging procedures have revolutionized the treatment and outcome of brain abscess. Eradication of the primary foci of infection is paramount<sup>5</sup>. The success of treatment is best when the etiologic agent is identified and antimicrobial therapy is targeted<sup>6</sup>.

The aim of our study is to present our experience with the management of otogenic brain abscess and outcome and compare it with the current concept of treatment. A multidisciplinary approach is paramount to the successful management of otogenic brain abscesses.

## MATERIAL AND METHODS

The study was descriptive study conducted from 1<sup>st</sup> Jan 2013 to 31<sup>st</sup> Dec 2014 (2 Years duration) at Peshawar Institute of Medical Sciences, Peshawar. Total number of 32 patients having otogenic brain abscess of all ages and both sex who presented to Out Patient department/ Emergency Department of Peshawar Institute of Medical Sciences Hospital during this time period were included in the study. Brain abscess of other origin were excluded from the study. The study was designed to determine the clinical manifestation, management and outcome of otogenic brain abscess. Sampling was done through consecutive sampling (non-probability), a total of 32 patients, with 95% confidence interval.

The study was conducted after getting approval from hospital ethical and research committee. The patients meeting the inclusion criteria were included in the study through OPD/ER department. The diagnosis of brain abscess was based upon complete head and neck examination, the clinical features and CT-Scan of the head. The purpose, risks and benefits of the study were explained to all included patients, they were assured that the study is purely conducted for research and data publication and a written informed consent was obtained from all included patients.

Detailed history was taken from all patients followed by complete physical examination and routine pre-operative baseline investigations. Postoperatively all patients were followed at regular intervals and finally once stable were sent to ENT department for final eradication of the source of infection. All the above-mentioned information including name, age, gender, address and telephone numbers were recorded on a pre-designed proforma.

All the data was entered and analyzed in SPSS 16 (version 16). Frequencies and percentages were calculated for categorical variables like Gender and effectiveness. Mean  $\pm$  SD was calculated for numerical variables like age. All the results were presented as tables.

## RESULTS

In our study of 32 patients with otogenic brain ab-

cess most of the patients 23/32 (71.9%) were younger than 15 years, 4/32 (12.5%) were in 16-40 years age group and 5/32 (15.6%) patients were of more than 40 years. In 32 patients the males were predominantly affected (65%) as shown in table 1.

In our study clinical features like ear discharge, headache and vomiting were present in all 32 (100%)

**Table 1: Demographic Features of Patients**

Sex and age of patients	Number of patients	Percentages
Gender		
Male	21/32	65.6%
Female	11/32	34.4%
Age of patients	23/32	71.9%
Less than 15 years		
16-40 years	4/32	12.5%
More than 40 years	5/32	15.6%

**Table 2: Clinical Features**

Clinical features	Number of patients	Percent-ages
Ear discharge	32/32	100%
Headache	32/32	100%
Vomiting	32/32	100%
Fever/malaise	29/32	90.6%
Drowsiness	25/32	78.1%
Coma	3/32	9.5%
Increased ICP Slow pulse	25/32	78.1%
Papilledema	23/32	71.9%
Cerebral features	7/32	21.9%
Seizures		
Nominal aphasia	4/32	12.5%
Visual field defect	3/32	9.5%
Facial weakness	6/32	18.8%
Limb paralysis	2/32	6.2%
Cerebellar features	2/32	6.2%
Muscle weakness		
Incoordination	3/32	9.5%
Ataxia	3/32	9.5%
Intention tremors	4/32	12.5%
Overshoot the mark	4/32	12.5%
Spontaneous nystagmus	5/32	15.6%
Dysidiadokinesis	5/32	15.6%

**Table 3; Types of Otogenic Brain Abscess**

Type of abscess	Number of patients	Percentage
Cerebral abscess	19/32	59.4%
Cerebellar abscess	11/32	34.4%
Multiple abscess	2/32	6.2%

**Table 4; Surgical Procedure for Brain Abscess**

Surgical procedure	Number of patients	Percentages
aspiration and drainage via burr hole	32/32	100%
Excision of capsule In Resistant Cases	3/32	9.5%

patients, fever/malaise in 29/32 (90.6%), drowsiness in 25/32 (78%) and coma in 3/32 (9.5%) presentations. Increased ICP features like slow pulse was present in 25/32 (78.1%) patients and papilledema in 23/32 (71.9%) patients respectively. In cerebral features seizures was the most common found in 7/32 (21.9%) patients. The most common cerebellar feature was spontaneous nystagmus and dysdiadokinesis found in 5 patients each (16.6%). Other features of cerebral and cerebellar are shown in table 2.

In our study cerebral abscess was found in 19/32 (59.4%) patients followed by cerebellar abscess in 11/32 (34.4%) patients while multiple abscesses were found in 2/32 (6.2%) patients.

In our study all the patients 32/32 (100%) were treated with initial antibiotics and aspiration/drainage of abscess via burr hole. Excision of abscess was carried out in three of unresolved cases. All the patients recovered from the brain abscess were sent to ENT department for eradication of primary source.

## DISCUSSION

Brain abscess is one of the life-threatening complications of chronic otitis media particularly with cholesteatoma<sup>13</sup>. According to Dubey SP et al<sup>14</sup> almost 60% of the patients of brain abscess were younger than 18 years of age and males were twice commonly affected as compared to females, which is in accordance with our study.

In our study the common presenting features were headache and vomiting in all 32 (100%) patients, fever/malaise in 29/32 (90.6%), drowsiness in 25/32 (78%) and coma in 3/32 (9.5%), increased ICP, 25/32 (78.1%), cerebral signs 19/32 (59.4%), cerebellar signs 11/32 (34.4%) and mixed 2/32 (6.2%). In Korean study The common presenting clinical manifestations were fever (18/25, 72%), seizure (12/25, 48%), altered mental status (11/25, 44%), and signs of increased intracranial pressure (9/25, 36%)<sup>16</sup>.

In China a study by Yang H et al.<sup>10</sup> showed that all brain were located at the same side as the diseased ear, which is in accordance with our study. Sennoroglu et al. found 54% cerebral and 44% cerebellar abscess<sup>17</sup>. In this study we found 19/32 (59.4%) cerebral (temporal and temporo-parietal), 11/32 (34.4%) cerebellar abscess and 2/32 (6.2%) mixed abscess.

Successful management of otogenic brain abscess should include medical treatment, local drainage of the abscess and cleansing of primary focus of infection<sup>19</sup>. Medical treatment should start first with empirical antibiotics and later on modified according to the results of C/S. In addition, steroid, anti edema and anti-epileptic drugs should be used<sup>9</sup>. The surgical treatment of brain abscess is aspiration drainage of abscess through a burr hole and some time through craniotomy with abscess excision. Once the patient's condition stabilized, the source of infection has to be eradicated by an otologist<sup>18</sup>. In our study all the patients were initially given medical treatment in form of antibiotics, steroid and antiepileptic. Aspiration drainage was performed via burr hole. Excision of the capsule was done in three cases. Pus was sent for culture and sensitivity. After recovery the patients were sent to ENT department for eradication of primary focus.

Post-operative follow up is very important and CT is the method of choice<sup>2</sup>. In our study CT scan was done for all the patients, in which three of them showed residual abscess.

## CONCLUSION

In spite of excellent antibiotic treatment, intracranial otogenic complications incidence are still high as well as life threatening and needs multidisciplinary treatment strategy for better outcome.

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