

# Epidemiological Trends in Brain Abscess: A Study at a Tertiary Care Centre

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**Abstract:** Background: Despite the recent advances in diagnosis and management, brain abscess still remains a highly lethal lesion. It has been noted that there is little change in the incidence of brain abscess over the past 20 yrs. Aims: To determine the current epidemiological trends, clinical presentation and commonest organism of brain abscess in this part of the country. Material and Methods: 59 cases admitted during dec 2012 to june 2014 in the department of neurosurgery of SSH BHU, Varanasi were included in the study. Detailed clinical history was taken and detailed neurological examination was done including assessment by glasgow coma scale(GCS).Relevant laboratory investigations were done as needed along with CT scan and /or MRI. Patients were managed by aspiration or surgical excision and aspirated material sent for microbiological examination. Results were collected and analysed. Results: Chronic suppurative otitis media (CSOM) was the commonest cause of infection in 31 patients (52.5%).Trauma was encountered in 7 cases (11.8%) with one having traumatic rhinorrhoea. Other causes were haematogenous spread of infection from distant sites and meningitis. No source could be identified in 13 patients (22%). Conclusion: Chronic suppurative otitis media (CSOM) is still a major cause of brain abscess in developing country like India which is a benign curable disease and should not be neglected. Prompt diagnosis and treatment allows immediate decompression of mass reduces duration of antibiotic stay and minimizes treatment cost.

**Keywords:** brain abscess, intracranial abscess, epidemiology, csom, headache

## 1. Introduction

Intracranial abscess is a focal suppurative process within and around the brain parenchyma caused by a spectrum of microbes. They include brain abscess and subdural or extradural empyema. Although a benign condition, cases with extensive edema can lead to acute intracranial hypertension and death. Little change has been noted in the incidence of brain abscess over a 20 year period despite the widespread use of antibiotics and improved living condition<sup>1</sup>Samson and clerk<sup>2</sup> suggested that the incidence may actually be rising due to rapidly increasing incidence of opportunistic infection in immune compromised hosts. This increase is more likely due to increased detection and diagnosis with modern imaging techniques. The incidence has remained relatively stable in the antibiotic era.<sup>3</sup>

## 2. Literature Survey

Intracranial abscess is caused by a spectrum of microbes. However the causes vary in developed and developing countries and also in different areas in a country. So studies are needed for evaluation of epidemiological trends.

## 3. Aims

The present study was done with following aims:

- 1) To determine the epidemiological trends of brain abscess in this part of the country.
- 2) To determine the various clinical presentation of patients with brain abscess and its different causes.

## 4. Material and Methods

59 cases admitted during dec 2012 to June 2014 in the department of neurosurgery of SSH BHU, Varanasi were included in the study. The institute caters to vast area of rural population Detailed clinical history pointing to any septic focus was taken. Detailed neurological examination was done including assessment by glasgow coma scale (GCS). Relevant laboratory investigations were done as needed along with CT scan and /or MRI for diagnosis confirmation and localization of abscess. Patients were appropriately managed by aspiration or surgical excision. Aspirated material was sent for microbiological examination to identify etiologic agent by smear examination, culture and sensitivity. Results were collected and analysed.

## 5. Results

The study included 59 patients with verified intraparenchymal brain abscesses treated between dec 2012 to jun 2014 in the department of neurosurgery. The observations are as follows:

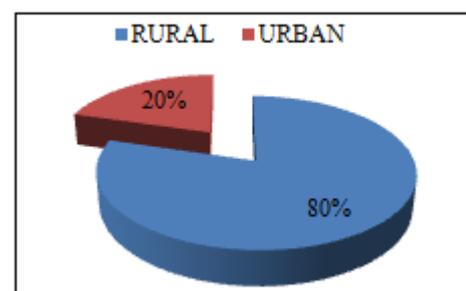
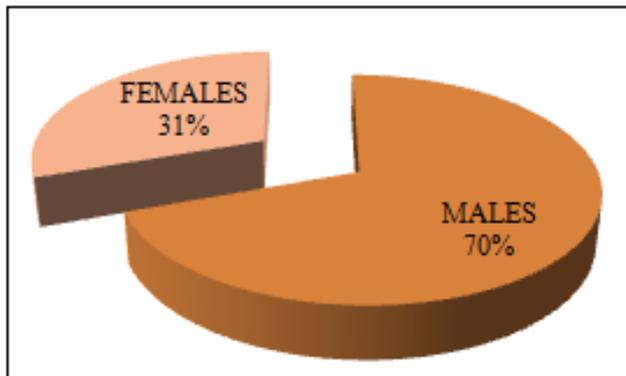


Chart 1: Rural and urban distribution of patients

In present study out of the total 59 patients 47 (79.6%) patients belonged to the rural areas and 12(20.4%) were from urban areas.[Chart 1]



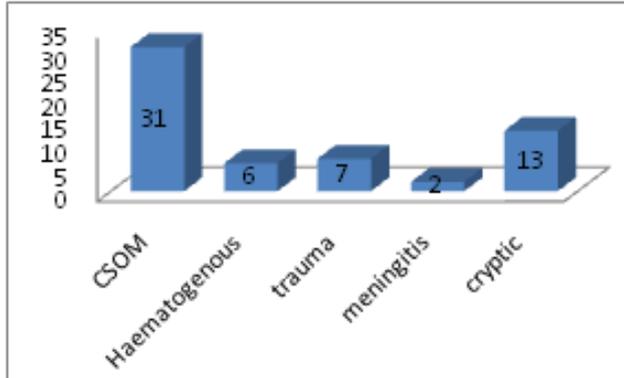
**Chart 2:** Sex wise distribution of patients.

The study included 41 male (69.5%) patients and 18 females (30.5%) The male:female ratio was 2.3:1. [Chart 2]

The age range of patients was from 3 years to 64 years. Most of the patients were young with age below 25 years.

**Table 1:** Aetiology

S.No	Aetiology	Total no of patients	Percentage
1.	CSOM	31	52.54
2.	Haematogenous	6	10.17
3.	trauma	7	11.86
4.	meningitis	2	3.39
5.	cryptic	13	22.04



**Chart 3:** Aetiology.

Chronic suppurative otitis media (CSOM) was the commonest cause of infection. 31 patients (52.5%) developed brain abscess secondary to discharging ear(unilateral or bilateral).The duration of on and off ear discharge in these patients varied from 3 months to 10 years.6 cases showed haematogenous spread of infection from distant sites due to underlying heart disease, pulmonary disease and dental caries.1 patient had HIV infection. Trauma was encountered in 7 cases (11.8%) with one having traumatic rhinorrhea, where abscess was located in frontal lobe. Meningitis was present in 2 patients belonging to pediatric age group. No source could be identified in 13 patients (22%).[Table1][Chart 3]

**Table 2:** Clinical Features

No.	Clinical features	Total no of patients	Percentage
1.	Headache	47	79.67
2.	Nausea/ vomiting	34	57.63
3.	Fever	31	52.54
4.	Seizure	13	22.03
5.	Altered sensorium	18	30.50
6.	Focal neurological deficit	17	28.81
7.	Pupillary abnormality	8	13.56

In present study the most common presenting symptom was headache seen in 47 patients(79.7%) which was followed by nausea/vomiting in 34 patients (57.6%).Other presenting symptoms included fever, altered sensorium, focal neurological deficit, seizure and pupillary abnormality.

**Table 3:** Glasgow Coma Scale.

GCS	Cases	
	No of pts.	Percentage
3-8	8	13.55
9-12	13	22.03
13-15	38	64.42

All the patients were grouped according to GCS.13.5% of patients had GCS less than 9, while 22.03% had GCS between 9 to 12 and 64.42% of patients had GCS between 13 to 15.[Table 3]

**Table 4:** Causative organism

Nature of isolate	Organism isolated	No of cases
Pyogenic	Aerobe	29
	Streptococcus	11
	Staphylococcus	6
	Pseudomonas	2
	Proteus	2
	Ecoli	1
	Citrobacter	1
Anaerobe	Kleibseilla	1
	Mixed	2
	Bacteroides	2
	Peptostreptococcus	1
Mycobacteria		2
Fungi	Aspergillus/candida	1
No organism isolated		23

On microbiological examination the culture was positive in 32 cases while no organism was detected in 23 cases.

## 6. Discussion

The difficulty in identification and localization of brain abscess before irreversible damage to the cerebral tissue has taken place is the limiting factor in the prognosis of the patient with intracranial brain abscess. With technological advancement in surgical techniques and advent of CT and MRI, more effective antibiotic regimes, the prognosis of brain abscess has greatly improved. In present study the incidence of brain abscess among intracranial space occupying lesions was higher 12.57% compared to 8% in study by Bhatia<sup>4</sup> et al and 1-2 % by Loftus<sup>5</sup> et al..This may be due to low socioeconomic status and poor living condition of the population catered by the institute who are more prone to infectious diseases. In present study there

were 69.5 % males and 30.5% females with a male female ratio of 2.23. In studies by Berlitz<sup>6</sup> et al and Sinha<sup>7</sup> et al also the incidence of brain abscess is more common in males compared to females where male female ratio was 2.5:1 and 2.72: 1 respectively. The present study encountered large number of intracranial abscess secondary to middle ear infection 58.9%. This was higher than observed in studies by Yang<sup>8</sup> et al (37%) and Malik<sup>9</sup> et al (34%) but correlate with the findings of Lakshmi<sup>10</sup> et al and Bhardwaj<sup>11</sup> et al. This probably reflects the gravity of ear infection about which the people of this particular area are not aware. The most common clinical symptoms in patients were features of raised intracranial pressure- headache, nausea/vomiting in 82.25% and 62.65% patients respectively. Other symptoms were seizure, altered sensorium and focal neurological deficit. Studies by Morgan<sup>12</sup> et al and Nielsen<sup>13</sup> et al showed similar presentation. Most of the abscesses were located supratentorially followed by temporal region. Literature shows change in microbiological profile of brain abscess in the past 50 yrs. Earlier staphylococcus aureus was the most common etiological agent but now streptococcus is most common followed by staphylococcus and pseudomonas are common causes of intracranial brain abscess as also seen in present study.<sup>9, 14</sup> The incidence of anaerobic organisms is also increasing.<sup>15</sup>

## 7. Conclusion

CSOM is still a major cause of brain abscess in developing country like India which is a benign curable disease and should not be neglected. Prompt diagnosis and treatment allows immediate decompression of mass reduces duration of antibiotic stay and minimizes treatment cost.

## 8. Future Scope

Further study is required in different part of country to determine the true epidemiology of brain abscess in India.

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