

PROFILE OF PATIENTS WITH BRAIN ABSCESS

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ABSTRACT

Introduction

Despite of the advent of modern neurosurgical techniques and antibiotics, brain abscess possesses a major neurosurgical challenge in treatment. In this study we present the profile, clinical features, radiological features, treatment received and their outcome of cases of brain abscess that we managed in our center.

Methodology

Total 30 patients diagnosed with brain abscess who underwent treatment in last four months were included in this study. A descriptive observational data of brain abscess and the outcome variables in the form of Glasgow Outcome Scale (GOS) at discharge, hospital stay, and mortality were studied. The ultimate outcome was measured in Glasgow Outcome Score.

Result

Total number of cases was 30, out with male dominance 19 (63.3%). Age ranged from 2 months to 60 years. Twenty-five patients were of acute pyogenic abscess while and rest were tubercular abscess. Common clinical features were headache (70%), fever (30%), vomiting (23%), seizure (23%) and focal neurological deficits (16.7%). Overall mean hospital stay was 31 days. The common aetogenic factors included chronic suppurative otitis media (16.7%), tuberculosis (16.7%), post-traumatic (10%), congenital heart disease (10%) and rest (46%) were of unknown source. lobe Temporal lobe and cerebellar were most common site involved (20%) each followed by frontal (16.7%). Surgery was done in 25 (83.3%) cases out of which 12 underwent burr hole and aspiration and 12 patients underwent craniotomy and excision and one patient underwent burr hole and followed by craniotomy. Five patients were managed conservatively. Complete resolution of abscess with complete recovery of preoperative neurological-deficit was seen n 28 (93.3%) cases.

Conclusion

Early diagnosis and timely intervention improves the outcome of brain abscess. Most of the cases required surgical intervention and drainage of pus and had good postoperative outcome.

KEYWORDS

Brain abscess, burr hole, craniotomy, CSOM, excision, pyogenic, tubercular.



INTRODUCTION

Brain abscess is an intra-parenchymal collection of pus. The incidence of brain abscess is approximately 8% of intracranial masses in developing countries and 1-2% in the western countries.^{1,2} They begin as localized areas of cerebritis in the parenchyma and evolve into collections of pus enclosed by a well vascularized capsule. Although there have been breakthrough advances in neuroimaging, neurosurgical techniques, neuro anesthesia, microbiological isolation techniques and antibiotic therapy, bacterial brain abscesses can be fatal.³⁻⁶ However, the advent of modern neurosurgical techniques including stereotactic aspiration, better anaerobic culture techniques, newer generation antibiotics, and modern non-invasive neuro radiological imaging procedures have revolutionized the treatment and outcome of brain abscess. Eradication of the primary foci of infection is paramount.^{3,8,9}

The success of treatment is best when the causative agent is identified and antimicrobial therapy is targeted. The causative pathogens of bacterial brain abscesses vary according to geographic location, age, underlying medical and/or surgical condition, and mode of infection.^{5, 8, 10-12} Over the period of last 10-15 years. The incidence of otogenic abscess is in decline since last one and half decades while the post traumatic or postoperative brain abscess has increased.¹³⁻¹⁵

Patients with brain abscess are regularly treated in our center but their clinical and radiological profile and the treatment outcome has not been reported. So present study will evaluate these parameters and causative microorganisms and guide us to implement better treatment protocol for patients with brain abscess according to recent advancements in diagnostic equipment like high resolution CT and MRI and modern technologies such as neuronavigation and stereotaxy.

METHODOLOGY

Descriptive observational study conducted in Department of Neurosurgery Bir Hospital and National Trauma Center. All patients who were managed with diagnosis of brain abscess were included in the study. Total 30 patients who were treated during the period of four months and were followed up in OPD. CT scan was carried out on all patients on the finding of clinical features referable to the nervous system or focal neurological deficits and features of raised intracranial pressure, i.e. headache, hemiparesis, seizures, vomiting, papilledema, etc. A hypo dense mass with an encircling ring of contrast enhancement—usually associated with perilesional edema and mass effect - on brain CT confirms the diagnosis of abscess and precludes likely differential diagnoses. All patients with brain abscess of size less than 2 cm in maximum dimension volume <20 ml in supratentorial lesion and <10ml in infratentorial lesion were managed with intravenous antibiotics for 6 weeks. If the size was greater than that, patient underwent burr hole and evacuation and i.v. antibiotics. CT head was repeated in 2 weeks. The CT findings and the treatment details were recorded and

outcome factor taken as Glasgow Outcome Scale of patients at the time of discharge was documented.

Glasgow Outcome Scale

GOS	
V	GOOD RECOVERY Resumption of normal activities even though there may be minor neurological or psychological deficits.
IV	MODERATE DISABILITY (Disabled but independent). Patient is independent as far as daily life is concerned. The disabilities found include varying degrees of dysphasia, hemiparesis, or ataxia, as well as intellectual and memory deficits and personality changes.
III	SEVERE DISABILITY (Conscious but disabled). Patient depends upon others for daily support due to mental or physical disability or both.
II	PERSISTENT VEGETATIVE STATE Patient exhibits no obvious cortical function
I	DEATH

GOS V, IV, III was considered as favourable outcome and GOS I, II was considered as unfavourable outcome. Statistical analysis was done by applying appropriate statistical test with recent version of SPSS software.

RESULTS

Total 30 patients with brain abscess were included in this series out of which 19 patients were male, mean age of presentation was 22.6 years and range were two months to 60 years.

Table 1. Age and sex distribution of intracranial abscess

Age(yrs.)	Male (%)	Female (%)	Total (%)
0-14	5(16.6)	5(16.6)	10(33.3)
15-29	7(23.3)	4(13.3)	11(36.6)
30-44	2(6.6)	0(0)	2(6.6)
45-59	5(16.6)	1(3.3)	6(20)
>60	0(0)	1(3.3)	1(3.3)
Total	19(63.3)	11(36.7)	30(100)

Table 2. Clinical Features

Clinical features	(%)
Headache	21(70%)
Fever	9(30%)
Vomiting	7(23%)
Seizure	7(23%)
Neurological Deficits	6(16.3%)

Most common clinical features at presentation was headache (70%), fever was present in 30%, which was followed by vomiting in 23%. Seizure was present in 23% and 16.3% presented with neurological deficits ie; weakness of limbs. Mean hospital stay was 31 days overall, 28 days in burr hole and aspiration group and 25 days in craniotomy and excision group whereas in conservative group it was 46 days.



Table 3. Radiological features of brain abscess

Number	Single	26(86.7%)
	Multiple	4(13.3%)
Site	Supra-tentorial	24(80%)
	Infra-tentorial	6(20%)
Side	Left	15(50%)
	Right	15(50%)

In radiological imaging 26 (86.7%) were single and rest were multiple. Most of them were supratentorial 24 (80%). 12 (40%) patients were managed by burr hole and aspiration, 12(40%) patients underwent craniotomy and excision. One patient initially managed by burr hole and aspiration underwent craniotomy and excision due to no resolution of lesion. 5 (16.7%) were treated with only intravenous antibiotics. Out of total patients 28 (93%) patient were discharged with good outcome and 2(7%) patients had mortality. Out of two mortalities both patients were treated by burr hole and aspiration. One patient developed ventriculitis and the other died due to septic shock due to delayed presentation in our center.

Table 4. Treatment Modalities of Brain Abscess

Procedure	N (%)
Burr Hole and Aspiration	12(40%)
Craniotomy and Excision of Abscess	12(40%)
Both burr hole and Craniotomy and Excision	1(3.3%)
IV Antibiotics only	5(16.7%)

Table 5. Conditions at Discharge

Glasgow Outcome Scale	N (%)
I(Death)	2(6.7%)
II(Persistent Vegetative State)	0
III(Severe Disability)	0
IV(Moderate Disability)	3(10%)
V(Good Recovery)	25(83%)

Table 6. Comparison of Different Treatment Modalities and Their Outcome

Treatment Modalities	Outcome	
	Favourable (GOSV,IV)	Unfavourable (GOS ,II,III)
IV antibiotics	5	0
Burr Hole and drainage	10	2
Craniotomy and Excision	12	0
Both burr hole and craniotomy and excision	1	0

DISCUSSION

Out of total 30 patients with brain abscess 25 were managed surgically. Brain abscess was more common in male 19(63%). This may be due to discrimination in seeking medical advice on the basis of sex by local population and exposure of male population to trauma. Mean age of

presentation was 22.6 years. Most of the patients were in first three decades of life ie; 21(70%). This finding was in congruence with most other studies like Singh et al¹⁶ (2017) as 73%. Gupta et al (1990)¹⁷, Menon and Bhardwaj et al¹⁸ (2008) also showed high incidence in first two decades of life as 67 years. Patients with brain abscess presented mostly with headache (70%), fever was present in 30%, which was followed by vomiting in 23%. Seizure was present in 23% and 16.3% presented with neurological deficits ie; weakness of limbs.

In most of the large series of brain abscess from developing countries, CSOM still remains to be the commonest source of intracranial abscess. In our study common aetiological factors were CSOM and tuberculosis are both equal (16.7%) followed by trauma (10%). Similar results have been reported in other studies from India by Bhardwaj and Joshi¹⁹ (1998) and Lakshmi et al²⁰ (1993). While in developed countries the incidence of CSOM had come down to 0.04% (Osma et al, 2000) and trauma has been increasing cause of brain abscess.

Out of them 86% were had single lesion and 14% had multiple. Eighty percent were supratentorial and 20% were infra-tentorial. Commonest lobe was temporal and cerebellar which were associated with CSOM followed by frontal. In a study carried out by Cavuşoglu H et al²¹, the temporoparietal region was the most commonly affected location like in our study.

Equal number of patients,12 each were treated by burr hole and aspiration and craniotomy and excision. One patient had undergone burr-hole aspiration followed by craniotomy and excision. All the patients treated by craniotomy and excision had good outcome whereas 2 (16%) patients treated by burrhole and aspiration had mortality due to ventriculitis and septic shock. Five patients treated with iv antibiotics had good recovery. Xiao et al²² reported similar effectiveness between the two procedures, but significantly lower mortality (p = 0.02) with open craniotomy excision.

CONCLUSION

CSOM and tuberculosis are most common cause of brain abscess followed by trauma in our region. Most of the cases required surgical intervention and drainage of pus and had good postoperative outcome. Patient managed with craniotomy and excision had better outcome than those managed by burr hole and aspiration and also had shorter hospital stay. Patient who presented in comatose state had bad outcome. Early diagnosis and appropriate interventions improves the outcomes of brain abscess.

RECOMMENDATION

Early diagnosis and appropriate interventions improves the outcomes of brain abscess. Any patients presenting with neurological features suggestive of brain abscess should be evaluated with adequate suspicion along with necessary radiological evaluation and prompt treatment should be started.



LIMITATIONS OF THE STUDY

This study is done at the tertiary referral centre so the results cannot be generalized. The study period and sample size is small.

CONFLICT OF INTREST

None

FINANCIAL DISCLOSURE

None

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