



ISSN: 0976-3031

Available Online at <http://www.recentscientific.com>

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 10, Issue, 06(D), pp. 32941-32943, June, 2019

**International Journal of
Recent Scientific
Research**

DOI: 10.24327/IJRSR

Research Article

OUR CLINICAL EXPERIENCE OF BRAIN ABSCESS IN A TERTIARY CARE CENTER

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DOI: <http://dx.doi.org/10.24327/ijrsr.2019.1006.3572>

ARTICLE INFO

Article History:

Received 12th March, 2019

Received in revised form 23rd

April, 2019

Accepted 7th May, 2019

Published online 28th June, 2019

Key Words:

Brain abscess, Neuronavigation,
Stereotactic

ABSTRACT

Introduction: Brain abscess is a focal suppurative collection of pus within the brain parenchyma surrounded by a capsule. Despite the ever-growing development in neuroimaging, surgical techniques and antibiotics, the management is still controversial including the need for surgery, optimal surgical approaches, type and length of antibiotic treatment, and need for monitoring during treatment.

Materials and Methods: This is a retrospective review of patients treated for brain abscess between 2016 to 2018 at Upendra Devkota Memorial National Institute of Neurological and Allied Sciences, Bansbari, Nepal.

Results: There were a total of 19 patients treated for brain abscess over a period of three years. Headache followed by fever and nausea/vomiting is the most common presenting complaint. They were investigated with CT / MIR and subjected to stereotactic/neuronavigation guided aspiration with few cases requiring craniotomy as well. All patients were treated with six weeks of intravenous and six weeks of oral antibiotics. Culture positivity was seen in five cases, three bacterial and two fungal. Three patients required re-aspiration.

Conclusion: The management of brain abscess should be individualized in each patient. In most of the cases single aspiration was sufficient. Most of them usually resolved with surgery followed by 12 weeks of antibiotic therapy.

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INTRODUCTION

Brain abscess is a focal suppurative collection of pus within the brain parenchyma surrounded by a capsule. The incidence of brain abscess is varying with 1-2% in developed countries and 8-10% in the developing countries.¹ Despite the ever-growing development in neuroimaging; surgical techniques and antibiotics the management is still controversial and at times the disease can turn out to be troublesome.²⁻⁴ The exact incidence of brain abscess in Nepal is still not known and several aspects of management is still controversial, including the need for surgery and optimal surgical approaches, type and length of antibiotic treatment and need for monitoring during treatment.

MATERIALS AND METHODS

This is a retrospective cases series from Upendra Devkota Memorial National Institute of Neurological and Allied Sciences, Bansbari, Nepal. Literature review was done and study variable determined. Patients >16 years diagnosed with confirmed or suspected brain abscess treated between 2016 and 2018 were included in the study. Medical records were reviewed by paper and electronic data query. Data were entered by custom made data entry forms and analyzed via MICROSOFT EXCEL 2007. Ethical clearance was obtained from Institutional review board.

Inclusion criteria: Patients with characteristic clinical history, computed tomography (CT)/magnetic resonance imaging (MRI) with contrast, Diffuse Weighted Image and Spectroscopy suggestive of brain abscess were included.

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Surgery

Patients with clinical findings & imaging correlating with brain abscess were subjected to neuronavigation guided aspiration and then subjected with antibiotics.

CT with contrast head was done on weekly basis till complete resolution of the lesion and re-aspiration was required for recurrent collection.

Those with foci of chronic otitis media underwent Modified Radical Mastoidectomy.

Antibiotic Treatment

The first choice for treatment was a beta-lactam (high dose penicillin) in combination with an aminoglycoside and metronidazole for anaerobic coverage.

The choice of antibiotic treatment was primarily guided by microbial findings and changes made as per the culture and sensitivity and the majority of patients were treated with 6 weeks of IV antibiotics followed by 6 weeks of oral antibiotic treatment.

Those with culture showing acid fast bacilli were managed with anti-tubercular drugs and those with fungal growth received antifungal therapy.

Results

There were a total of 19 patients with brain abscess over the period of study duration. Most of them were males (12) with M: F: 1.71:1. Median age was 36 years with range from 18 to 73 years.

Clinical Findings

Relatively few patients (15%) presented with the classical triad of fever, headache and nausea (Table 1). The most common presenting symptom was headache (52%), followed by fever (42%) and 36% had nausea & vomiting. 26% patients presented with dizziness; 21% patient had altered sensorium & 10.5% patients had seizure on presentation.

Glasgow Coma Score (GCS) was less than 15 in 15% of the total patients.

Table 1

Symptoms	Frequency	Percentage
Headache	10	52%
Nausea & vomiting	7	36%
Fever	8	42%
Seizure	2	10.5%
Dizziness	5	26.31%
LOC	1	5.2%
Drowsiness	1	5.2%
Forgetfulness	1	5.2%
Altered Sensorium	4	21%
Diplopia	1	5.2%

Neuro Radiological Investigation

The primary imaging of choice was CT scan (contrast enhanced) followed by MRI in selected cases. The most common location was temporal lobe 31%; followed by occipital lobe 21%, frontal lobe 21%, 10.5% in the parietal lobe & posterior fossa each.

Table 2

Site	Percentage
Temporal lobe	31%
Occipital lobe	21%
Frontal lobe	21%
Parietal lobe	10.5%
Cerebellum	10.5%

Treatment

All the patients were started with IV antibiotics once the diagnosis was confirmed with imaging. Six patients underwent neuronavigation guided aspiration; four underwent burr hole and aspiration; two underwent stereotactic aspiration; one patient underwent craniotomy and evacuation of subdural empyema; one developed brain abscess after one month of elevation of depressed skull fracture and required evacuation; one underwent craniotomy and debridement and dural repair; one patient who was initially diagnosed to have a cerebellar lesion underwent sub occipital craniectomy and excision of the mass was found to have an abscess intraoperatively.

Three patients were treated with just antibiotics and three of the patients underwent re-aspiration.

Two patients had chronic suppurative otitis media and they underwent modified radical mastoidectomy.

Table 3

Surgery	Frequency
Neuronavigation Aspiration	6
Burr hole and Aspiration	4
Stereotactic Aspiration	2
USG guided Aspiration	1
Craniotomy	3
Antibiotics	3
Reaspiration	3
Modified Radical Mastoidectomy	2

Bacteriology

All the aspirated pus were subjected for microbiology. Among them three patients had bacterial growth; one had growth of E. coli; one had growth of Klebsiella and one had growth of Mycobacterium tuberculosis.

- ✓ Two patients had fungal growth on microbiology.
- ✓ Rest of the patients had no growth.

Complications

All the patients were cured at the time of discharge. However few had complications. Five patients had seizure during the course of treatment and were managed accordingly. However one developed meningitis and was managed conservatively.

DISCUSSION

The finding of fever and headache as the most frequent presenting complaint in our sample, as well as the low frequency of presentation of the classic triad, reciprocates the findings observed by Helweg-Larsen *et al* in a retrospective cohort study on pyogenic brain abscess studied in Denmark.⁵ Headache was also found to be the principal complaint in another study in India (Dattatraya),⁶ as well as in a hospital in Nepal (Kafle).⁷ However because of their non-specificity, headache and fever remain only guiding signs in diagnosing of

brain abscesses. The most common location of the abscess was found to vary in the literature; Larsen *et al* report the most common location of the abscess was found to be frontal and parietal lobes, ⁵ while Dattatraya *et al* report it to be in the temporoparietal region. ⁶ In our sample, it was revealed to be in the temporal lobe which is consistent with another study conducted within Nepal (Kafle). ⁷ These differences might suggest varying portal of entry, or varying etio-pathogenesis in different study settings, which could be affected by interplay of a number of factors.

Although previously deemed a fatal condition, advancements in imaging and diagnosis as well as its comprehensive management, has demoted the status of brain abscess to a less fatal, more easily diagnosable and treatable condition. There are no pragmatic rules for treatment of brain abscess and each case must be individualized and treated on its own merits. The main stay of the treatment includes prompt action and institution of antibiotic therapy.

All patients in our study were initially started with penicillin, metronidazole and gentamycin. Those with culture positive were subjected to specific antibiotic as per sensitivity. It has been a common practice worldwide to start with a penicillin and metronidazole followed by other antibiotics as performed by Janson *et al*.⁸ However some studies have equally advocated the use of carbapenems (either meropenem or imipenem) in comparison to combined antibiotic (Penicillin + Metronidazole) and single use of carbapenem has been found to be equally efficacious as combined therapy but meropenem has been proved to be much efficacious than imipenem in terms of seizure frequency in the study of Martin canal *et al*.⁹ We had 26% patients who developed seizure during the course of treatment with combined therapy which is not compatible to the findings of Martin canal *et al*.⁹ None of their patients with combined therapy had seizure. 86% of the patients in our study underwent surgical treatment and out of them 69% underwent needle aspiration and 15% requiring craniotomy and drainage procedures. Only 15% of the patients underwent reaspiration. These proportions are quite similar to the findings of Jannik Helweg-Larsen *et al*.⁵

Summary of Findings

The management of brain abscess should be individualized in each patient. Most of them usually resolve with surgery followed by antibiotic therapy. In most of the cases aspiration is sufficient enough. However craniotomy and excision of the abscess should be reserved for difficult cases.

Imaging with either a CT or MRI plays a definite role in guiding the efficacy of treatment. Weekly imaging till the abscess cavity resolves should be the definite endpoint of imaging. Any abscess cavity that enlarges in serial scan or fails to resolve should be subjected to reaspiration.

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How to cite this article:

Thulung Suraj *et al.*, 2019, Our Clinical Experience of Brain Abscess in A Tertiary Care Center. *Int J Recent Sci Res*. 10(06), pp. 32941-32943. DOI: <http://dx.doi.org/10.24327/ijrsr.2019.1006.3572>
