www.surgicalneurologyint.com

Surgical Neurology International

Editor-in-Chief: Nancy E. Epstein, MD, Professor of Clinical Neurosurgery, School of Medicine, State U. of NY at Stony Brook.

SNI: Infection

Editor
Ali Akhaddar, MD, IFAANS
Avicenne Military Hospital, Marrakech, Morocco

ScientificScholar®
Knowledge is power
Publisher of Scientific Journals

SNI
Open Access

Case Report

Brain abscess caused by *Morganella morganii*: A case report and review of the literature

Saad Moussa Elmi[1], Fresnel Lutèce Ontsi Obame[1], Yao Christian Hugues Dokponou[1], Madina Rabileh Yassin[2], Soufiyan El Attari[3], Abad C. Chérif El Asri[1], Miloudi Gazzaz[1]

Departments of [1]Neurosurgery, and [2]Radiology, [3]Bacteriology, Military Teaching Hospital Mohammed V of Rabat, Mohammed V Faculty of Medecine and Pharmacy of Rabat, Morocco.

E-mail: *Saad Moussa Elmi - saad.elmi@yahoo.com; Fresnel Lutèce Ontsi Obame - ontsiobamef1@gmail.com; YAO Christian Hugues Dokponou - dokponou2407@gmail.com; Madina Rabileh Yassin - mryrirache@gmail.com; Soufiyan El Attari - soufiyan.elattari1998@gmail.com; Abad C. Chérif El Asri - abad20031@hotmail.com; Miloudi Gazzaz - gmiloneuro@yahoo.fr

***Corresponding author:**
Saad Moussa Elmi,
Department of Neurosurgery,
Military Teaching Hospital
Mohammed V of Rabat,
Mohammed V University of
Rabat, Morocco.

saad.elmi@yahoo.com

Received: 14 September 2023
Accepted: 06 December 2023
Published: 12 January 2024

DOI
10.25259/SNI_759_2023

Quick Response Code:

ABSTRACT

Background: *Morganella morganii* is a Gram-negative enteric rod found in the intestinal tracts of humans, mammals, and reptiles as normal flora. It is highly implicated in urinary tract infections, wound infections, and septicemia. The cerebral nervous system, especially brain abscess attributed to *M. morganii,* remains extremely rare. To the best of the author's knowledge, only eight documented cerebral brain abscesses caused by *M. morganii* have been reported in the literature.

Case Description: A 48-year-old man presented with headache, fever, and irritability two months after endoscopic endonasal repair of the cranial base defect. Following imaging studies, a large left frontal abscess was found. The patient underwent a fine-needle aspiration through a burr hole following antimicrobial therapy.

Conclusion: We report this case to create awareness among neurosurgeons and microbiologists that *M. morganii*, even though uncommon, is a cause of cerebral brain abscess. Prompt surgical management and appropriate antimicrobial therapy is the treatment of choice.

Keywords: Case report, Infection, *Morganella morganii*

INTRODUCTION

Morganella morganii is a Gram-negative aerobe belonging to the *Enterobacteriaceae* family. It is normally found as a part of normal flora inhabiting the intestinal tract of humans, mammals, and reptiles. *Morganella* species are commonly isolated in clinical laboratories and have been implicated in urinary tract infections, wound infections, and sepsis. This bacterial species may cause pyogenic infections elsewhere in the body when it has been accidentally introduced.[1,5,7]

Nevertheless, it is an extremely rare pathogen of cerebral nervous system (CNS) infection, especially brain abscess, with only eight documented cases.[1-8]

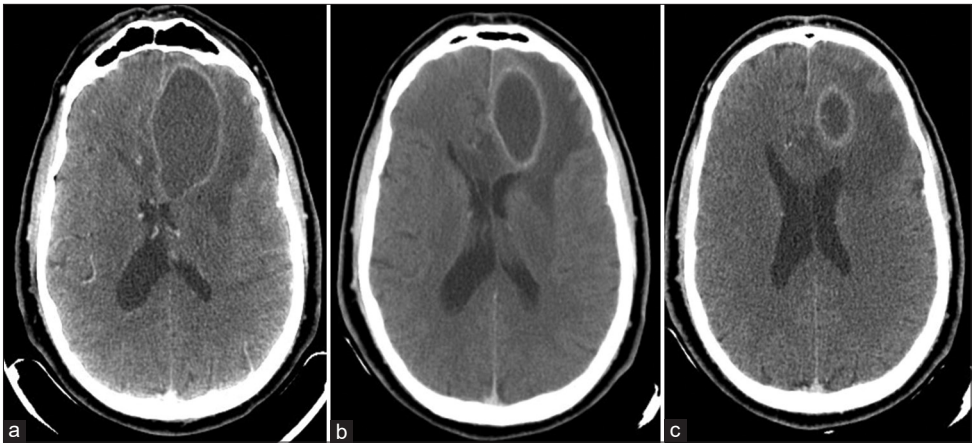

Figure 1: Computed tomography (CT) scan of the brain (axial images) revealing a large intracranial abscess-associated mass effect. (a) Initial CT scan, (b) after the first aspiration, and (c) after the second aspiration.

Herein, we present the case of a 48-year-old man with an isolated brain abscess caused by *M. morganii*, which was successfully managed by surgical aspiration followed by antimicrobial therapy.

CASE REPORT

Clinical presentation

A 48-year-old man presented with a headache and fever. This man had a medical history of cranial base defect situated in the cribriform plate, which was successfully repaired by endoscopic endonasal technique two months earlier. There was no history of otalgia, otorrhea, sinusitis, or urinary infection. At admission, the patient was conscious with a Glasgow coma scale of 15 with a cognitive impairment such as irritability and reduced verbal output suggestive of a frontal lobe syndrome. There was no focal neurological deficit.

Diagnosis assessment

Computed tomography (CT) of the head with and without contrast was performed. It demonstrated a left frontal abscess characterized by a hypodense center, a hyperdense ring with marked perilesional hypodense area suggestive of edema [Figure 1].

The blood laboratory test was normal.

Therapeutic intervention

The patient underwent needle aspiration of the brain abscess through a left frontal burr hole. The pus sample was collected and sent to the microbiology laboratory for analysis, and the patient was started on empiric antimicrobial therapy.

Table 1: Antimicrobial susceptibility test results of *Morganella morganii* isolated from a brain abscess.

Antibiotics	Susceptibility
Amikacin	S
Amoxicillin-clavulanate	R
Ampicillin	R
Cefadroxil	R
Cefepime	S
Cefotaxime	S
Cefoxitin	R
Ciprofloxacin	S
Fosfomycin	R
Gentamicin	S
Imipenem	S
Levofloxacin	S
Piperacillin/tazobactam	R
Ticarcillin	S
Tobramycin	S
Trimethoprim/sulfamethoxazole	S

R: Resistant, S: Sensitive

Follow-up

Antimicrobial identification and testing revealed *M. morganii* susceptible to ticarcillin, imipenem, aminoglycosides, quinolones, and third-generation cephalosporins [Table 1 and Figure 2].

The patient was treated with intravenous Ceftriaxone and Flagyl. Despite abscess aspiration and antibiotic treatment, the patient continued to be symptomatic. A repeat CT scan of the brain one week after the first aspiration was performed and showed a recollection of the abscess, which required a second aspiration. Intravenous antibiotics were changed to imipenem and continued for a total of 6 weeks.

The third CT scan [Figure 1] showed a marked reduction in the size of the brain abscess. He was discharged on oral ciprofloxacin. At four months follow-up, the patient did well with normal cognitive function.

DISCUSSION

M. morganii is a rare causative pathogen in CNS infections, especially brain abscesses. In a review of the literature, we found only nine cases, including our cerebral brain abscess caused by *M. morganii* reported since the first reported case by Verboon-Maciolek *et al*., in 1995,[1-8] as shown in Table 2.

The source of infection was always not known, with only one case showing a documented wound infection, one case of otogenic infection, and one case with bacteremia. The most common predisposing condition was a history of neurosurgical procedures that were craniotomy. In our study, the patient had previously benefited from an endoscopic repair of a skull base defect two months earlier.

The successful treatment of a brain abscess requires a combination of both medical and surgical approaches. However, the surgical approach has a pivotal role in the management of brain abscesses. Our patient underwent a needle aspiration. The previous reports showed that the

Table 2: Summary of findings from the previously reported *Morganella morganii* brain abscess.

Authors	Age	Sex	Site of brain abscess	Sources of infection	Clinical features	Underlying diseases	Treatment	Outcomes
Verboon-Maciolek *et al*. (1995)	8 day	M	Left frontal region	Unknown	Fever, anorexia, and vomiting	NS	Cefotaxime and gentamicin	Survival with delayed psychomotor development
Lu *et al*. (1999)	55 years	F	NS	Bacteremia	Fever and altered consciousness	Craniotomy	Imipenem and surgical drainage	Survival with neurological deficit and seizure disorders
Chuang *et al*. (1999)	55 years	F	Left frontotemporal	Wound	Craniotomy; hypertension ICH; wound infection; and CSF leak	NS	Amikacin, piperacillin, imipenem, and oral ciprofloxacin	Lived
Rau *et al*. (2002)	NA		NS	NS	NS	NS	Third-generation cephalosporins and surgical drainage	Recovered
Abdalla *et al*. (2006)	38	F	Right frontal region	Unknown	Fever, headache, vomiting, altered consciousness, and meningism	Craniotomy	Cefepime and surgical drainage	Died
Thomas *et al*. (2007)	2 months	M	Right frontal region	Unknown	Prominent bulge over the right frontal; sun-setting sign; and irritability	None	Surgical aspiration, cloxacillin, cefotaxime, metronidazole, and chloramphenicol	Unknown
Patil *et al*. (2012)	12 years	M	Right parietotemporal	Otogenic infection	Fever, headache, ear discharge, meningeal signs, and left-side motor deficit	Chronic suppurative otitis media	Surgical evacuation, amikacin, ceftriaxone, and metronidazole	Recovered
Águeda *et al*. (2013)	9 years	M	Left temporo-occipital	Otogenic infection	Fever, disorientation, and memory loss	Suppurative left otitis media	Ceftriaxone, metronidazole, vancomycin, and cefixime	Recovered

ICH: Intracerebral hemorrhage, CSF: Cerebral spinal fluid, M: Male, F: Female, NS: Not specified

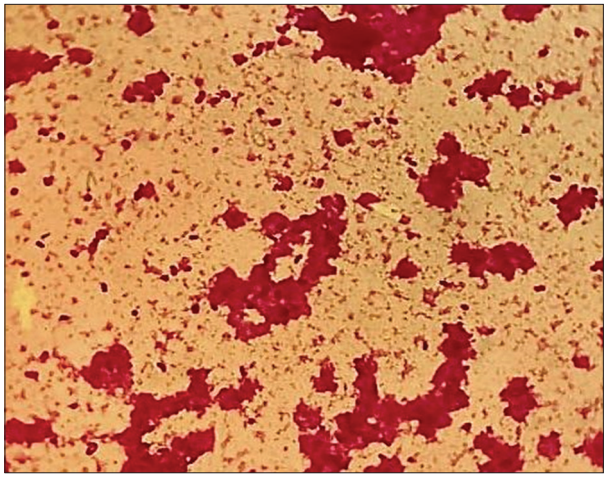

Figure 2: Microscopy analysis. (gram staining ×100).

advantages of aspiration are simplicity, reduced morbidity, and the fact that it can be carried out at any stage of the evolution of the abscess. Initial therapy should be commenced with broad-spectrum antibiotics that cross the blood–brain and blood-cerebral spinal fluid barriers in adequate concentrations. After the pus is drained and the antibiotic sensitivity reports become available, specific bactericidal agents for the cultured organism should be administered. *M. morganii* is usually susceptible to third-generation cephalosporins and aminoglycosides. It is characteristically resistant to many beta-lactam antibiotics. In this case, the patient responded well to the surgical aspiration, followed by appropriate antibiotic therapy.

CONCLUSION

We report this case to create awareness among neurosurgeons and microbiologists that *M. morganii*, even though uncommon, is a cause of cerebral brain abscess; a high index of suspicion is required when a patient with brain abscess has previously undergone endoscopic endonasal surgery.

Ethical approval

Institutional Review Board approval is not required.

Declaration of patient consent

The authors certify that appropriate patient consent has been obtained.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Use of Artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

REFERENCES

1. Abdalla J, Saad M, Samnani I, Lee P, Moorman J. Central nervous system infection caused by *Morganella morganii*. Am J Med Sci 2006;331:44-7.
2. Águeda S, Leitão A, Rocha G, Guimarães H. Cerebral abscess and empyema due to *Morganella morganii*. Pediatr Ther 2013;3:147.
3. Chuang YC, Chang WN, Huang CR, Chen HJ. *Morganella morganii* central nervous system infection: Case report and review. Infect Dis Clin Pract 1999;8:50-1.
4. Lu CH, Chang WN, Chuang YC. Resistance to third-generation cephalosporins in adult gram-negative bacillary meningitis. Infection 1999;27:208-11.
5. Patil AB, Nadagir SD, Lakshminarayana S, Syeda FM. *Morganella morganii*, subspecies morganii, biogroup a: An unusual causative pathogen of brain abscess. J Neurosci Rural Pract 2012;3:370-2.
6. Rau CS, Chang WN, Lin YC, Lu CH, Liliang PC, Su TM, *et al*. Brain abscess caused by aerobic Gram-negative Bacilli: Clinical features and therapeutic outcomes. Clin Neurol Neurosurg 2002;105:60-5.
7. Thomas VA, Sathish KT, Agarwal I, Chacko AG. Unusual cause of brain abscess in an infant. J Pediatr Neurosci 2007;2:94-5.
8. Verboon-Maciolek M, Vandertop WP, Peters AC, Roord JJ, Geelen SP. Neonatal brain abscess caused by *Morganella morgagni*. Clin Infect Dis 1995;20:471.

How to cite this article: Elmi SM, Ontsi Obame F, Dokponou Y, Yassin MR, El Attari S, EL Asri AC, *et al*. Brain abscess caused by *Morganella morganii*: A case report and review of the literature. Surg Neurol Int. 2024;15:7. doi: 10.25259/SNI_759_2023.