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Case Report

From Lungs to Brain: An Uncommon Brain Abscess Following Pneumonia

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ABSTRACT

A 37-year-old male with no significant medical history presented to the hospital following a fall into a pit containing animal feces, resulting in aspiration pneumonia. He was intubated and treated with antibiotics, and after 15 days of hospitalization, he was discharged in stable condition. Four days later, he returned with scrotal pain and swelling, diagnosed as epididymitis, and successfully treated with ceftriaxone. On September 1st, he re-presented with headache, dizziness, and malaise, and imaging revealed a brain abscess. Despite undergoing stereotactic surgery, the patient experienced persistent neurological symptoms, including fluctuating consciousness, nausea, and vomiting. He subsequently developed hydrocephalus, necessitating the placement of an external ventricular drain and transfer to the ICU. The patient was treated with antifungal and antibiotic therapies, but his clinical condition deteriorated. Despite intensive care, he succumbed to his illness after 19 days in the ICU.

Introduction

Brain abscess is characterized by a confined collection of pus within the brain tissue, representing a life-threatening infection with a significant risk of neurological impairments in those who survive [1]. Common causes of brain abscesses include the spread of infection through the bloodstream from distant sites (such as pneumonia or infectious endocarditis) or from nearby areas of infection (such as sinusitis, otitis, dental infections, or cranial trauma) [2]. The routine diagnosis is based on clinical signs, neurological examination, and cerebrospinal fluid (CSF) analysis [3]. Strong diagnostic support relies on epidemiological, clinical, serological, and neuroimaging evidence, as seen in conditions like neurocysticercosis or toxoplasmosis [4].

Case Report

The patient is a 37-year-old male with no past medical history. He initially presented to the hospital on August 15th, 2024, following a fall into a pit containing animal feces, which resulted in inhalation of gas and subsequent shortness of breath. The vital signs were included: T = 36.8˚C, HR = 67 bpm, RR = 14/min, and BP = 127/73 mmHg. Diagnostic evaluation revealed aspiration pneumonia, and the patient was promptly intubated and treated with appropriate antibiotics. After 15 days of being treated in the hospital, he was discharged without complications after stabilization on 27th August. After 4 days, the patient returned to the hospital with complaints

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of scrotal pain and swelling; his vital signs included T = 36˚C, HR = 56 bpm, RR = 18/min, BP = 109/63 mmHg. He was diagnosed with epididymitis by sonography and treated with intravenous ceftriaxone 2 g/day BID. Following successful treatment, the patient was discharged.

On September 1st, 2024, the patient re-presented to the hospital with symptoms of headache, dizziness, and generalized malaise, and his GCS was 14, and his vital signs included T=37.7˚C, HR= 105 bpm, RR=20/mean, and BP=100/60 mmHg. A computed tomography (CT) scan and magnetic resonance imaging (MRI) revealed a brain abscess (Figure 1), and the patient was subsequently admitted for further management. His electroencephalogram (EEG) was normal, and his ejection fraction (EF) was measured at 55%.

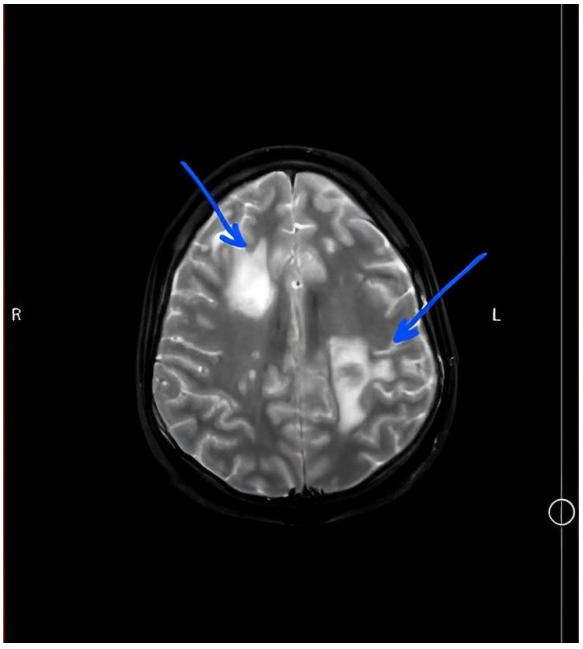
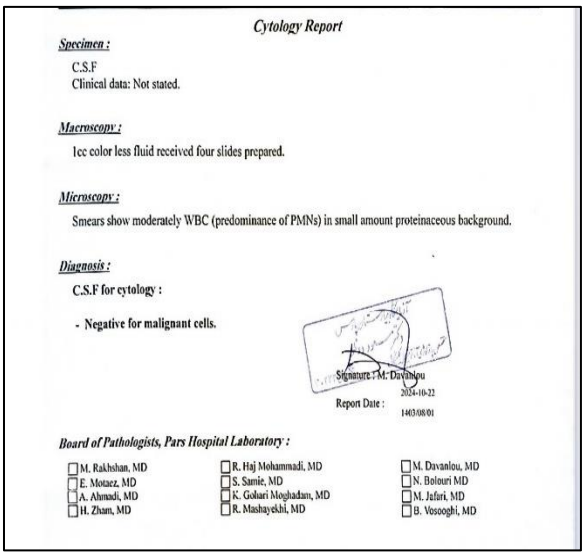


Figure 1- Brain CT scan of the patient. Marked areas show abscesses located in his brain.

The patient was evaluated as a candidate for stereotactic surgery, but prior to the procedure, he experienced a fall, likely precipitated by dizziness and vertigo. Following the surgery, he demonstrated some improvement in headache and mental status, although he continued to experience fluctuating consciousness, nausea, and non-bloody vomiting during his stay in the brain surgery unit. An orogastric tube was placed for decompression of the stomach. In the subsequent days (10 days later), the patient developed a fever and further deterioration in his level of consciousness, prompting a diagnosis of hydrocephalus. An external ventricular drain (EVD) was placed, and the patient was intubated and transferred to the intensive care unit (ICU) for close monitoring and management. A cerebrospinal fluid (CSF) culture was obtained multiple times for microbiological analysis; the CSF culture results ruled out bacterial and fungal infections (Figure 2). Additionally, the patient was tested for human polyomavirus 1 (BK virus) infection for differential diagnosis, and the result was negative. During the patient's prolonged stay in the intensive care unit (ICU) for the management of a suspected infection, he received treatment with colistin 9 9mu/hr, fluconazole 8mg IV state, and amphotericin 50mg IV with 500 cc D/W IV state over 4 hours.



Cytology Report

Specimen :

C.S.F
Clinical data: Not stated.

Macroscopy :

1cc color less fluid received four slides prepared.

Microscopy :

Smears show moderately WBC (predominance of PMNs) in small amount proteinaceous background.

Diagnosis :

C.S.F for cytology :

- **Negative for malignant cells.**

Signature : M. Davanlou
2024-10-22
Report Date : 1403/08/01

Board of Pathologists, Pars Hospital Laboratory :

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H. Zham, MD	R. Mashayekhi, MD	B. Vosooghi, MD

Figure 2- CSF culture result of the patient.

To mitigate the risk of seizures associated with elevated intracranial pressure (ICP), the patient was administered Levetiracetam 2.5mg IV stat and valproate 40mg. In addition, dexamethasone 40mg IV TD and paracetamol 1 gr IV were prescribed to address fever and inflammation. Despite these interventions, the patient's clinical condition showed no significant improvement. A differential diagnosis of tuberculosis was subsequently considered, and the patient was initiated on anti-tuberculosis therapy. However, his symptoms continued to deteriorate, and on November 10th, 2024, the patient ultimately succumbed to his condition after being 19 days in ICU.

Discussion

Brain abscess is still known as an intimidating situation, however effective antimicrobial and chemotherapy and radiological and neurological technology have been introduced.

The management of brain abscess aims to decrease the space-occupying activity, reduce the intracranial pressure, and eradicate the pathogenic microorganism [5]. BA occurs when bacteria or fungi are transferred to brain tissue and it can happen either through bloodstream or from an infected area in the head, such as ears or sinuses [6]. In this case, the potential etiologies for the

development of this condition are falling into pit and having head trauma, aspiration pneumonia, and on the other hand, non-goal-oriented antibiotic therapy due to failure to identify the main source of infection.

In a 2023 case report by Alkhalifa et al., a 41-year-old unemployed Saudi man presented with fever, chronic dry cough, shortness of breath, night sweats, and weight loss. He had a history of smoking and owning cats. His condition worsened, requiring ICU admission and mechanical ventilation. HIV testing was positive, and Rhodococcus equi was identified as the cause of his infection. He was treated with meropenem, vancomycin, and levofloxacin. Six months later, he developed a seizure and was diagnosed with a brain abscess caused by Rhodococcus equi. Given that the bacterium is found in animal feces, it was suggested that the patient may have contracted the infection through his cat's feces [7]. In our case study, although the patient's HIV was negative, the patient may have been exposed to this similar bacterium following a fall into a pit containing animal waste. Due to the probable misidentification of the causative pathogen, the patient's condition worsened.

In another study done by Abdsalam Mohammed Aleid in 2023, a 46-year-old male with fever, nausea, sore throat, cough, and confusion and, on the other hand, a history of pneumonia, bronchoscopy, and vaccinations presented in the hospital. After the CT and MRI, a brain abscess was suspected. Cultures also recognized Escherichia coli and Staphylococcus aureus. Bilateral brain abscesses were diagnosed, and antibiotic therapy was started [8]. Given that the causative pathogen was not identified in our case, goal-oriented antibiotic therapy was not initiated for the patient.

There is also a study done by Sakaria et al. in 2018; this case report describes a 17-year-old male with well-controlled type 2 diabetes and a history of pneumonia with empyema due to Streptococcus intermedius treated two years earlier. He presented with acute altered mental status, and imaging suggested a brain abscess and pneumonia with empyema. S. constellatus was identified from both the brain abscess and pleural fluid. This bacteria is related to oral and dental infections, and it emphasizes the importance of timely surgical debridement and intravenous antibiotics for treating pyogenic infections caused by this common oral bacterium [9]. The patient had not been evaluated for dental infections, and this possibility remains a consideration.

There is another similar case report narrated in 2014 by Ueda et al.; a 69-year-old male with systemic lupus erythematosus (SLE) developed lung nocardiosis and a brain abscess while on high-dose immunosuppressive therapy. He had a history of cryptococcal pneumonia and meningitis. In April 2012, he showed consolidation in the right middle lobe, and by June, he was diagnosed with obstructive pneumonia, with Nocardia species identified in sputum cultures. Brain imaging revealed a lesion in the right cerebellum. He was treated with meropenem, amikacin, and sulfamethoxazole-trimethoprim, later switched to sulfamethoxazole-trimethoprim and clarithromycin after identification of Nocardia elegans. The patient showed clinical and radiological improvement and sustained recovery [10].

Based on a review of reputable databases regarding the relationship between brain abscess and pneumonia, similar findings were observed. It appears that pneumonia may lead to the development of a secondary brain abscess, suggesting a potential connection between these two conditions.

Following a search regarding the relationship between epididymitis and brain abscess, unfortunately, no relevant articles were found, and it seems there is no evidence to support a connection between these two conditions.

It does not seem that the fall into the pit itself directly caused the brain abscess. Rather, the possibility of exposure to contaminated material in the pit, which led to pneumonia and ultimately the abscess, is considered. However, the exact cause remains unclear.

Conclusion

Given the patient's clinical history and treatment course, it is essential to consider the potential development of a brain abscess in patients with exposure to animal and human feces, particularly when they present with respiratory symptoms such as dyspnea. Early recognition and timely intervention are crucial for improving clinical outcomes.

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References

[1] Bodilsen J, D'Alessandris QG, Humphreys H, Iro MA, Klein M, Last K, et al. European society of Clinical Microbiology and Infectious Diseases guidelines on diagnosis and treatment of brain abscess in children and adults. Clin Microbiol Infect. 2024; 30(1):66-89.

[2] Liu K, Yang C, Zhang Y, Yuan X, Xiao H, Xi B. Brain abscess following intracerebral hemorrhage in a patient with pneumonia. J Craniofac Surg. 2016;27(8):e773-e5.

[3] Tunc TA. Brain Abscess [Master's thesis]. Rijeka: University of Rijeka, Faculty of Medicine; 2024.

[4] Bokhari MR, Mesfin FB. Brain abscess. In: StatPearls [Internet]. Treasure Island (FL):

StatPearls Publishing; 2024.

[5] Sarmast AH, Showkat HI, Kirmani AR, Bhat AR, Patloo AM, Ahmad SR, et al. Aspiration versus excision: a single center experience of forty-seven patients with brain abscess over 10 years. Neurol Med Chir (Tokyo). 2012; 52(10):724-30.

[6] Miranda HA, Castellar-Leones SM, Elzain MA, Moscote-Salazar LR. Brain abscess: current management. J Neurosci Rural Pract. 2013;4(Suppl 1):S67.

[7] Alkhalifa W, Ali BA, AlDandan H, Aljehani H, Alwazzeh M, Diab A. Rhodococcus equi bacteremia with necrotizing pneumonia and brain abscess in a newly diagnosed HIV patient in Saudi Arabia: A case report and review of literature. Heliyon. 2023; 9(11):e21953.

[8] Aleid AM, Shehata AB, Alaethan MH, Aldawood HA, AlQurayn AA, Alahmed IH. Unusual presentation and outcomes of bilateral brain abscess in adult: a case report. Int J Med Dev Ctries. 2023;7(9):1266-8.

[9] Sakaria R, Shah R. A rare case of brain abscess due to Streptococcus constellatus following pneumonia and empyema in a young immunocompetent male. J Investig Med. 2018;66(1):266.

[10] Ueda Y, Yamamoto K, Watanabe K, Yamashita H, Ohmagari N, Mimori A. [Obstructive pneumonia and brain abscess due to Nocardia elegans in a patient with systemic lupus erythematosus]. Kansenshogaku Zasshi. 2014 May;88(3):282-7. Japanese.