Case Report

Mucor and Aspergillus Maxillary Bone and Sinuses coinfection in a woman with Systemic Lupus Erythematosus: A Case Report

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Abstract

Background: Mucorales and Aspergillus have invasive fungal infections with high mortality, mainly in immunocompromised and diabetic patients. The diagnosis is microbiological and pathological, with a strong clinical suspicion. The treatment is medical and surgical debridement. Invasive fungal coinfection by these two is reported as a case report. Here, we highlight the importance of considering the coinfection of Aspergillus and Mucor in the maxillary bone and paranasal sinuses in patients with systemic lupus erythematosus (SLE).

Cases Report: A 38-year-old woman had a fever and toothache 1.5 months before and had been treated for a dental abscess, which continued to fever, epistaxis, teeth out spontaneously, left Bell's Palsy, and swelling in the left side of her face. She had a history of immunosuppressive therapy and steroid-induced hyperglycemia for SLE. The PNS CT Scan found increased mucosal thickness of the left maxilla and sphenoid sinuses. Extensive debridement was done. Pathologic study of debrided samples showed coinfection of invasive mucormycosis and aspergillosis. She was treated with liposomal amphotericin B and voriconazole with complete recovery without recurrence after a one-year follow-up.

Conclusion: In mucor and aspergillus coinfection, no one should be missed at first and treated by specific antifungal amphotericin B, with no time-wasting for a better prognosis.

Keywords: Mucor, Aspergillus, Coinfection, Maxillary bone, Paranasal sinuses, Systemic lupus erythematosus

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Introduction

Mucormycosis is an opportunistic and life-threatening infection causing high mortality in immunocompromised patients. This infection is usually seen in neutropenia, uncontrolled diabetes, hematologic neoplasms, or steroid therapy[1]. The number of patients presenting with these predisposing conditions has been growing, as has the number of mucormycosis cases in recent decades[2]. In the last two years, fungal infections have increased as comorbidities in COVID-19 patients[3]. The clinical form depends on the underlying risk factors in the nose, sinuses, central nervous system, orbit, respiratory system, mouth, jaw, larynx, and gastrointestinal tract, as necrosis and bleeding with mortality ranging from 20 to 100% in adults[1,4].

Aspergillosis also has a significant morbidity and

mortality in the immunodeficient patients. It has broad manifestations ranging from noninvasive infection to severe and rapidly fatal disease, nearly similar to mucormycosis[5].

These invasive fungal infections (IFIs) are diagnosed by pathologic studies and treated by systemic antifungals combined with surgical debridement[6]. Few co-infections of these two fungi have been reported. Here is a case of invasive *Aspergillus* and *Mucor* coinfection of palate, Maxilla, maxillary, and ethmoid sinuses in a patient with cirrhosis and systemic lupus erythematosus (SLE).

Case Report

A 38-year-old woman was referred to our tertiary Medical and Educational Center in May 2020. She complained of left-side facial painful swelling, epistaxis, and 4th teeth out spontaneously. The disease had begun 1.5 months before with fever, left 4th maxillary tooth abscess, and dyspnea, which was diagnosed as the flair of SLE (systemic Lupus Erythematous) with bilateral pleural effusion, atelectasis and thrombocytopenia; ruled out COVID19 and Pulmonary Thromboembolism. She was treated with her previous drugs, azathioprine, hydroxychloroquine, and prednisolone, with metronidazole for dental abscess.

One week after discharge again, she was admitted to a second hospital with fever, tachycardia, tachypnea, and altered mental status; exacerbation of previous manifestations and spontaneous left 4th maxillary tooth out. With the impression of SLE exacerbation and sepsis, vancomycin, meropenem, 2 days high dose methylprednisolone pulse therapy, heparin, and pentazole were added to previous drugs. She had pancytopenia, steroid-induced hyperglycemia, and no positive blood culture. A pathologic study of the maxilla tissue sample showed mucormycosis. The patient underwent liposomal Amphotericin B (AMB) treatment with no response and progression of disease with new symptoms such as left Bell's Palsy swelling on the left side of the face. She was referred to our tertiary referral hospital for an infectious ward oral and maxillofacial surgery ward for extensive debridement.

She was under treatment for SLE lupoid hepatitis with F1-F2 fibrosis with the mentioned drugs. On admission, she was ill with Blood Pressure of 90/60 mmHg, Respiratory rate of 18/min, Pulse rate of 120/min, OT:37°^{C}. Abnormal findings in the physical examination were as left Bell's Palsy, left eye ptosis, swelling in the left side of the face with an ill-defined border, and herpes labialis in the lower lip and chin. Necrotic maxilla bone was exposed next in the left 3rd to 7th tooth site, with 4th out tooth, erythema, and necrosis in the soft palate in the intraoral exam. The ophthalmologic exam showed normal external movement, negative Marcus Gun, 4 meters' finger count, left eye palpebral fissure chemosis; after two days, left eye visual acuity 7/10, right eye visual acuity 9/10, left leg ophthalmia with superficial punctate exposure keratopathy localized to the inferior one-third of the cornea, bilateral normal intraocular pressure (12

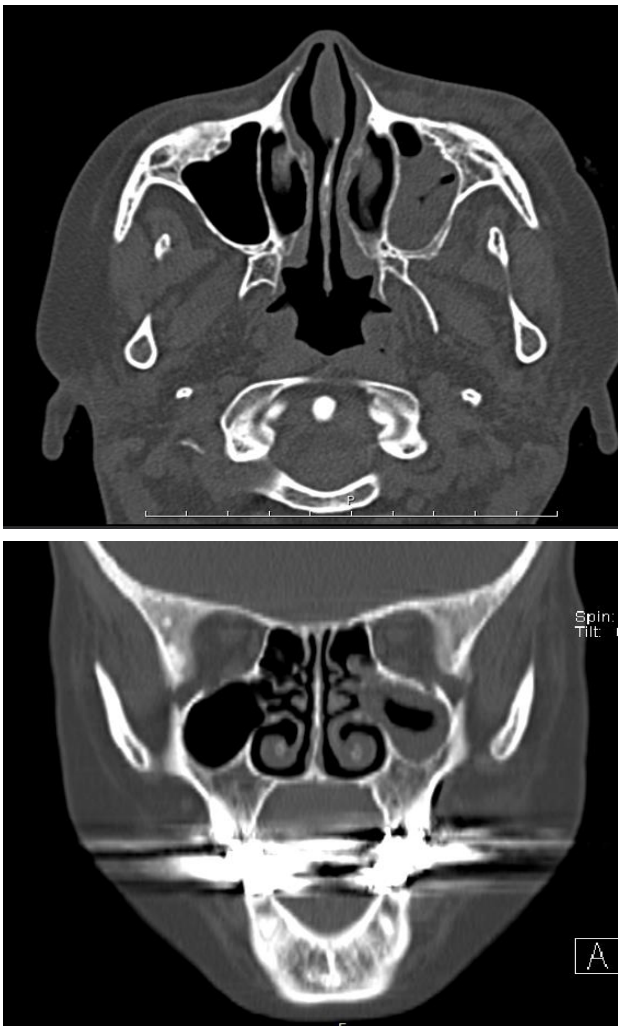

Figure 1. Paranasal sinus CT scan: increased mucosal thickness of left maxilla and sphenoid sinus, no bone destruction.

Table 1. Lab data of patients with fungal co-infection**.**

Lab Test	Level		
	1st Day	4th Day	10th Day
WBC/ml	2.2	1.2	4.800
Hgb g/dl	8.6	7.5	9.7
Plat/ml	71.000	53.000	50.000
Cr	0.9	1.2	1.2
FBS	230	106	141
Bil-T	2.01	4.29	--
Bil-D	1	3.5	--
AST	76	260	--
ALT	149	236	--
AL.PH	1939	4536	--
ESR	67	--	--
CRP	91.9	--	--
Anti COVID19 IgM	Neg	--	--
Anti COVID19 IgG	Neg	--	--

mmHg) and normal posterior segment. She also had splenomegaly due to SLE. In the second week, she developed lower extremities edema with findings in echocardiography as mild LV systolic dysfunction, EF 45-50%, septal hypokinesia, mild MR, and mild pericardial effusion, which recovered by diuretics. Images showed increased mucosal thickness of the left maxilla and sphenoid sinuses and no bone destruction in paranasal sinus CT scan (Figure 1). Lab data was included in Table 1. Rheumatologic tests were in the normal range.

She underwent surgical debridement of necrotic bone of the maxilla, maxillary, and sphenoid sinuses, extractions of 4 left maxillary teeth (5-8), and palatal mucosa (Figure 2). Pathologic study of surgical samples showed co-infection (Figure 3).

The patient was prescribed Liposomal AMB, caspofungin (only for the first 2 days), voriconazole (from the 3rd day), and acyclovir. Moreover, she received vancomycin and meropenem, GCSF 3 days for leukopenia, and supportive treatment for eyes. After 12 days, she left our educational hospital to a private center and continued antifungal for a total of 8 weeks with complete recovery without recurrence after a one-year follow-up.

Discussion

Aspergillosis and mucormycosis, two invasive opportunistic fungal diseases, have similar clinical and laboratory manifestations. They show rare specific manifestations with difficult and time-consuming diagnoses. They can be disseminated, involve multiple systems, and are fatal in immunodeficient patients[7]. These filamentous fungi are everywhere in the environment, mainly in animal excreta and vegetable decompositions. *Aspergillus fumigatus* and *Rhizopus* species are the most prevalent species, respectively. Transmission is primarily respiratory, through inhalation of spores. Infection can be acquired percutaneously, usually with disruption of skin barriers with invasive trauma, burns, direct injection, or catheters[6].

There are few reports on mixed mucormycosis and aspergillosis coinfection in immune-compromised patients with hematologic malignancies, neutropenia, solid organ transplantation, and uncontrolled diabetes[8,9].

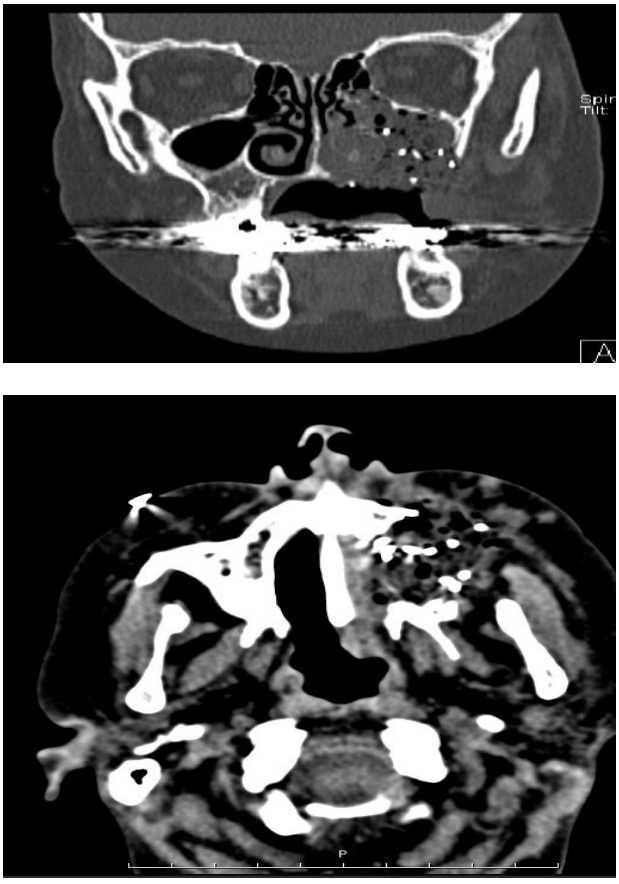

Figure 2. Paranasal sinus CT Scan post operation: Resection of lower and medial wall of maxilla and alveolar process.

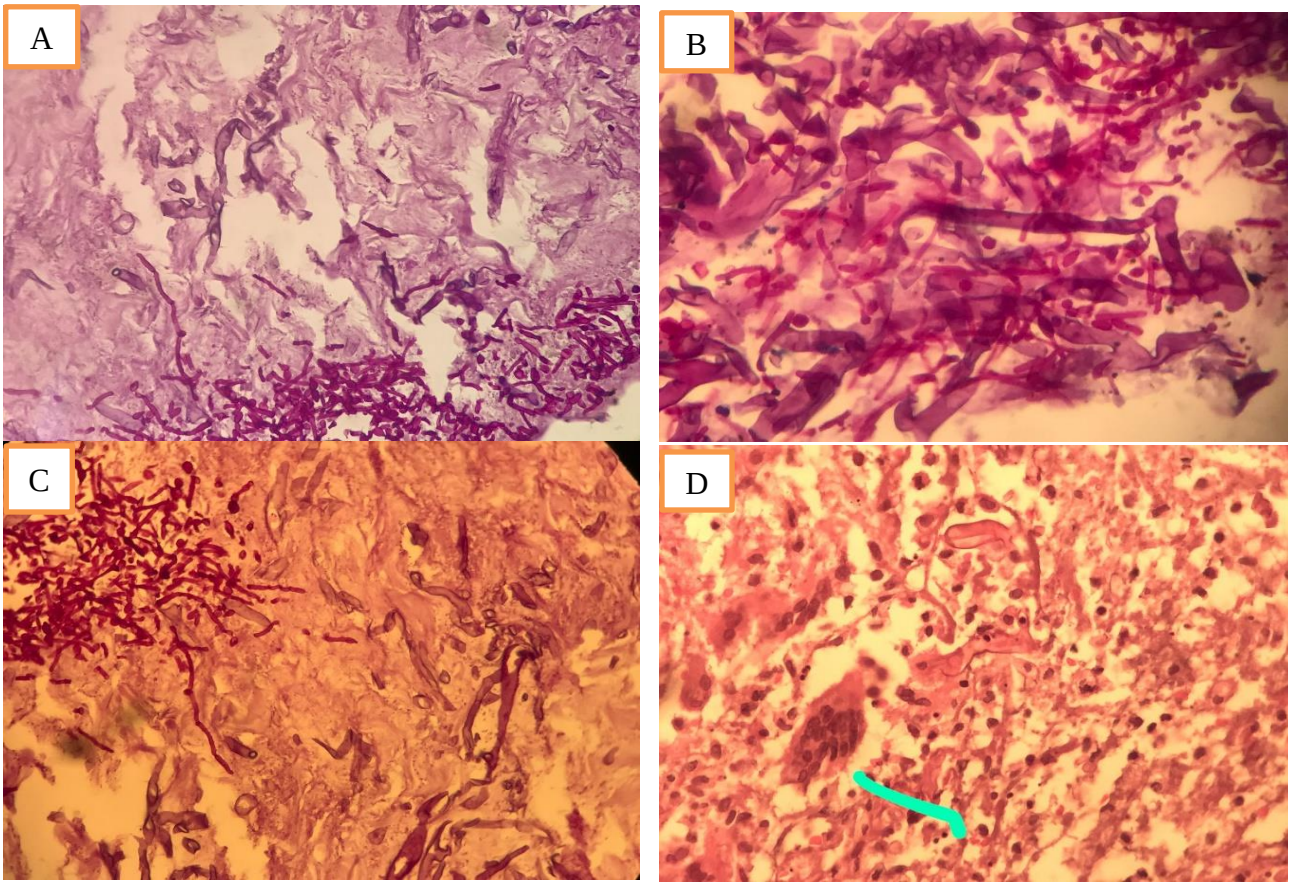

Figure 3. Microscopic view A: on low power field showing thin hyphae of Aspergillus fungi in the lower part of field admixed with wide hyphae of mucor in the middle part of the field (x100, PAS), B: (x400, PAS), C: Aspergillus fungi on right side of field composed of thin septate, with regular branching at acute angles compared with wider aseptate hypha of mucormycosis branching at a right angle 90° in right side of field(x100, PAS), D: Microscopic view of adjacent stroma of mucormycosis showing some histiocytic giant cells, foreign body type granulomatous inflammation (x400, H&E).

Viral diseases, uniquely severe influenza, and new COVID-19, complicated with acute respiratory distress syndrome (ARDS), can cause greater susceptibility to these infections in patients with no immunodeficiencies[10]. Patients with uncontrolled diabetes mellitus show decreased granulocyte phagocyte activity and impaired neutrophil cell response to infection. Acidosis and hyperglycemia are suitable conditions for the proliferation of fungi[11]. Simultaneous infection usually occurs in the mouth, face, or sinuses[8]. COVID-19 patients with traumatic injury, diabetes mellitus, and other immunosuppressant conditions are at higher risk of developing mucormycosis. Petrikkos G study showed that "Aspergillus species also could be an important cause of death in COVID-19 patients, commonly in those with other potential risk factors as steroid therapy, prolonged low neutropenia, chronic obstructive pulmonary disease, allogeneic hematopoietic stem cell transplant, solid organ transplant, inherited immunodeficiencies, hemopoietic malignancy, and cystic fibrosis"[3]. During the ongoing COVID-19 pandemic, physicians should be alert for co-infections of these two molds[12-15].

In co-infection, if mucor is diagnosed and missed aspergillosis, specific treatment with AMB will cover Aspergillus; conversely, if mucor is missed and Aspergillus is treated with voriconazole, mucor will progress with high mortality and morbidity. So, in suggestive clinical manifestations, pathologic evaluation should be exact, including these two mold fungi.

Conclusion

Clinicians should be alert, consider the diagnosis of

fungal co-infections, and prescribe effective medical treatment for two pathogens in addition to surgery. No one should be missed at first and treated by specific antifungal AMB, with no time-wasting for a better prognosis.

Acknowledgment

None.

References

1. Hu ZM, Wang LL, Zou L, Chen ZJ, Yi Y, Meng QB, Feng Y. Coinfection pulmonary mucormycosis and aspergillosis with disseminated mucormycosis involving gastrointestinalin an acute B-lymphoblastic leukemia patient. Braz J Microbiol. 2021;52(4):2063-8.

2. Petrikkos G, Skiada A, Lortholary O, Roilides E, Walsh TJ, Kontoyiannis DP. Epidemiology and clinical manifestations of mucormycosis. Clin Infect Dis. 2012;54(Suppl 1):S23–34.

3. Ge Song. Guanzhao Liang. Weida Liu, Fungal Co-Infections Associated with Global COVID-19 Pandemic: A Clinical and Diagnostic Perspective from China, Mycopathologia; 2020;185(4):599-606.

4. Klimko NN, Khostelidi SN, Volkova AG, Popova MO, Bogomolova TS, Zuborovskaya LS, et al. Mucormycosis in haematological patients: case report and results of prospective study in Saint Petersburg, Russia. Mycoses. 2014;57(Suppl 3):91–6.

5. Cadena J, Thompson GR, Patterson TF. Invasive aspergillosis: current strategies for diagnosis and management. Infect Dis Clin North Am. 2016; 30(1):125-42.

6. Mandel, Douglas & Bennett. Principles and Practice of Infectious Diseases. 9th ed. Philadelphia: Churchill Livingston;2019:3112-25.

7. Boroujeni ZB, Shamsaei S, Yarahmadi M, Getso MI, Salimi-Khorashad A, Haghighi L, et al. Distribution of invasive fungal infections: molecular epidemiology, etiology, clinical conditions, diagnosis and risk factors: a 3-year experience with 490 patients under intensive care. Microb Pathog 2020;104616

8. S. Zayet, A. Zaghdoudi, L. Ammari, B. Kilani,Tiouiri Benaissa H. Cerebro-rhino-orbital mucormycosis and aspergillosis coinfection in a patient with diabetes mellitus: a case report, ID Cases, 23 (2021), p. e01022,

9. A.H. Mahadevaiah, N. Rajagopalan, M. Patil, S C; Coinfection of pulmonary mucormycosis and aspergillosis presenting as bilateral vocal cord palsy, BMJ Case Rep, 2013 (2013), Article bcr 2013009615.

10. Singh A, Mohanty A, Jha S, Gupta P, Kaistha N. Concomitant Mucormycosis with Aspergillosis in Patients with Uncontrolled Diabetes Mellitus: A Case Series.J Clin of Diagn Res.2021; 15(2):DR01-DR03.

11. Rit K, Saha R, Dey R, Barik G. Rhino-oculo-cerebral aspergillus and mucor co-infections in an immunocompromised patient with type 2 diabetes mellitus. Med J Dr Patil Univ 2014;7(4):486

12. Gangneux JP, Bougnoux ME, Dannaoui E, Cornet M, Zahar JR. Invasive fungal diseases during COVID-19: we should be prepared. J Mycol Med. 2020.

13. Paul M, Sasidharan J, Taneja J, Chatterjee K, Abbas SZ, Chowdhury V, Das A. Invasive Mucormycosis and Aspergillosis Coinfection Associated with Post-COVID-19 Pneumonia in a Tertiary Care Hospital. Med Mycol J. 2022;63(3):59-64.

14. Chiurlo M, Mastrangelo A, Ripa M, Scarpellini P; Invasive fungal infections in patients with COVID-19: a review on pathogenesis, epidemiology, clinical features, treatment, and outcomes, New Microbiol. 2021 Apr;44(2):71-83.

15. Fallah F, Lotfali E, Azimi L, Khodaei H, Rajabnejad M, et al. The First Fungal Identification from Mini-BAL of Critical COVID-19 Patients. Arch Pediatr Infect Dis. 2023;11(4):e136153.