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Letter to Editor

A Rare Case of Sinonasal Invasive Mucormycosis Presenting Concurrently With A Fungus Ball

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Dear Editor;

Sinonasal fungal infections are broadly classified as non-invasive (absence of fungal hyphae within the sinus mucosa) and invasive (presence of fungal hyphae within the sinus mucosa) (1,2). Invasive fungal rhinosinusitis (IFR) is further subdivided into acute, chronic and chronic granulomatous and non-invasive fungal rhinosinusitis (NIFR) is subdivided into allergic fungal rhinosinusitis and fungus ball (FB) (1-3).

FB is the most frequent NIFR and is characterized by accumulation of fungal hyphae within the nasal cavity without angioinvasion or tissue invasion. FB is commonly seen in immunocompetent and non-atopic individuals (8). However, mucormycosis is a rare and potentially fatal opportunistic acute IFR that most seen in immunocompromised and diabetic patients and is caused by a saprophytic aerobic fungus that belongs to the class "phycomycetes / zygomycetes"; order "mucorates", family "mucoraceae" and genera "Rhizopus, Mucor and Absidea" (1,3,5). IFR can also be caused by fungal species such as aspergillus, Alternaria species and phaeohypomycoses (6). In addition to these microorganisms, few invasive candida infections have been reported in the literature (7).

A 33-year-old male patient diagnosed with acute myelocytic leukemia 3 months ago, was consulted to our clinic with nasal congestion and mucopurulent discharge from right nasal cavity. The patient had been neutropenic for 45 days and hence received broad-spectrum antibiotics. Endoscopic examination showed congested nasal mucosa and mucopurulent discharge in the right nasal cavity, but there were no signs of mucosal pallor or necrosis. Paranasal computed tomography scan showed density increase which was compatible with FB, however there was a high suspicion of orbital invasion (**Figure 1**). Orbital and maxillofacial magnetic resonance imaging showed high suspicion of invasive fungal infection (**Figure 2**). Consequently, the patient was administrated amphotericin B immediately, before confirmation with

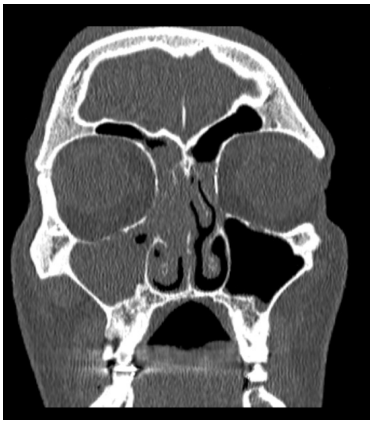

Figure 1. Preoperative computerized tomography imaging

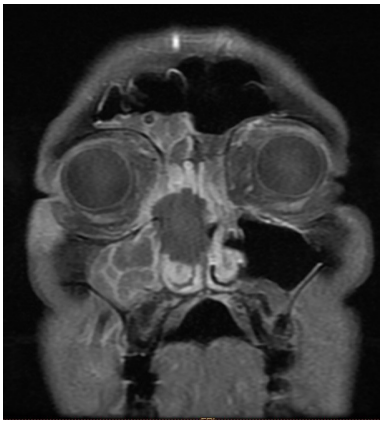

Figure 2. Preoperative magnetic resonance imaging

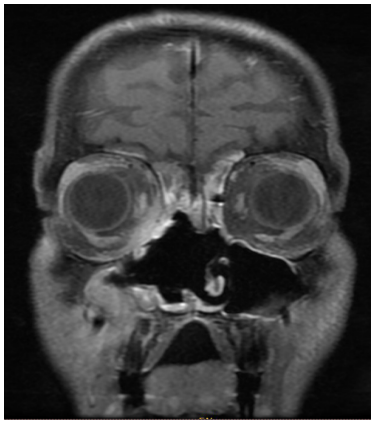

Figure 3. Postoperative magnetic resonance imaging

biopsy. We performed a nasal cavity biopsy for frozen section analysis which showed angioinvasion by fungal hyphae. Based on the pathological diagnosis of the IFR, we applied a comprehensive nasal debridement, including the posterioinferior region of the nasal septum, right nasolacrimal duct and sac and the medial wall of maxillary sinus. Amphotericine B impregnated gelfoam was placed in the nasal cavity and nasal lavage with amphotericine B was administrated once a day. The patient was given antifungal treatment for 6 weeks. The patient went under daily endoscopic examination in the postoperative period. On the 3rd postoperative day, necrotic mucosal areas were detected on the anterior septum, nasal base and right lacrimal bone, therefore an extensive debridement was performed. Candida spp, Aspergillus spp. and Mucor spp. were identified on the pathology specimen. The daily endoscopic examinations, nasal lavage with amphotericine B were carried on and there are no signs of recurrence on the postoperative 3rd month (**Figure 3**).

Sinonasal FB is a benign colonization of fungal hyphae, in which affected patients are usually immunocompetent and are either asymptomatic or have insignificant symptoms (2). The pathogenesis of FB is not completely understood, however obliteration of sinus ostium with the development of an anaerobic environment have been suggested to be possible contributing factors (3,8). FB often remains asymptomatic for a long period and is incidentally found by imaging procedures; thus, it may represent as chronic rhinosinusitis.

On the other hand, IFR typically affects immunocompromised patients with an impaired neutrophilic response (4,7). These conditions include poorly controlled diabetes mellitus, acquired immunodeficiency syndrome, iatrogenic immunosuppression and hematological malignancies (4,7,8). Morbidity and mortality rate of IFR in immunocompromised patients are rather high, due to rapid spread and extensive necrosis and destruction of contiguous structures. The following four issues are currently considered critical for eradicating IFR: Rapidity of diagnosis, reversal or reduction of predisposing factors, appropriate surgical debridement of infected and necrotic tissues and rapid and aggressive antifungal therapy (5). Extensive debridement should be performed during surgery including all necrotic tissues as well as pale and non-bleeding tissues. The patient should be closely monitored in terms of incipient necrotic areas and surgery should be extended if necessary.

Differential diagnosis is also important and should be kept in mind in immunocompromised patients. These pathologies include fungus ball, chronic rhinosinusitis with or without nasal polyp, allergic fungal rhinosinusitis as well as acute or chronic invasive fungal infections (3-5).

In some studies, progression or reactivation of FB to IFR were reported on immunocompromised patients (3,4) so we would like to point out whether asymptomatic FB should be treated to prevent IFR.

In conclusion, we observed the FB to progress into IFR in our patient and had to take immediate action. Therefore, our case may lead to further investigation with large cohorts studying the prophylactic surgery of FB to avoid complications of IFR.

DECLARATIONS

Ethics Committee Approval: Not required.

Author Contributions: All authors equally contributed to data collection and analysis for the final manuscript. All authors read and approved the final manuscript.

Conflict of Interest: None.

Informed Consent: Written informed consent to participate was obtained from the patient participated in this study. Personal data privacy has been protected. The patient signed informed consent regarding publishing their data.

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REFERENCES

1. Singh VP, Bansal C, Kaintura M. Sinonasal Mucormycosis: A to Z. *Indian J Otolaryngol Head Neck Surg.* 2019;71(Suppl 3):1962-1971. doi:10.1007/s12070-018-1384-6
2. Kim YK, Kim HJ, Kim HY, et al. Extrasinonasal infiltrative process associated with a sinonasal fungus ball: does it mean invasive fungal sinusitis?. *Diagn Interv Radiol.* 2016;22(4):347-353. doi:10.5152/dir.2015.15417
3. Yoon YH, Xu J, Park SK, Heo JH, Kim YM, Rha KS. A retrospective analysis of 538 sinonasal fungus ball cases treated at a single tertiary medical center in Korea (1996-2015). *Int Forum Allergy Rhinol.* 2017;7(11):1070-1075. doi:10.1002/alr.22007
4. Assiri AM, Ryu S, Kim JH. Concurrent diagnosis of sinus fungus ball and invasive fungal sinusitis: A retrospective case series. *Mycoses*. 2021;64(9):1117-1123. doi:10.1111/myc.13343
5. Jeyaraj P. (2021) Sino-Maxillary Mucormycosis of Iatrogenic etiology in an immunocompetent patient - Importance of early diagnosis and prompt management. *J Clinical Otorhinolaryngology.* 2021; 3(2); DOI: 10.31579/2692-9562/029
6. Tauziède-Espariat A, Wassef M, Adle-Biassette H, et al. Les infections fongiques nasosinusiennes ne sont pas uniquement liées aux mucorales et aux Aspergillus ! [Sinonasal fungal infections are not exclusively due to mucorales and Aspergillus!]. *Ann Pathol.* 2016;36(4):245-251. doi:10.1016/j.annpat.2016.04.005
7. Bhandari S, Agarwal S, Bhargava S, et al. Post Covid-19 Sinonasal Candidiasis: A Crisis Within the Pandemic. *Indian J Otolaryngol Head Neck Surg.* 2023;75(2):523-528. doi:10.1007/s12070-022-03318-4
8. Kim DW, Kim YM, Min JY, et al. Clinicopathologic characteristics of paranasal sinus fungus ball: retrospective, multicenter study in Korea. *Eur Arch Otorhinolaryngol.* 2020;277(3):761-765. doi:10.1007/s00405-019-05738-5