

Diagnostic Study of Fungal Sinusitis in People Suffering from Immunodeficiency

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*Corresponding author: Khetam Ibrahim Mohammed | Received: 03.06.2024 | Accepted: 08.07.2024 | Published: 14.08.2024 |

Abstract: Numerous fungi can cause a variety of diseases in both humans and animals. Some are pathogenic or opportunistic: meaning this fungi cause disease when they find an opportunity to do so, such as when immunity is low or the right conditions are present for the fungus to grow. Fungi sinusitis is one of disease. This study involved the isolation, diagnosis, and analysis of fungi that cause sinusitis in a number of individuals who were diagnosed with the disease by a medical professional. Fungi were grown from patient samples on plates, and the fungus's shape on the dish was used to aid in the diagnosis process. beneath an optical microscope. Studies have also looked at the connection between this fungal infection and a number of variables, such as the patient's age, gender, and the chronic disease.

Keywords: Fungal sinusitis, *Aspergillus niger*, immunodeficiency.

INTRODUCTION

Although fungus sinusitis was formerly thought to be an uncommon condition, cases are becoming more common worldwide. The invasive group of fungal sinusitis includes acute, chronic, and chronic granulomatous cases; on the other hand, noninvasive fungal sinusitis includes fungal balls (fungal mycetomas) and allergic fungal sinusitis. To prevent a long-term or deadly consequence, prompt diagnosis and the start of suitable therapy are crucial [1-3] Allergy-induced fungal rhinosinusitis is a type of non-invasive fungal sinusitis (AFRS). Believed to be the most prevalent type of fungal sinus illness [4]. Deutsch & Prasad 2019 are classified sinusitis into six subgroups: (Non-Invasive Fungal Rhinosinusitis: Saprophytic fungal infestation, Fungal Ball, Allergic fungal rhinosinusitis) (Invasive Fungal Rhinosinusitis: Acute invasive fungal rhinosinusitis, Chronic invasive fungal rhinosinusitis, Chronic Granulomatous invasive fungal rhinosinusitis.

Facial pain (or retro-orbital pain in sphenoid illness), post-nasal drip, and anosmia are among symptoms that are common to both disease stages. In the context of fungal balls, endoscopic examination of the nasal cavity yields a number of distinct findings. This can include everything from a completely normal nasal cavity and mucosa to crusting, purulent discharge, and

oedematous mucosa with polyp growth [5-7]. Fungal balls are a densely matted cluster of extra-mucosal fungal hyphae that elicit minimal mucosal irritation or reaction. These fungal balls usually only affect one sinus, the maxillary sinus being affected 94% of the time. The majority of the remaining cases are located in the sphenoid [4,3,6] Allergy-induced fungal rhinosinusitis is a type of non-invasive fungal sinusitis (AFRS). This may be the most prevalent type of fungal sinus illness [9].

While AIFR and chronic invasive fungal rhinosinusitis (CIFR) have very similar pathologies, the latter develops over a far longer time span (months to years). This is partly because immunocompetent individuals experience it more frequently [5,1]. In the western world, chronic granulomatous invasive fungal sinusitis (CGIFS) is an uncommon condition. It is more prevalent in people who are immunocompromised or immunosuppressed in Northern Africa, the Middle East, and Asi.[5].

Immunocompromised or diabetic patients presenting with orbital apex syndrome, fever or cough without apparent cause, inflammation of the nasal septal mucosa, or acute sinusitis should be suspected of having invasive fungal sinusitis. It needs histopathological investigations to distinguish between these disorders [10] and Acute invasive fungal sinusitis is a highly fatal

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Citation: Khetam Ibrahim Mohammed, Lina Abdulkadhim Oudah, Mervat Kamil Kadhom (2024). Diagnostic Study of Fungal Sinusitis in People Suffering from Immunodeficiency. *Cross Current Int J Med Biosci*, 6(4), 92-95.

infection that affects patients with compromised immune systems. It is an aggressive infection. Patients with COVID-19 are more likely to experience invasive lung fungal infections, most likely as a result of compromised immune function [11,12].

METHODS

Isolation and Diagnosis

The fungus that caused the sinusitis were identified in triplicate from a group of patients who were receiving medical care in clinics in the city of Diwaniyah. The fungus that caused the sinusitis were identified in triplicate from a group of patients who were receiving medical care in clinics in the city of Diwaniyah. Using a swab, nasal swabs were taken from these patients, which were cultured on Petri dishes and

incubated at a temperature of 37 degrees Celsius for three to four days. Both microscopic and macroscopic examinations were used to identify the Petri dishes that had demonstrated positive growth of the infection. [15]

RESULTS

Three samples that cultured, a positive result on the culture media for pathogenic fungus were gathered after 25 specimens were cultured. Based on how the fungus looked on the plate after incubation at 37°C, the diagnosis was determined. *Aspergillus niger* was the diagnosis made after further examination under a microscope [15,17] initially white colonies, but quickly take on black colors. Colonies grow in 3–5 days and are fluffy to velvet-like., as seen in Figure 1.

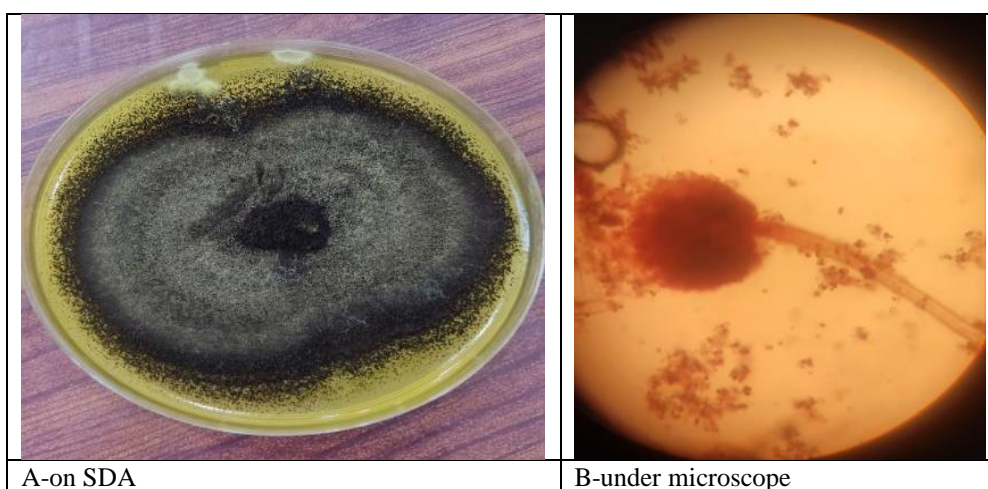


Fig 1: Aspergillus Niger

The number of fungal sinusitis-causing isolates is displayed in Table No. 1 below. Three of the 25 specimens tested positive for fungal growth when the

nasal swab was cultured on sabroaud dextrose agar medium and allowed to incubate for three to four days.

Table 1: Fungi positive specimens from total specimens

Total samples	Positive samples	%
25	3	12

Table 2: Distribution of positive fungi samples according to the gender of patients

Gender	Total samples	Positive samples	%
Female	16	2	12.5
Male	9	1	11.11
Total	25	3	12
Calculated X ²	0.011		
Calculated P	0.918*		

* No significant difference (P>0.05)

Fungal sinusitis is generally observed in immunocompetent patients and have been found to be more common in middle-aged females. The majority of researchers held this view, including Uri, *N et al.*, 2003 & Dufour *et al.*, 2006 and other, [17-20] This could be supportive of what we found in Table 2, where out of three isolates, two were from females, but this cannot be

concluded. This may be the reason why the number of samples collected from male patients was less than that of females. I also agree with them that patients who suffer from diseases that affect their immunity are more susceptible to such infections. Table No. 3 illustrates this, showing that two of the three positive isolates are associated with individuals with chronic illnesses.

Table 3: Distribution of positive fungi specimens according to the presence of other disease

Status	Total samples	Positive samples	%
Yes	7	2	28.57
No	18	1	5.55
Total	25	3	12
Calculated X ²	2.52		
Calculated P	0.112*		

* significant difference (P>0.05)

It can also be noted that Sebastian *et al.*, in 2022 mentioned a significant death rate is linked to COVID-19 infection, which is likely a risk factor for acute invasive fungal rhinosinusitis [12]. The researcher in

[13,14] mentioned that diabetes, especially ketosis, is a strong indicator of fungal sinus infections. Kidney failure was also mentioned among the diseases most susceptible to such infections.

Table 4: Distribution of positive fungi specimens according to the age of patients

Age interval	Total samples	Positive samples	%
19-31	4	1	25
32-44	16	2	12.5
45-58	5	0	0
Total	25	3	12
Calculated X ²	1.32		
Calculated P	0.515*		

* No significant difference (P>0.05)

CONCLUSION

Chronic diseases and patients with weak immunity are more susceptible to infection with opportunistic fungi, which cause sinus infections. The cause of sinusitis may be bacterial, fungal, or even tissue, and the diagnosis should not depend, as we have seen in our institutions, on clinical examination. Rather, samples must be cultured to confirm the type of organism causing the disease.

Acknowledgments

We are appreciative of the opportunity to study in the College of Science at Al-Qadisiyah University, additionally to the Diwaniyah Hospital located in the Diwaniyah province of Iraq. I would want to express my gratitude to everyone who helped in any way.

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