

CASE REPORT

Subcutaneous Mycoses on The Face of A Child: A Case Report

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ABSTRACT

Skin infections is a common presentation at primary healthcare clinics. It may be caused by a variety of pathogens, including viruses, bacteria, fungi, or parasites. The most common skin infections are caused by bacteria, namely *Staphylococcus aureus* and Group A beta-haemolytic streptococci. Fungal infections, particularly subcutaneous mycoses, may exhibit similar clinical features as bacterial infections. In this case report, we highlight the importance of considering subcutaneous mycoses as a differential diagnosis for patients presented with skin infections, especially if the condition did not improve with antibiotic. This case report also emphasised the importance of considering the potential side effects of systemic antifungal medications before initiating the treatment in children. Accurate diagnosis through culture testing is essential to guide the treatment, rather than relying solely on empirical treatment based on clinical symptoms.

INTRODUCTION

The skin serves as the body's main external barrier, and is vulnerable to infections caused by bacteria, viruses, and fungi (Ma et al., 2021). Fungal infections affecting the cutaneous and subcutaneous tissue are becoming more common, affecting both healthy and weakened immune systems individuals. Cutaneous and subcutaneous fungal infections are caused by



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a wide range of fungi, including molds, yeasts, and dimorphic fungi, which can be either pathogenic or opportunistic in nature (Ma et al., 2021). Subcutaneous fungal infections may involve deeper layers, such as the dermis and subcutaneous tissues (Pang et al., 2004). Prominent types of subcutaneous fungal infections are sporotrichosis, mycetoma, chromoblastomycosis, and zygomycosis (Pang et al., 2004). Occasionally, these infections may be misidentified as bacterial skin infections caused by staphylococcus bacteria, thereby leading to improper treatment. This case report described the subcutaneous fungal infection which was initially misdiagnosed as the bacterial infection of the skin due to its similar clinical presentation.

CASE PRESENTATION

A 2-year-old boy made several visits to a primary healthcare clinic due to skin lesion situated beneath his right eye for three weeks. It began as a minor puncture wound, which was reported to be caused by a poke from a small iron rod (Figure 1). Later, it developed into a swollen, red, and painful lump for three weeks (Figure 2). The lump became larger and more painful during that period. Initially, he also had a fever that lasted for one week but has subsided. On his first consultation at the clinic, he was prescribed topical antibiotic ointment and syrup antibiotic. The preliminary diagnosis was pre-septal cellulitis near the right eye. Despite a week of medication, the lesion showed no signs of improvement, prompting a second round of antibiotics. Even after completing the treatment, there was no notable progress in the healing of the lesion. The patient was then referred to a dermatology clinic for further evaluation.

On physical examination, he was well and afebrile. The vital signs were also normal. There was a 3cm x 2cm lesion on the right cheek just below the right eye (Figure 2). The lesion was erythematous, warm and tender on palpation. There was no palpable lymph node.

Upon seeing this patient at the dermatology clinic, skin biopsy was performed for diagnostic confirmation. Sample was analysed for both bacterial and fungal infections. Results showed no significant bacterial growth, but fungal cultures resulted in the growth of non-sporulating hyaline mold. This confirmed the diagnosis of subcutaneous mycosis.

The treatment was commenced with a daily dose of 62.5 mg of syrup terbinafine for two weeks. Upon completing this treatment, the lesion improved but was not completely cleared (Figure 3). The patient was then prescribed 55 mg of itraconazole syrup twice a day for one week. Upon reviewing the patient two weeks later, it was observed that the lesion was resolved completely (Figure 4). Since the patient consumed itraconazole syrup, liver function test was conducted before initiation of syrup itraconazole and after completed therapy. Both results were within the normal range.



Figure 1: Minor puncture wound caused by a poke from a small iron rod.

DISCUSSION

Subcutaneous mycoses are a group of fungal infections caused by a heterogenous group of fungi that infect the skin, subcutaneous



Figure 2: Progression of skin lesion.



Figure 3: Hypertrophic scar in the right infra-orbital area. A few pinpoint papules on erythematous macule on the right side between nasal bridge and cheek.



Figure 2: Hypertrophic scar in the right infra-orbital area. No new papules or nodules.

tissue and, in some cases, deeper tissues and organs. The causative agents are commonly found in soil, leaves, and organic material, and are introduced by traumatic injury to the skin (La Hoz & Baddley, 2012; Warnock, 2012). The majority of these infections stem from fungi thriving as decomposers in nature. There are superficial, subcutaneous, and systemic types of fungal infections. Fungi can manifest as yeasts that reproduce through budding, or as molds with thread-like structures known as hyphae that weave together into a network called mycelium, or as dimorphic fungi capable of growing either as yeast or mold depending on the conditions. (La Hoz & Baddley, 2012).

Subcutaneous fungal infections caused by mold typically arise from the introduction of fungal spores into deeper skin layers through pre-existing open wounds or breaks in the skin barrier. (Kozel & Wickes, 2014). Mold begins its life cycle as ubiquitous spores found in soil, air, and on various surfaces. When these microscopic spores land on a suitable environment, such as human skin, they can germinate under favorable conditions like warmth, moisture, and often keratin-rich substrates like skin, hair, or nails. Following this initial germination, a period of incubation occurs, which can last anytime from days to months before any visible symptoms appear. The first noticeable sign of infection is typically

a firm, painless or slightly tender nodule on the skin, ranging in color from pink to almost purple. At this stage, as the fungus establishes itself and multiplies, germination gives rise to hyphae, thread-like filaments that penetrate the skin's outermost layer (epidermis). These hyphae then spread, either across the skin's surface or within hair follicles, solidifying the infection. As the infection progresses, the lesion becomes more prominent and undergoes visible changes in appearance. (Warnock, 2012; Cole et al., 1996; Pang et al., 2004) As the infection progresses, the initial nodule may transform into an open sore or ulcer, potentially draining clear fluid. The lesion's appearance continues to evolve in response to both fungal growth and the body's immune response. Eventually, the maturing fungus begins to produce new spores, potentially spreading the infection to other skin areas. This can manifest as an increase in the number or size of lesions. Without treatment, these nodules and ulcers can become chronic, persisting for years with a stable appearance despite the ongoing infection. (Warnock, 2012; Cole et al., 1996; Pang et al., 2004). The evolution of the skin lesion was seen in this case.

Although non-sporulating hyaline molds are frequently isolated from patients and have been recognised as agents of pulmonary disease, their clinical significance in cutaneous specimens is relatively unknown. Previous study has shown that some non-sporulating hyaline molds affect both cutaneous and subcutaneous tissue infections (Jeyaprakasam et al., 2016). Nonsporulating hyaline molds are fungi that do not readily produce spores under certain laboratory conditions and have clear or translucent (hyaline) hyphae. Without spores, it is challenging for mycologist to identify specific type of mold as spore formation is the key feature in mold identification (Silvarajoo et al., 2021).

Subcutaneous fungal infections and bacterial infections can indeed present with similar symptoms, such as erythema, warm

and swelling (La Hoz & Baddley, 2012; Ally, 2011). Typically, fungi can cause infections when the immune system is compromised, or when there is a breach in the integrity of the mucocutaneous barrier as in this case. Diagnosis of fungal infections can be difficult, and this may delay the initiation of appropriate therapy. The diagnosis relies on cultures, and specific molecular techniques to differentiate between bacterial and fungal infections (Kozel & Wickes, 2014). Nevertheless, it is essential to establish the correct the diagnosis to provide a proper treatment (Dalbeni, 2023).

The choice to prescribe terbinafine syrup instead of itraconazole was initially made due to the lower side effects associated with terbinafine, which is particularly important to consider when treating a child with systemic antifungal medication (Elewski & Tavakkol, 2005). Terbinafine proved to be an effective treatment option for subcutaneous fungal infections caused by non-sporulating fungal strains (Elewski & Tavakkol, 2005). However, in this case, despite completing a two-week course of terbinafine, the skin lesion was still not completely resolved. Consequently, the treatment was changed to itraconazole due to its broader coverage for all types of fungal infections, including both yeast and mold (Elewski & Tavakkol, 2005). Since this patient received itraconazole treatment, potential side effects were closely monitored through liver function test due to the higher risk of hepatotoxicity (Elewski & Tavakkol, 2005). For this patient, liver function tests were conducted before commencing the treatment with itraconazole syrup and after completing the therapy. All test results were within normal range.

CONCLUSION

Subcutaneous infections are commonly presented by patients seeking treatment at primary healthcare clinics. The infections are typically caused by bacteria. However, in circumstances where lesion does not respond

to antimicrobial treatments, it is essential to consider other potential diagnosis, including subcutaneous fungal infections. This case report aims to emphasise the importance of considering subcutaneous fungal infection as a differential diagnosis. Considering the extensive side effects associated with systemic antifungals treatment, it is essential to initiate therapy only after the diagnosis is confirmed, rather than treating empirically relying solely on clinical suspicion.

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CONFLICT INTEREST

No external funding was received for this study.

CONSENT

Written consent was obtained from parents before the preparation of this case report.

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