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CLINICAL RECORD

Scytalidium dimidiatum associated invasive fungal sinusitis in an immunocompetent patient

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Abstract

Background: *Scytalidium dimidiatum* is a soil and plant pathogen that frequently affects fruit trees, but can also cause human infection. There are only two reported cases of invasive fungal sinusitis involving this rare micro-organism.

Objective: This paper reports the first case of invasive fungal sinusitis caused by *Scytalidium dimidiatum* occurring in a young immunocompetent patient from a non-endemic region, and discusses potential sources of exposure and relevance of local factors.

Method: Case report.

Results: The patient was treated successfully with a combination of functional endoscopic sinus surgery, and antifungal and corticosteroid treatment.

Conclusion: This paper describes the first reported case of invasive fungal sinusitis secondary to *Scytalidium dimidiatum* in a young immunocompetent patient from a non-endemic region. Importance is placed on following a systematic process of investigation and management, and adhering to well-defined basic surgical principles.

Key words: Endoscopic Surgical Procedure; Mycoses; Mangifera; Phaeohyphomycosis; Sinusitis

Introduction

Scytalidium dimidiatum is a soil and plant pathogen that frequently affects fruit trees, but can also cause human infection. It is endemic in regions with a tropical climate, and infection can result from direct contact with infected soil or plants. This most commonly causes onychomycosis and superficial skin infections.[1] There are a few reported cases of invasive disease, mostly occurring in immunocompromised patients, with over half resulting in death despite aggressive intervention.[2] There are only two reported cases of invasive fungal sinusitis involving this rare micro-organism.

Invasive fungal sinusitis is a common manifestation of an immunocompromised state that typically exhibits an aggressive course, and is associated with high morbidity and mortality. The most commonly implicated micro-organism is Mucorales, which is found in organic substrates such as food and soil. Management often requires multimodality treatment including surgery, as well as targeted and often prolonged antimicrobial treatments.

We present a case of invasive fungal sinusitis caused by a rare and unusual micro-organism. We outline our steps in the investigation and successful management of this condition.

Case report

A 23-year-old immunocompetent male student of Kuwaiti origin presented with a 1-year history of persistent nasal obstruction, anosmia and gradual left-sided proptosis. Of note, he had previously been admitted eight months earlier with a right periorbital abscess, for which he underwent emergency endoscopic drainage. The patient was otherwise in good health with no other medical history. He was a non-smoker who denied any illicit drug use, including cocaine.

Clinical examination confirmed left-sided chemosis, proptosis and diplopia on upward gaze. Nasal endoscopy showed severe mucosal inflammation with mucoid secretions, consistent with a periorbital complication of acute sinusitis. A contrast-enhanced computed tomography scan revealed mild left-sided proptosis and hyperdense material in all the sinuses, with extensive bony erosion of the frontal sinuses (Figure 1), consistent with invasive sinusitis. Investigation for possible underlying immunosuppression was negative and a haematological screen revealed only mild eosinophilia. Chest X-ray findings were normal. Serological testing revealed negative results for human immunodeficiency virus and hepatitis B and C, and normal serum immunoglobulin concentrations. Radioallergosorbent testing, however, confirmed significant allergies to aspergillus (5.28 kUA/l), alternaria (20.3 kUA/l) and cladosporium (5.72 kUA/l).

A diagnosis of fungal sinusitis with or without bacterial sinusitis was made. Treatment with azithromycin 500 mg was initiated. This was administered in conjunction with: a tapering regime of oral prednisolone, starting at 40 mg/day and reduced by 10 mg every 3 days for 2 weeks; and topical use of betamethasone (Betnesol®) steroid nose drops. Itraconazole 200 mg/day was commenced empirically for fungal sinusitis following confirmation of normal liver function.

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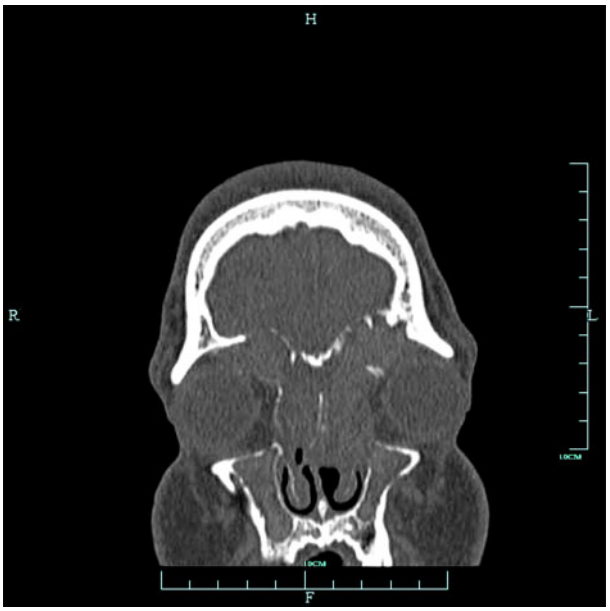

FIG. 1
Coronal computed tomography image of the nose and paranasal sinuses, showing opacification throughout, with double density and bony erosion of the lateral nasal walls. H = head; R = right; L = left; F = feet

Shortly after instigating empirical medical treatment, the patient underwent revision functional endoscopic sinus surgery (FESS). This demonstrated the presence of fungal material (Figure 2), along with extensive erosion of the lamina papyracea on the left and inter-sinus walls in both the sphenoid and frontal sinuses. There was no evidence of necrotic tissue, but all infective material was debrided with irrigation of the sinuses. Histopathology confirmed the presence of polypoidal submucosa with a lymphocytic and eosinophilic infiltrate, whilst microbiology culture from the sinuses grew *Scytalidium dimidiatum*.

The patient remained on itraconazole; it was later confirmed that the culture was sensitive to this agent, along with amphotericin, voriconazole, posaconazole and caspofungin. The medication was subsequently changed to voriconazole 400 mg/day owing to low blood levels of itraconazole and known better absorption of voriconazole. The patient continued to receive a low dose of prednisolone 5 mg/day. The patient also used Flixonase™ spray twice daily and conducted regular nasal douching with SinuRinse™ for six months post-operatively.

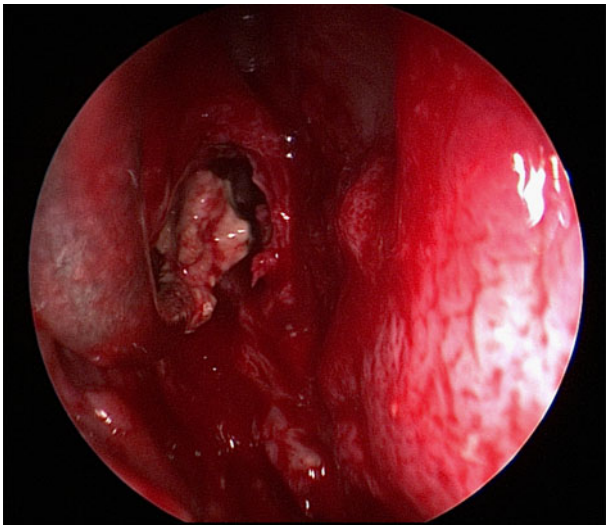

FIG. 2
Intra-operative endoscopic view showing mucopus and fungal material within the left posterior ethmoids.

The patient was referred to a dermatologist for further assessment of any associated dermatomycosis; the findings proved unremarkable. A bone scan was carried out in light of the prolonged steroid use. This showed decreased lumbar bone density, and the patient was commenced on alfacalcidol.

The patient subsequently made a sound recovery, and at the latest follow up (one year after discontinuing treatment), he remained well with no further sepsis or recurrence.

Discussion

Invasive fungal sinusitis usually occurs in immunocompromised individuals. It typically demonstrates an aggressive, rapidly progressive clinical course, and is associated with high morbidity and mortality. A high index of suspicion is required to make the clinical diagnosis, followed by urgent and prompt multimodality treatment. Treatment should include surgery with debridement of any necrotic tissue, prolonged antimicrobial treatments and correction of any immunosuppressant status. Evidence suggests that surgery, specifically FESS, is the single best independent predictor for improved survival.[3–5]

The most commonly reported micro-organism associated with invasive fungal sinusitis is Mucorales. *S dimidiatum*, originally described in 1916 as *Dothiorella mangiferae* from mangoes,[6] is a fungal organism commonly reported to cause simple skin and nail infections in tropical and subtropical regions.[1] The majority of cases reported in the literature were diagnosed in European clinics; however, all affected patients recounted a history of travel to endemic regions, in particular India.[1] Interestingly, our patient – a student of Kuwaiti origin living in Kuwait City – had never travelled to such a region. As the desert climate and scarce water resources prohibit the growth of tropical fruits in the country, mangoes are imported from abroad, with the majority coming from India. Our patient noted having eaten mangoes occasionally whilst in Kuwait. Although this may provide a theoretical source, no evidence exists to our knowledge that links the consumption of mangoes with *S dimidiatum* infection.

- ***Scytalidium dimidiatum* infections are usually superficial and self-limiting**
- **Few cases of invasive disease have been reported, with almost all occurring in immunocompromised patients from endemic countries or with history of travel to endemic regions**
- **The only previous successfully treated case of invasive fungal sinusitis relied on an open, external surgical approach**
- **Endoscopic management, with well-defined surgical principles, can be effective in treating invasive disease involving unusual pathology**

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TABLE I
CASES OF INVASIVE FUNGAL SINUSITIS ASSOCIATED WITH *SCYTALIDIUM DIMIDIATUM* INFECTION

Study	Pt age (y), sex	Year*	Country	Immune status	Treatment	Outcome
Dunn *et al.*[11]	51, F	2003	USA	On immunosuppressants following lung transplantation	Endoscopic drainage, amphotericin B, voriconazole	Died
Ikram *et al.*[18]	19, M	2008	India	Immunocompetent	Open drainage, amphotericin B, itraconazole	Cured
Current case	23, M	2013	UK	Immunocompetent	FESS, itraconazole, voriconazole	Cured

*Year of presentation. Pt = patient; y = years; F = female; M = male; FESS = functional endoscopic sinus surgery

Other possible sources of transmission may concern the interesting demographics of Kuwait. Over half of the population are non-nationals, with two-thirds being of South Asian origin – from India, Bangladesh, Pakistan, Sri Lanka and Nepal; the fungus is considered endemic to these regions. In fact, the first and only previous documented case of *S dimidiatum* associated infection in Kuwait involved a Bangladeshi patient who acquired cutaneous phaeohyphomycosis eight years previously, whilst still in his country of origin.[7] No reports exist of cutaneous or invasive disease in non-travelling, non-endemic hosts of Kuwaiti origin. Our patient therefore represents the first such case. It is unclear as to whether person-to-person transmission of such a fungus is possible and under which conditions this might occur. Few studies on prevalence have been carried out, and little is known about the virulence and mechanism of the *in vivo* survival of this fungus.[8]

Invasive *S dimidiatum* associated infections are rare and usually result in disseminated sepsis, mainly in immunocompromised patients.[9–17] Common underlying causes include human immunodeficiency virus infection, diabetes mellitus, long-term immunosuppressive therapy, chemotherapy, transplantation and chronic renal failure. Previous reports of infection have involved central nervous system abscesses,[12,14,16] endophthalmitis,[9,13,15] and invasive sinusitis (Table I).[11,18]

The first of the 2 reported cases of invasive sinusitis occurred in a 51-year-old patient on immunosuppressant treatment following lung transplantation who presented with invasive fungal sinusitis. The patient was treated aggressively with systemic antifungals and endoscopic drainage of the sinuses on two separate occasions, but later died from respiratory failure precipitated by acute graft rejection.[11] In contrast, the second reported case described invasive maxillary sinusitis in a 19-year-old immunocompetent Indian soldier, which was complicated by left-sided proptosis. He had a history of contact with mango trees, in his native country of India. This patient was treated successfully with systemic antifungals along with surgical debridement via an open, external approach.[18]

Conclusion

Our case represents the first report of invasive fungal sinusitis caused by *S dimidiatum* in an immunocompetent patient treated successfully by endoscopic surgery and medical treatment. Furthermore, we believe this to be the first report of invasive disease in a non-travelling, non-endemic host. These latter two characteristics raise a number of questions regarding the source of the infection as well as the factors that predisposed an apparently healthy, young male with no relevant risk factors to invasive disease.

Further research is needed to elucidate the mechanism of transmission of this fungus, a fungus which displays resistance to several antifungal agents and has been shown to cause invasive disease. Despite this seemingly rare and unusual pathology, our case also highlights that good results can be achieved by following a systematic approach and strict adherence to the principles of FESS.

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