

A case report on maxillary sinus mycetoma

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Abstract

Fungal ball sinusitis (mycetoma) is a chronic infection of the sinuses that can mimic the symptoms of bacterial sinusitis. It is typically found in immunocompetent individuals and can be present for many years before it is diagnosed. Treatment is important to prevent the development of more invasive disease. It is most commonly found in Asia and is rarely reported in Australia and New Zealand. This case describes a 41-year-old female who had an incidental finding of an opacity in the right maxillary sinus that led to a diagnosis of mycetoma.

Keywords: *Aspergillus fumigatus*; Mycetoma; Fungal ball; Sinusitis

Introduction

Fungal sinusitis is broadly categorised into invasive or non-invasive disease.^{1,2} The non-invasive form is most common and can be further subdivided into allergic fungal sinusitis or fungal ball (mycetoma).² *Aspergillus* mycetoma (fungal ball) is the most common non-invasive infection.^{2,3} It has a female predominance and mostly affects immunocompetent patients.¹⁻⁵ Fungal balls are occasionally asymptomatic and detected incidentally on imaging for other indications,^{4,5} however symptoms of facial pain, nasal discharge and obstruction as well as headache are often present.⁵ These symptoms are similar to bacterial sinusitis. Fungal balls are typically unilateral, with the maxillary sinus most often being affected.^{1,2,5} Classical CT findings include partial or complete opacification of the involved sinus with microcalcifications or iron-like signals seen in up to 60% of cases.^{2,6,7} Typical findings intraoperatively show a cheese-like, friable mass which may be black yellow or green and separates from the underlying mucosa with ease.⁸

Fungal ball sinusitis or mycetoma was once considered a very rare disease. However, the incidence is increasing, especially in Asia.^{1,2,4,9} This may be due to better diagnostic techniques as well as increasing endodontic procedures and use of antibiotics.^{4,6,10} Previous dental

treatments are theorised to cause initial colonisation of the sinuses, and zinc oxide used in dental sealers paralyse cilia and encourage fungal growth.¹⁰ Different studies have recorded a higher percentage of fungal ball-positive patients with endodontic procedures than control groups^{6,10–13} However this was not seen in all studies.⁵ Global warming has also been hypothesised to have increased the incidence.¹³ Most species of *Aspergillus fumigatus* across the globe have been shown to be capable of rapid adaptation to different temperatures.¹⁴ Strains that have evolved to be adaptable to thermal stresses can spread easily on air currents and be integrated into non-native environments which poses an increased risk of infection.¹⁴

Functional endoscopic sinus surgery is the treatment of choice to rule out other causes and to reduce patient symptoms.^{6,15} There is also the potential risk of progression to invasive disease if the patient becomes immunosuppressed.¹⁶ The aim of surgery is to restore aeration of sinuses and to improve ciliary clearance.¹⁵ Outcomes after surgery are good; the risk of recurrence is low^{2,6} and quality of life has also been shown to improve.⁶ Medical therapy is not required for non-invasive disease. Cultures are only positive in about a third of cases, but *Aspergillus* is the most common.^{5,17} This report presents a case of maxillary sinus ball in New Zealand.

Background

Ms. B was a 41-year-old female with a past medical history of polycystic ovaries treated with the oral contraceptive pill. She was immunocompetent and had no allergies. Past surgical history included the extraction of four impacted wisdom teeth two years ago. She presented to her GP after a fall where she hit her left orbit and had a tender left orbital floor on examination. An x-ray revealed no fracture on the left but an incidental finding of opacification of the right maxillary sinus (Figure 1). The remaining sinuses were clear.

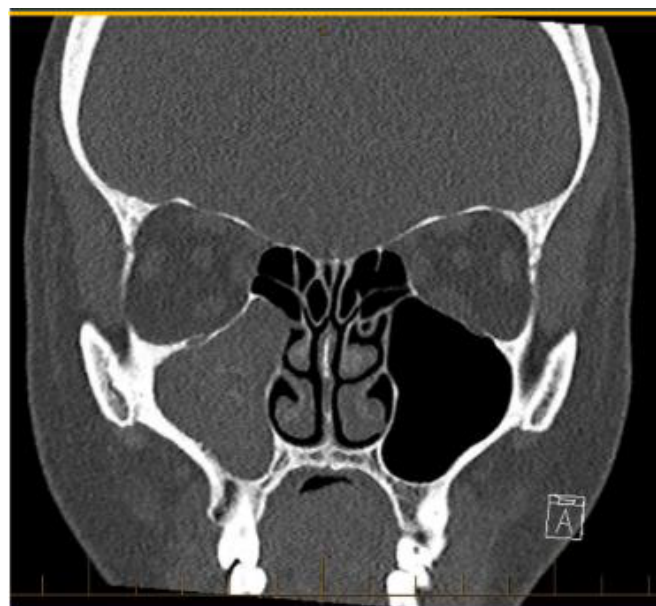
The patient did not report any history of sinus disease but upon questioning did have some vague symptoms of mild facial pain reported over the past six months. This was previously treated with one course of amoxicillin with little improvement. Public referral to the ear nose and throat (ENT) department at Dunedin Hospital was declined, so a private referral was arranged for a non-contrast computed tomography (CT) of the paranasal sinuses at Pacific Radiology in Dunedin (Figure 2). This demonstrated complete opacification and subtle expansion of the right maxillary sinus corresponding to the opacity seen on X-ray. There was associated central increased density and mineralisation within the opacified right maxillary sinus as well as bulging of soft tissue medially through the expanded, completely opacified

right accessory maxillary ostium. The surrounding right maxillary sinus wall was thickened and sclerotic in keeping with chronicity. There was no bony destruction or aggressive features. These findings were suggestive of a right maxillary sinus mycetoma.

Figure 1. Skull X-ray demonstrating opacity of the right maxillary sinus.



Figure 2. CT scan showing complete opacification and expansion of the right maxillary sinus.



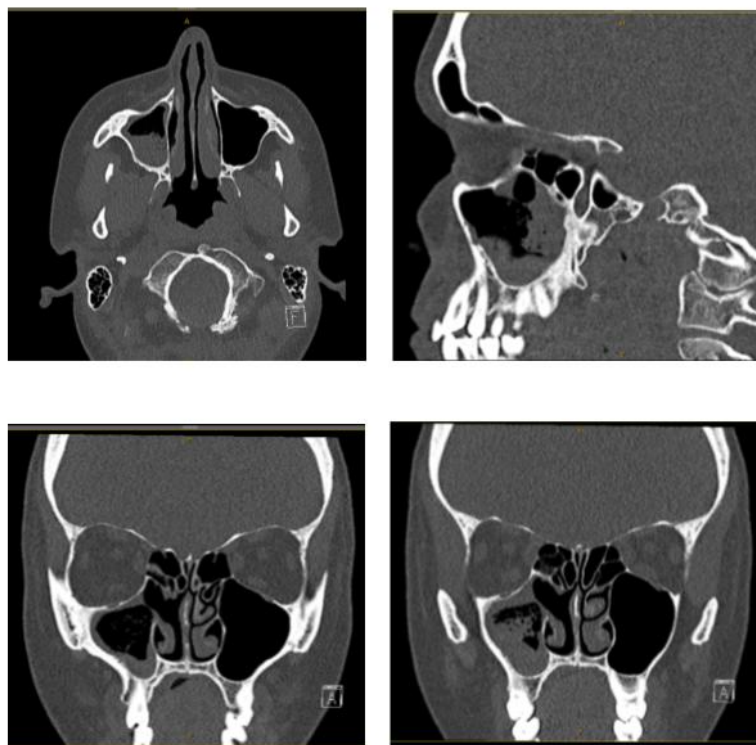
Treatment

The patient proceeded to receive functional endoscopic sinus surgery to clear the sinus. Post-operative care included daily nasal sinus rinses. Culture confirmed the growth of *Aspergillus fumigatus* complex consistent with a diagnosis of mycetoma.

Follow-Up

Ms. B continued the nasal sinus rinses once daily. After three months, she developed facial pain in the right maxilla. Swab confirmed moderate growth of *Staphylococcus aureus*. This was treated with oral flucloxacillin. At this point there was no evidence of recurrence of the mycetoma. At eight months, the patient experienced further sinus pain. A follow-up CT showed recurrent moderate right maxillary antral mucosal thickening with aerated secretions, suggestive of infection (Figure 3). A revision endoscopic sinus surgery was performed to remove the diseased mucosa to allow healthy mucosa to regrow. Culture showed heavy growth of *S. aureus*, which was treated with oral erythromycin and prednisone.

Figure 3. Follow-up CT scan showing recurrent mucosal thickening



Discussion

Fungal ball sinusitis is a non-invasive form of fungal sinus disease that typically affects immunocompetent patients and is most often caused by *Aspergillus fumigatus*.^{2,3} While the

entity is well described in Asian and European populations,^{5,9} reports from Australasia remain scarce. To date, only one other case of paranasal sinus fungal ball has been described in New Zealand,¹⁸ specifically involving sphenoid sinus mycetoma presenting as a nasal septal abscess with associated bone erosion, underscoring the rarity of our case and its significance within the Australasian context.

The incidental discovery of maxillary sinus mycetoma in this patient highlights the diagnostic challenge, as clinical symptoms were vague. The declined referral from the public ENT department also shows that incidental findings are often considered inconsequential, yet they proved clinically relevant in this case.

Radiologically, the presence of unilateral maxillary opacification with central hyperdense foci and sinus wall sclerosis is highly suggestive of fungal ball sinusitis.^{1,7} While CT remains the gold standard for diagnosis, many cases are only identified during work-up for unrelated conditions, as in this patient following a trauma evaluation. This underlines the importance of maintaining a high index of suspicion for fungal disease when such findings are encountered, even in asymptomatic patients.

The patient's history of wisdom tooth extraction is notable, as several studies have linked prior dental procedures with subsequent development of fungal ball sinusitis.^{6,10-13} While a direct causal relationship cannot be proven in this case, the temporal association adds weight to growing evidence that dental history is a key risk factor. This has relevance in New Zealand, where dental extractions and implants are common but awareness of their potential association to sinus mycetoma remains low.

Finally, although fungal ball sinusitis is non-invasive, it carries the potential risk of progression to invasive disease if the host becomes immunosuppressed.¹⁶ For this reason, prompt diagnosis and treatment remain important. In regions such as Australasia, where the condition is rare, this case serves as a reminder to clinicians to consider fungal ball sinusitis in sinusitis refractory to antibiotic treatment.

This report encourages physicians to consider fungal ball sinusitis as a differential, particularly in immunocompetent female patients with a recent history of endodontic procedures.

Patient consent: Photos and case reports were produced with the patient's permission.

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