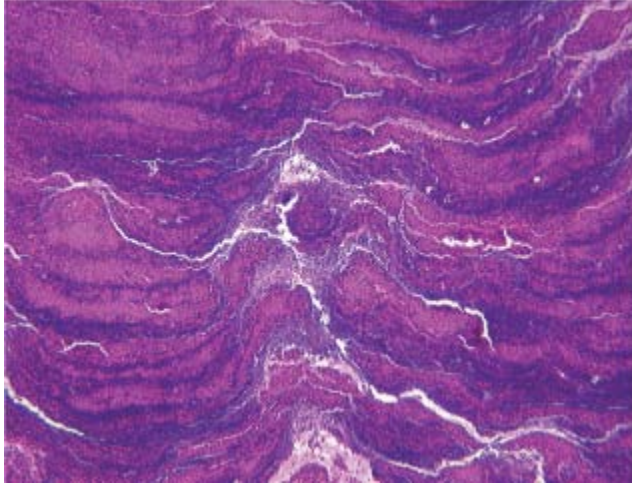


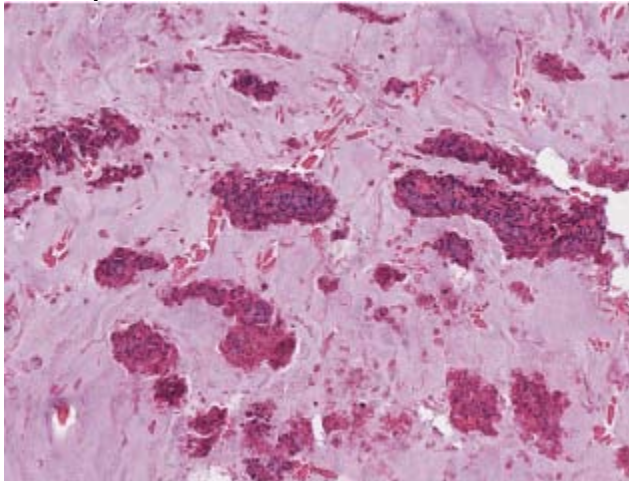
## Allergic fungal sinusitis

by Lester D. R. Thompson, MD

**Figure 1. The alternating tide-line appearance is quite characteristic of allergic fungal sinusitis. The degenerated mucinous material stains lighter than the cellular components.**



**Figure 2. The mucinous material serves as a background for the degenerating inflammatory cells. Note the numerous eosinophilic Charcot-Leyden crystals, a breakdown product from eosinophils.**



Allergic fungal sinusitis, also known as allergic mucin and eosinophilic fungal rhinosinusitis, is an allergic response in the sinonasal tract mucosa to aerosolized fungal allergens, amplified and perpetuated by eosinophils. The class II genes in the major histocompatibility complex are involved in antigen presentation and immune response (modulation), and an allergic reaction develops to inhaled fungal elements in immunocompetent people. *Aspergillus* species are the most common agents (widespread in soil, wood, and decomposing plant material), but *Alternaria*, *Bipolaris*, *Curvularia*, *Exserohilum*, and *Phialophora* species have also been reported.

The atopic host is exposed to finely dispersed fungi and develops an inflammatory response mediated by IgE. This results in tissue edema with sinus obstruction and stasis. The fungus

proliferates and increases antigenic exposure, creating a self-perpetuating cycle producing allergic mucin and possibly polyps.

Approximately 10% of patients with chronic rhinosinusitis or nasal polyposis have concurrent allergic fungal sinusitis. This rate is higher in patients with asthma, allergies (atopic), and allergic bronchopulmonary aspergillosis. It is interesting that the incidence of allergic fungal sinusitis is higher in warmer climates. Either sex will present between the third and seventh decades of life with chronic, unrelenting rhinosinusitis or a mass lesion. Within the sinonasal tract, the maxillary and ethmoid sinuses are most commonly affected. Atopy is frequently present, along with discharge, rhinorrhea, and headaches, while facial dysmorphism and proptosis are also reported. Patients frequently demonstrate peripheral eosinophilia and an elevated fungus-specific IgE level. Cultures will frequently identify the etiologic fungal agent, but the results are used only to conduct desensitization treatments.

The consistency of the polypoid fragments is like that of putty, grease, mud, or crunchy peanut butter, and they usually have a foul odor. "Mucinous" material is free-floating, unattached to the surrounding respiratory tissues. The most characteristic findings are the "tide lines," "tree rings," waves, or ripples created by an alternating pattern of mucin material and inflammatory debris, which appears as blue and pink (figure 1).

The degenerated material is composed of neutrophils, eosinophils, and mucinous debris. Ghost outlines of cells are common, along with nuclear debris. Charcot-Leyden crystals (degenerated eosinophils) are present as long, needle-shaped, or bipyramidal eosinophilic crystals (figure 2). In general, fungal elements are uncommon, and even when they are present, they are often difficult to detect. Therefore, the diagnosis is usually rendered without ancillary techniques to confirm the presence of fungal elements. If necessary, the hyphae can be seen with Gomori methenamine silver or a PAS light-green staining. It is important for the histologic examination to exclude invasive fungal sinusitis, in which fungal hyphae are identified within vessel walls or vascular spaces and which requires a completely different management approach; cultures are of value in determining antimicrobial sensitivities.

In general, management of allergic fungal sinusitis requires a combination of surgery and medical therapy to achieve the best long-term clinical outcome. Extensive debridement and complete evacuation of impacted mucin is the mainstay of therapy. Postoperative anti-inflammatory therapy and oral corticosteroids usually yield the best results. Although a good outcome generally can be achieved with integrated medical and surgical approaches, recurrences develop with fair frequency and must be diligently treated.

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## **Suggested reading**

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