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MOC-CME Review

Possible allergic fungal sinusitis

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INSTRUCTIONS

Credit can now be obtained, free for a limited time, by reading the review article in this issue and completing all activity components. Please note the instructions listed below:

- Review the target audience, learning objectives and all disclosures.
- Complete the pre-test online at http://www.annallergy.org (click on the CME heading).
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Release Date: April 1, 2016
Expiration Date: March 31, 2018
Target Audience: Physicians involved in providing patient care in the field of allergy/asthma/immunology
Learning Objectives:
At the conclusion of this activity, participants should be able to:

- Discuss recent advances in the diagnosis and treatment of allergic fungal sinusitis
- Discriminate between allergic fungal sinusitis and eosinophilic mucin rhinosinusitis

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Clinical Vignette

A 55-year-old African American man was referred by his otolaryngologist for further evaluation and treatment of probable "allergic fungal sinusitis" (AFS). The patient had a long history of chronic rhinosinusitis, although neither he nor his first-degree relatives had rhinitis, eczema, or asthma. He reported 3 previous endoscopic sinus surgeries spaced roughly at 3-year intervals. The recent revision sinus surgery leading to this referral was preceded by symptoms of nasal obstruction. A sinus computed tomogram showed postsurgical changes, complete opacification of the paranasal sinuses, and obstruction of the remaining components of the osteomeatal complex (Fig 1). There were areas of hyperattenuation in the ethmoid and maxillary areas bilaterally, which the radiologist commented, "suggest the presence of polyps or fungal elements." The bony margins of the sinuses were intact.

His most recent operative and surgical pathology reports were obtained for review. The surgeon reported that during functional endoscopic sinus surgery, he had attempted to remove all the mucoid material, thought to be eosinophilic mucin (allergic mucin) and polyps. The surgical pathology report confirmed the presence of eosinophilic mucin with dense accumulations of eosinophils in mucin containing Charcot-Leyden crystals (Fig 2). Numerous attempts to demonstrate fungal elements in the allergic mucin obtained directly from the sinuses by culture and appropriate fungal stains, including Gomori methenamine silver, were unsuccessful. A diagnosis was made and a treatment plan was developed.

Figure 1. Computed tomogram showing evidence of extensive previous endoscopic sinus surgery to open the osteomeatal complex. There is maxillary and ethmoid pansinusitis with nasal septal deviation to the left. Hyperattenuation of material (*white areas*) within the sinuses is present and most visible in the right ethmoid sinuses, suggesting the presence of eosinophilic mucin. The right nostril is completely obstructed by mucous or polyps. The orbits are intact and the frontal sinuses appear uninvolved.

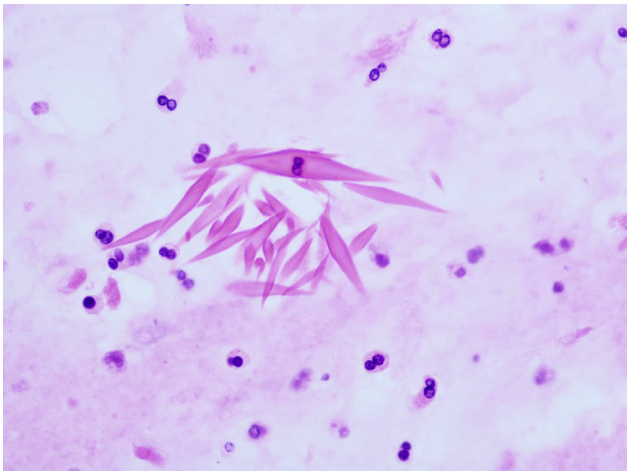

Figure 2. High-power photomicrograph of eosinophilic mucin showing dense accumulations of eosinophils and Charcot-Leyden crystals (hematoxylin and eosin stain, magnification ×100). No fungal elements (hyphae or hyphal fragments) were present here or on the required fungal stains.

Introduction

The pathophysiology of AFS is still debated. Most believe it reflects the same eosinophilic inflammation seen in the IgE-dependent late-phase allergic reaction best described in skin after injection of allergen and present in the bronchi in allergic fungal mycosis.[1] In AFS, the inflammatory response occurs within a closed space with access to cytokines that not only attract and activate eosinophils to perpetuate inflammation but also stimulate the production of large quantities of mucus. The fungal elements present in allergic mucin stain darkly with silver stains and are usually fragmented and nonviable. They have been postulated to present a persistent stimulus for ongoing IgE production and allergic inflammation. This hypothesis does not explain the mechanism by which eosinophilic mucus is produced when fungal elements are not present. Nonetheless, eosinophilic mucin can become an expansive inflammatory mass within the sinuses that can obstruct the osteomeatal complex, promote bacterial superinfection with probable superantigen functionality, and induce compression necrosis and breach of the boney sinus margins. Breaches of the sinus walls can result in serious complications outside the sinuses and result in the mis-diagnosis of invasive sinusitis.[2–4]

Confusion in the Medical Literature

Diagnostic Criteria for Syndromes of Fungal Sinusitis

Several years ago, to establish a contemporary classification of fungal sinusitis, the authors set out to establish evidence-based diagnostic criteria for the known forms. The results of that work were published in 1997 and have subsequently been used widely in the clinical management of patients with fungal sinusitis[5] (Table 1).