

**Acute, Chronic and Fungal Sinusitis from a Patient's Perspective
with Hands-on Management Tips-Part Two
(Continued from December 2007 Article of Interest)**

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To continue December's review of sinusitis, upper respiratory symptoms that persist for more than 12 weeks could represent IgE mediated disease. Appropriate history, skin testing or RAST testing can provide guidance. Other differential diagnoses include immune deficiency or autoimmune conditions. More often, when an upper respiratory illness that meets the criteria for systemic antibiotic fails to clear completely, alternate antibiotics (including anaerobic coverage) coupled with extended treatment duration are viable options.

What if symptoms persist or return soon after therapy has been completed? Recurrent sinusitis is defined as 3 episodes of sinusitis in 6 months or 4 episodes in 12 months. Management options include prophylactic antibiotic therapy begun quickly at the onset of a new URI or routinely taken once a day during peak viral season.⁴ For persistent symptoms, sinus CT imaging with or without rhinoscopy can provide valuable information in regards to possible anatomical obstruction of the osteomeatal complex. Remember that sinus CT scans are of little value during acute upper respiratory illnesses, as scans can demonstrate transient abnormal mucosal thickening with a common cold.

In terms of soft tissue obstruction associated with sinusitis, nasal polyposis is number one. Nasal polyps are pouches of mucosa that hypertrophy, often enlarging beyond the originating sinus and obstructing the drainage aqueducts. They are often associated with allergic rhinitis and frequently, aspirin hypersensitivity. They are infrequently associated with a carcinoid process, but when obstructive, must be reduced to promote adequate sinus drainage. Polyps can often be reduced with a 'medical polypectomy' via a burst of oral prednisone versus surgical intervention. Once polyps are reduced, routine preventive therapy is required to help prevent re-growth and to avoid frequent systemic steroids or repeat surgeries.

There is a unique subset of atopic individuals who have a common disease presentation which includes allergic rhinitis, asthma, aspirin hypersensitivity and nasal polyps. These individuals typically have difficult to control nasal polyps, sinus disease and asthma. Literature reports a significant improvement of both upper and lower airway disease for those who undergo aspirin desensitization. Depending on the severity of the aspirin reaction and degree of asthma control, aspirin desensitization is more commonly being performed in an office setting versus ICU⁹, which decreases cost to the patient and may be more comfortable, less frightening and therefore more appealing to the patient.

Fixed obstructions associated with sinusitis are more likely to require surgical intervention. Examples include severe and occlusive septal deviation, large conchae bullosa, obstructive sinus cysts, scar tissue or mass. Surgery, as a general rule, is a last resort: the more surgical revision of the sinus complex, the more likely that cilia motility

will be disrupted. In a normally functioning sinus, cilia move mucus in an ungainly bottom to top fashion, as the sinus ostia empty into the osteomeatal complex at the superior portion of the maxillary sinus. Anything that injures the cilia (mechanical or biochemical) hampers the body's ability to effectively move mucus. This promotes stagnant, thickened mucus which tends to become secondarily infected if not manually expelled such as with nasal lavage.

One condition which hampers mucus clearance and promotes chronic sinusitis is uncontrolled sarcoidosis of the sinus. This autoimmune disease causes inflammation of affected tissues. In the nose and sinus, upper respiratory cilia are eventually destroyed, resulting in wide scale scarring, distortion of sinus anatomy and recurrent infections. Atrophic rhinitis is characterized by sclerosed and scarred nasal anatomy with dysfunctional cilia. It can develop as a result of systemic illness but in the United States, is more often associated with multiple sinus surgeries. Genetically occurring motility disorders are less common and usually present with both upper and lower respiratory system symptoms.⁸

When fixed obstructions or aggressive interventional and preventive therapies fail to clear documented pansinusitis in immunocompetent patients, surgical intervention may be necessary. Having a good working relationship with your local ENT is 'priceless'- With experience, the otolaryngologist will likely have a good idea as to the underlying culprit pathogen based on the nature and quality of sinus secretions evacuated during surgery. This is especially important in identifying one of the most interesting and least understood causes of chronic rhinosinusitis: allergic fungal sinusitis or AFS.

Despite recent strides in obtaining a basic understanding of the pathophysiology of this fascinating phenomenon, a clear and concise explanatory snapshot remains elusive with two controversial theories: cell-mediated response versus an IgE-mediated hypersensitivity. Regardless, there are thought to be five distinctly unique forms of fungal sinusitis: three invasive and two non-invasive.^{11,12} All five have unique radiographic characteristics, pathology, treatment recommendations and prognosis. The three invasive forms are typically associated with immunocompromise in the form of uncontrolled diabetes, carcinoma, medication induced compromise such as during chemotherapy or with other immunosuppressive agents and acquired immunodeficiency conditions such as AIDS.

Recent articles by deShazo^{10,11}, Karuppiyah et. al.¹³ and literature review by Schubert¹² note that acute fulminant invasive fungal sinusitis and chronic invasive sinusitis have less favorable prognosis than granulomatous invasive fungal sinusitis. Prognosis for granulomatous invasive fungal sinusitis is typically good following surgical debridement, but can recur. The fourth type of fungal sinusitis (mycetoma or 'fungal ball') is frequently unilateral, non-invasive and has excellent prognosis following surgical revision.

AFS (ne Allergic Fungal Rhinosinusitis/AFRS not to be confused with eosinophilic fungal rhinosinusitis/EFRS or eosinophilic mucin rhinosinusitis/EMRS- although

everyone else is, so why shouldn't you?) and allergic bronchopulmonary mycosis (ABPM- formerly ABPA) have several unique commonalities which help define the diagnosis. These include the presence of fungal hypersensitivity and episodic expulsion of brown or black material called 'casts'. In 2002, similar and concomitant findings of these parallel diseases in 5 patients prompted Venarske and deShazo to suggest that this represented an expression of the same syndrome in both the upper and lower airway. The term sinobronchial allergic mycosis or SAM, was suggested.¹⁴

While diagnostic criteria for ABPM is well established, there have been several proffered diagnostic criteria for AFS. For the most part, the majority agree to the following:

1. abnormal sinus CT with multiple sinuses affected,
2. presence of allergic mucin in the sinuses,
3. presence of fungus demonstrated by Silver Stain, and
4. fungal hypersensitivity demonstrated by skin test or RAST in an immunocompetent patient with non-invasive chronic rhinosinusitis.

Most agree that nasal polyposis is strongly associated with AFS, as is elevated peripheral blood eosinophilia.

Allergic mucin alludes to the unique and particularly nasty brew of sinus debris consisting of dead and dying eosinophils typically evacuated from affected sinuses. According to deShazo, *N Engl J Med*, 1997, allergic mucin has been described as a foul smelling "brown or greenish black [material] with a texture resembling...peanut butter, cottage cheese or axle grease..."¹⁰ Typically, surgical specimens are submitted to pathology for microscopic evaluation. Because fungal elements are very difficult to identify using the more common eosinophil stain, fungal hyphae may be missed without specific inspection using Silver stain. The hyphae scarcity and difficulty in detection has played a role in some of the controversy regarding definition and diagnosis of AFS.

When considering a diagnosis of AFS, scrutinize the surgical pathology report which will typically indicate which stain was utilized. In our practice, we have not infrequently had to call the pathologist, ask them to pull the slide and re-stain with Silver stain to assist in making an accurate diagnosis. Slides fixed up to 3-5 years ago are still eligible for re-inspection. We have also had to ask for a slide review when comparing surgeon's notes and pathology report in order to differentiate between mycetoma and AFS patterning. As AFS becomes more commonly reported, appropriate staining and review should become less and less of a problem.

Management guidelines for AFS have not been firmly established, but common recurrence has been well documented. Most agree that desensitization to appropriate fungus, maintaining adequate sinus drainage (typically with nasal lavage) and routine use of intranasal corticosteroids is essential. Oral prednisone immediately following surgery and maintained for 2-4 weeks in addition to the above regimen seems to be helpful in establishing control in our practice. Systemic or intranasal antifungal therapy has not proven beneficial. Routine monitoring is paramount to detect recurrence early with rapid and aggressive therapeutic response needed to maintain control. Without patient diligence, second surgeries are common.

Nasal sinus lavage as noted above, refers to the manual practice of flushing the nose and sinus with isotonic or hypertonic saline solution. Although it may sound uncomfortable initially, nasal lavage has been practiced for hundreds of years and is well proven as an effective means of clearing nasal secretions. Not only does rinsing mechanically move mucus, but also provides an avenue to administer topical medications, such as nasal steroids or antibiotics. Currently, there are several over-the-counter resources utilizing squeeze bulbs and nasal syringes including NeilMed Sinus Rinse and Nasaline Nasal Irrigator, not to mention the original Neti-Pot or newer pulsing and non-pulsing electric compressors fitted with a nasal adapter. One medical supply company website listed 9 different types of irrigators and 2 different nasal tip adapters for irrigation systems including Water Pik brand and Interplak.
(<http://www.natlallergy.com/category.asp?c=39&bhcd2=1199770547>).

As an FYI, patients typically have some misgivings about starting nasal lavage, but after a few times, indicate phenomenal benefit. Veteran lavagers who outlive their compressor, will need to double check the compatibility of their adapter tip with any new irrigation system. Grosson has developed its own line of compressors available online under the name of Grosson Hydro Pulse irrigation systems; there may be compatibility issues between the Grosson nasal tip and newer Water Pik models. Other systems available include Hydro-Flo system by Ethicare and SinuPulse Elite Sinus Irrigation System by Health Solutions. An excellent patient educational resource can be found on the AAAAI website under Patients & Consumers (<http://www.aaaai.org/patients/publicedmat/sinusitis/rinse.stm>). It includes lavage technique tips and a recipe for mixing inexpensive saline solution. Typically, sinus lavage is performed once to twice a day, depending on patient status and if medication is being administered by this vehicle.

In conclusion, we speak of ‘controlling’ chronic rhinosinusitis rather than ‘curing’ it. Restoration of quality of life is paramount. Patients with chronic rhinosinusitis and AFS tend to cycle through the same emotional ‘grieving’ process as anyone else with a serious chronic disease. Until they ‘own’ their condition and the significance of its chronicity, long term remission will be difficult to achieve. Finding a regimen to provide relief of symptoms, prevent disease flare and that the average person can incorporate into every day life without breaking the bank is our top priority.