

## Fungal Sinusitis: Treatments Described

Read this interesting information by W. S. Tichenor, M.D., NY, NY on the topic of Sinusitis and Fungal Sinusitis. Many who are exposed to damp buildings have lingering sinus problems and this information may be of help. Formerly, Dr. Vincent Marinkovich successfully treated many sufferers, until his untimely death several years ago. We do not know of Dr. Tichenor's work, save for this very thorough website (SMH).

<http://www.sinuses.com/index.htm>

to see the Fungal Sinusitis info, scroll down

Sinusitis: A treatment plan that works for asthma and allergy too- WS Tichenor M.D.  
Sinusitis: A Treatment Plan That Works

for asthma and allergies too

sinusitis, allergy ,asthma, sinus infection,

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Sinusitis: A treatment plan that works for asthma and allergy too- WS Tichenor M.D.

This is an extremely comprehensive website which explores the symptoms and treatment of sinusitis, and other sinus diseases, as well as the interrelated problems of allergy and asthma. There is also information for physicians about sinusitis, as well as information about new techniques for endoscopic sinus surgery including images of the image guided surgery.

This information should not be construed in any way as being specific medical advice. All information contained in this website is supplied for general informational purposes. It should not be used as specific medical information for any individual, as such information can only be supplied by a physician. You should consult with a physician regarding any information contained within this website in order to obtain optimal treatment. If you

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Any comments on this site would be appreciated. Please send mail

to [wtichenor@sinuses.com](mailto:wtichenor@sinuses.com). We will attempt to answer as many

questions as is feasible personally, but are obviously limited

due to time constraints. Any items of general interest will be

included within the website.

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Fungal Sinusitis

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<http://www.sinuses.com/fungal.htm>

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An article published in the Mayo Clinic Proceedings in September, 1999 by the Mayo Clinic suggests that fungal sinusitis may be much more common than previously thought. The disease is now known as EFRS (eosinophilic fungal rhinosinusitis) or EMRS (eosinophilic mucinous rhinosinusitis).

Fungal growth was found in washings from the sinuses in 96% of patients with chronic sinusitis. Normal controls had almost as much growth, the difference being that those patients with chronic sinusitis had eosinophiles (a type of white blood cell involved in allergic and other reactions) which had become activated. As a result of the activation, the eosinophiles released a product called MBP (Major Basic Protein) into the mucus which attacks and kills the fungus but is very irritating to the lining of the sinuses. We believe that MBP injures the lining of the sinuses and allows the bacteria to proliferate.

The injury to the lining of the sinuses by the fungus and mucus led to the belief that treatment of chronic sinusitis should be directed at the fungus rather than the bacteria. Obviously the optimal treatment would address the reason the eosinophiles attack the fungus, however, at the present time, we do not know the reason.

There has been much speculation about why people develop the sensitivity to fungi. Some people believe that it is as a result of extensive use of antibiotics causing overgrowth of fungi. Others believe that it is the result of extensive exposure to mold and fungi in the environment, both due to water leaks from roofs and plumbing as well as more efficient homes with less air exchange. Needless to say it is important to fix leaks and repair damage immediately so that this exposure doesn't occur. None of these fully explain the problem, however.

Unfortunately the discussion above was not included in the original article by the Mayo clinic. As a result, the article was not well received initially. There was also no information about the success of treatment in the original article, and there was very little discussed about mechanisms. As more data has accumulated, there is more evidence that the problem may be as important as the Mayo Clinic suggests and the significance is starting to be accepted.

Prior to the Mayo group's work on fungal sinusitis, it was recognized that there were several types of fungal sinusitis, which we will discuss later in this webpage.

Whenever a new finding is discovered in medicine, it is often met with resistance. It becomes important for that finding to be confirmed by an independent group. This has now been accomplished by a well respected group from Graz, Austria. They were able to show positive fungal cultures in 92 % of their patients. Almost as many of the controls also had fungi. Clusters of eosinophiles were found around fungi in 94 % of patients. This is important because we believe that this shows that the eosinophiles are involved in attacking and killing the fungi.

The Mayo Clinic researchers have done elegant work on the interaction of eosinophils and fungi in patients with chronic

sinusitis. They have been able to film videos of eosinophils from patients with chronic sinusitis in which the eosinophils are shown attacking and killing the fungi, as contrasted to patients without sinusitis in whom the eosinophils will "sniff" the fungus (as Dr. Ponikau suggests) and then ignore it. Current techniques make it difficult for doctors who are not in research institutions to clearly determine that it is the fungus which is causing the problem. For example, it is possible to tell by electron microscopy that the degranulation of the eosinophile is in response to fungus. Unfortunately, however, there is not a good way to tell that the eosinophile is degranulating in response to the fungus by methods that most physicians can use. Those techniques are under investigation.

At the present time, patients are being treated with irrigation with topical antifungals such as Amphotericin B. The Mayo clinic has found that 75 % have an improvement. A paper was presented at the American Academy of Allergy, Asthma and Immunology meeting in 2004 which compared 6 months of irrigation with Amphotericin (250 micrograms/ml) vs. a placebo. There was a statistically significant difference in the amount of mucosal thickening on the CT scan as well as endoscopic scores. In addition there were changes in levels of interleukin-5 and eosinophil-derived neurotoxin. There has long been a concern that there were no double blind studies done on use of antifungal agents. This should help in that regard. The Mayo clinic is now recommending a concentration of 100 micrograms/ml, however.

A study has begun which will hopefully lead to the approval by the FDA of the first treatment for chronic sinusitis. This involves a new formulation of Amphotericin B. For more information on the study, please contact Accentia Pharmaceuticals. If you are in the New York area, you can contact our office (212-517-6611).

Itraconazole (Sporanox) can also be used topically, but it is very difficult to make up since most mixtures cause the itraconazole to be inactivated immediately. Although many pharmacies claim to be able to make up the itraconazole, almost all pharmacies are unable to make it up correctly and be able to ensure that there is active drug in the mixture. It must be made up by Anazao pharmaceuticals, Sinucare or JCB labs. (The Mayo clinic is no longer making up itraconazole.) (If your local pharmacy thinks that they are able to make it up, I would suggest that you insist that they provide you with an outside analysis that shows that there is active drug in the formulation.) Many patients require other agents such as nasal or systemic steroids, however many patients in the Mayo clinic trial were able to stop treatment with oral steroids.

Although when given intravenously there are serious side effects with Amphotericin B, topically it causes minimal problems. These can include burning due to the fact that it must be mixed with sterile water. It cannot be mixed with saline, and must be protected from light and refrigerated. It is therefore very inconvenient to use. More acceptable formulations are being evaluated. We anticipate that patients will need to be treated indefinitely, or at least until we understand better why these problems are occurring.

Some patients seem to respond to treatment with oral antifungals, including Sporanox, Diflucan, and possibly Nizoral or Lamisil. We are working on other treatments which we hope will be able to be used in the near future.

Because irrigation must get into the sinuses in order to be effective, it is often necessary for patients to have endoscopic sinus surgery before irrigation can be effective. It is possible that by using an irrigation device such as the Grossan irrigator, it will be possible to irrigate effectively without surgery.

Some doctors have added antifungals ( or antibiotics ) to the Grossan irrigator. One method is to add 1 tsp of salt ( or Breathease, or salt-baking soda solution ) to 500 cc of water in the Hydropulse and irrigate. When the solution is almost gone, it is possible to add the antifungal to the irrigation fluid and continue irrigating. The antifungal solution should not be added at the beginning because it may become too diluted.

It is speculated by some that since almost half of patients with EFRS have a positive allergy skin test for fungi or mold it may be possible to treat them by standard allergy management. Since we cannot allergy test for all of the fungi, it can be a difficult proposition, but we now test and give allergy immunotherapy for a much larger number of molds and fungi.

We are also concerned that fungal sinusitis may be caused or made worse by exposure to fungi in the environment, or by extensive antibiotic use. The literature now seems to indicate that patients with more exposure to fungi are more likely to develop markers suggestive of greater fungal sensitivity.

Prior to the reports from the Mayo clinic, fungal sinusitis was well known, but thought to be much less common. Those other types of fungal sinusitis are discussed below.

Patients who have repeated bouts of sinusitis, as well as those who are immunocompromised should be considered to possibly have a fungal sinusitis. A CT scan will sometimes show calcification, but MRI is more sensitive in diagnosis. Cultures are best obtained from the sinuses, as nasal cultures are unreliable.

Fungal sinusitis is broken down into several categories: Allergic, Fungus balls (Mycetoma), and Invasive.

Allergic fungal sinusitis (AFS) is commonly caused by *Aspergillus*, as well as *Fusarium*, *Curvularia*, and others. Patients often have associated asthma. The criteria include CT or MRI confirmation, a dark green or black material the consistency of peanut butter called "allergic mucin" which typically contain a few hyphae, no invasion, and no predisposing systemic disease. Charcot-Leyden crystals, which are breakdown products of eosinophiles are often found. Usually patients are found to be allergic to the fungus, although this is controversial. This disease is analogous to Allergic Bronchopulmonary Aspergillosis. This problem is most similar to the type described at the Mayo clinic, but these patients have a much different character to their mucus.

Fungus balls often involve the maxillary sinus and may present similarly to other causes of sinusitis including a foul smelling breath. In addition to radiological abnormalities, thick pus or a clay-like substance is found in the sinuses. There is no allergic mucin, but dense hyphae are found. There is no invasion. There is an inflammatory response in the mucosa. Upon looking into the sinus, the fungus ball can vary in size from 1 mm or smaller to a size which completely occupies the sinus. It may have a greenish-black appearance. Removal of the fungus ball is the typical treatment.

Invasive sinusitis can progress rapidly, and typically necessitates surgery, often on an emergent basis and often requiring Amphotericin B intravenously as well. There have been some forms of invasive sinusitis which can cause proptosis. There is a form of chronic invasive fungal sinusitis which is associated with visual abnormalities due to bony erosion from the ethmoids.

Fungal sinusitis should obviously be treated by someone with extensive experience in treatment of that disease.

We would suggest going from here to

Surgery - What to expect

or, if you have already had surgery to

Persistent Sinusitis Despite Surgery

or

Letters

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