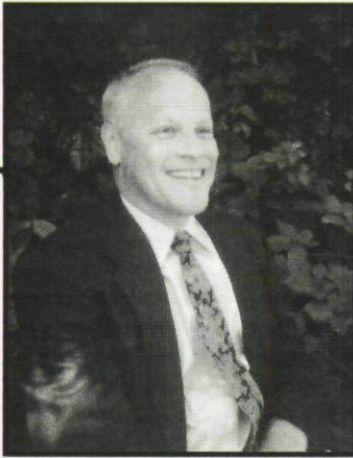


Literature Review & Commentary

by Alan R. Gaby, MD

email: drgaby@earthlink.com



Bromelain for sinusitis

Forty-nine patients with severe sinusitis (48 acute, 1 chronic) were randomly assigned to receive, in double-blind fashion, bromelain (Ananase®; 2 tablets 4 times a day) or a placebo for six days, in addition to antibiotics and

other standard medications. Eighty percent of the patients receiving bromelain had good-to-excellent improvement, compared with 50% of those given the placebo. Bromelain was significantly more effective than placebo in relieving nasal discomfort, breathing difficulty, and pain. Compared with placebo, bromelain also significantly reduced the mean duration of standard therapy (16 days vs. 10 days).

Comment: Bromelain is an extract of the stems of pineapples that has anti-inflammatory activity. It also appears to increase the permeability and reduce the viscosity of inflammatory exudates, thereby promoting normal drainage and enhancing access of antibacterial agents (e.g., antibiotics, antibodies, and other components of the system) to the site of an infection. The results of this study indicate that bromelain can increase the response to conventional therapy in patients with sinusitis. In some studies of people with other types of infections, bromelain was beneficial even when administered without antibiotics.

The product used in this study was an enteric-coated preparation that is no longer commercially available. Most of the bromelain products currently on the market are not enteric-coated, so it is possible that a substantial proportion of the biological activity of these products is destroyed by gastric juices after oral administration. Ananase contained 20 mg of bromelain per tablet, whereas modern products usually contain substantially larger amounts. There is little or no published research on the effectiveness of non-enteric-coated bromelain products.

Seltzer AP. Adjunctive use of bromelains in sinusitis: a controlled study. *EENT Monthly* 1967;46:1281-1288.

Is sinusitis caused by allergy to fungus?

Two hundred-ten consecutive patients with chronic sinusitis, of whom 101 were treated surgically, were studied. Fungal cultures of nasal secretions were positive in 202 (96%) of the patients. *Candida albicans* was cultured in 15.4% of patients, *Alternaria* in 44.3%, *Penicillium* in 43.3%, *Cladosporium* in 39%, and *Aspergillus spp.* in 29.5%; a wide range of other organisms were cultured less frequently. Allergic mucin (containing clusters or sheets of degenerating eosinophils) was found in 97 (96%) of the 101 surgical cases. Fungal elements (hyphae, destroyed hyphae, conidia, and spores) were found histologically in 82 (81%) of the 101 surgical specimens. Allergic fungal sinusitis was diagnosed in 94 (93%) of the 101 surgical cases, based on histopathologic findings and culture results. An elevated IgE level to at least one fungal species was found in only 28% of 95 patients tested, and skin-prick tests were positive to at least one fungal allergen in only 25% of 179 patients tested.

Comment: The results of this study suggest that, among patients with chronic sinusitis, allergy to common airborne fungi appeared to be a causative factor in at least 93% of cases. Conventional tests for fungal allergy (e.g., IgE levels and skin-prick tests) failed to detect fungal allergy in the majority of patients with allergic fungal sinusitis. The research group that performed this study subsequently demonstrated that patients with chronic sinusitis have an exaggerated immune response to airborne fungi (*J Allergy Clin Immunol* 2004;114:1369-1375). They have also reported, in open (*J Allergy Clin Immunol* 2002;110:862-866) and double-blind (*J Allergy Clin Immunol* 2005;115:125-131) trials, that intranasal administration of the antifungal drug amphotericin B resulted in clinical improvement and a reduction in mucosal thickening. In the open trial, of 51 patients treated, 75% improved and 35% became disease-free.

In my experience, some patients with chronic sinusitis show marked improvement after identifying and avoiding allergenic foods. A few patients have shown a dramatic response to intravenous nutrient therapy (the Myers' cocktail; see *Altern Med Rev* 2002;7:389-403).

Ponikau JU, et al. The diagnosis and incidence of allergic fungal sinusitis. *Mayo Clin Proc* 1999;74:877-884.

Glutathione aerosol for chronic lung disease

Nineteen patients (aged 6-19 years) with cystic fibrosis were randomly assigned to receive, in double-blind fashion, inhaled, buffered reduced glutathione (GSH) or placebo (sodium chloride with a hint of quinine) for 8 weeks. The treatments were administered 4 times a day (3 to 4 hours apart), for a total daily GSH dose of approximately 66 mg/kg of body weight. Primary outcomes were forced expiratory volume in 1 second (FEV₁), forced vital capacity, forced expiratory flow at 25-75% of vital capacity, and peak flow; secondary outcomes were body mass index, 6-minute walk distance, and self-reported cough frequency, mucus production, wellness, improvement, and stamina. The mean change for peak flow was -6.5 L/min with placebo and +33.7 L/min with GSH (p = 0.04). Self-reported mean improvement on a scale from 1 to 5 (1 being much worse and 5 being much better) was 2.8 for placebo and 4.7 for GSH (p = 0.004). Of the 13 primary and secondary outcomes examined, 11 favored the treatment group over the placebo group (p = 0.002), indicating a general tendency of improvement in the GSH group. No significant side effects of GSH were reported.

Comment: Glutathione is a major antioxidant in lung tissue. Patients with cystic fibrosis have markedly decreased concentrations of total (oxidized plus reduced) glutathione in the epithelial lining fluid of the lung. Anecdotal reports suggest that nebulized glutathione administered by aerosol can relieve symptoms and improve clinical outcome in patients with chronic obstructive pulmonary disease. The results of the present study indicate that glutathione is also beneficial for the chronic lung disease that occurs in patients with cystic fibrosis.

Bishop C, et al. A pilot study of the effect of inhaled buffered reduced glutathione on the clinical status of patients with cystic fibrosis. *Chest* 2005;127:308-317.

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