Evaluation of Manuka Honey in Management of Allergic Fungal Rhinosinusitis: A Case Report:

Introduction:

Chronic rhinosinusitis (CRS) is one of the most common disorders in the United states and Europe (1,2). It is estimated to affect nearly 15% of the US population and it is reported that its prevalence is increasing, thereby causing an increase in heathcare costs (3)). Allergic Fungal Rhinosinusitis (AFRS), a subtype of CRS, accounts for approximately 7% of all CRS patients requiring surgery (4,5,6,7). Many AFRS patients who have undergone functional endoscopic sinus surgery (FESS) continue to develop sinus disease (8,9) and depend on long term medical management with either steroids or antifungals, or both, for relief. Unfortunately, the side effects of these medications ultimately lead to their discontinuation and poor control of the disease.

Manuka honey is a natural product that has been shown to have antimicrobial and anti-inflammatory effects (10). We report two difficult to control, post-operative AFRS patients at our centre who used Manuka Honey irrigations twice a day for 12 weeks and showed significant endoscopic and symptomatic changes after treatment.

Case Presentation:

We present two patients diagnosed with allergic fungal rhinosinusitis, based on Bent and Kuhn's criteria, that underwent functional endoscopic sinus surgery (FESS) and at least one year of close follow-up and maximal medical management for their chronically recurrent AFRS. Both patients were treated with manuka honey irrigation for a 12 week period after failing maximal medical management. Each patient diluted 10cc of Manuka honey in 240 cc's of saline for a final honey concentration of 4%, and irrigated each nasal cavity twice a day (120 cc per side twice a day). Both patients completed a 22 item sinonasal outcome test (SNOT-22) (11) before and after the 12 week treatment course. Each patient had pre-treatment appointments and subsequent appointments at 6 weeks and 12 weeks to endoscopically examine and grade their sinuses.

Case 1:

A 71 year old male patient presented to our clinic with a 3 year history of nasal congestion and discharge, anosmia, and facial pressure. 7 months later, he underwent meticulous computer assisted FESS at our hospital. After surgery, the patient was started on budesonide saline irrigation rinses twice a day. Despite the steroid rinses, he continued to have sinus infections and developed polyps bilaterally in his nasal cavities. He had a subsequent polypectomy and was treated with undiluted Pulmicort irrigations for 9 months without any improvement in endoscopic staging (Table 2). Manuka honey in saline rinse as described above was added to his ongoing undiluted budesonide irrigation treatment. At 12 weeks the patient was symptom free, and endoscopic examination showed no polypoid edema or allergic mucin (Fig 1).

His SNOT-22 scores after 12 weeks of Manuka honey and budesonide irrigation showed a significant improvement in sense of smell. His prior complaints of thick nasal discharge, ear fullness, dizziness, fatigue and reduced productivity resolved completely (Fig 2).

Case 2:

A 31 year old man with a history of severe asthma was referred to our clinic by a local ENT specialist for surgical treatment of nasal polyps and radiologic evidence of orbital erosion of sinus disease. The patient had suffered for 3 years with sinus pressure, thick nasal discharge, and difficulty breathing through his nose.

He subsequently underwent complete FESS. He had a 3 week period of sinus relief following surgery, but at his 4 week follow up, he began complaining of severe nasal congestion. His endoscopic examination showed increasing sinus disease with a Kupferberg et al. staging of IIIb bilaterally. Budesonide saline irrigations and a 10 day course of oral prednisone were started immediately. At the subsequent 12 week follow up, he continued to compain of facial pain and nasal obstruction despite topical management. He had no improvement in sinus symptoms and his asthma progressively worsened in the next several months requiring several courses of oral prednisone.

Budesonide saline rinses were switched to undiluted budesonide irrigations for two months without any improvement. Oral itraconazole was added to the undiluted budesonide irrigations regimen and showed significant improvement in symptoms and endoscopic examination (Table 2). However, after 12 weeks of treatment, itraconazole had to be discontinued due to an increase in liver enzymes. The patient's symptoms once again worsened after discontinuing the itraconazole. Since all prior medical treatments had failed, Manuka honey saline irrigation was added to the undiluted budesonide irrigations. After 12 weeks, the patient's symptoms (Fig 3) and endoscopic examination (Fig 1) improved drastically.

His SNOT-22 scores after 12 weeks of honey irrigation showed a significant drop in symptoms from moderate to very mild for nasal obstruction, sense of smell and nasal discharge. Post-treatment SNOT-22 scores showed improvement in sleep, increased concentration, and improved mood.

Discussion:

Allergic Fungal Rhinosinusitis is defined by Bent and Kuhn using the following diagnostic criteria: a) type I hypersensitivity to fungi, b) nasal polyposis, c) characteristic radiographic findings, d) esosinophilic mucin and e) postive fungal stain of sinus contents without fungal invasion into sinus tissue (5). Based on this, studies have show a prevalence of approximately 7% for all sinusitis patients undergoing FESS (4, 5, 6, 7).

At present, there is no long-term successful treatment for AFRS. A combination of meticulous surgery followed by long term follow-up and medical treatment are currently used to manage the disease and delay recurrence (9,12,13,14). Steroids have been the mainstay in the first line treatment to prevent recurrence (9,12). Topical antifungal

treatment and immunotherapy are also used but with variable clinical efficacy (9, 15, 16). Despite maximal treatment, the recurrence rate of nasal polyps and esosinophilic mucin remains unacceptably high (8, 9). There is a clear need for a better understanding of this disease and for the development of alternative non-steroidal therapies.

To date, there has been minimal success in finding alernative therapeutic agents with good efficacy for treating AFRS. The effectiveness of a possible alternative therapeutic agent is dependent on its ability to reduce inflammation as well as to eradicate the underlying pathogens.

One agent that has been used for centuries to treat non-healing wounds, infections and other ailments has been honey (10). Honey has been shown to inhibit the growth of a wide range of bacterial, fungi, protozoa and viruses (10,17,18). Several published clinical cases have shown honey to be effective in treating wounds infected with MRSA, Pseudomonas, Staphylococcus aureus and Enterococcus (19-22). The anti-microbial property of honey is due to several important ingredients including hydrogen peroxide produced by honey, glucose oxidase and flavonoid pinocembrin (22). A recent study that fully characterized medical-grade honey found that sugar, hydrogen peroxide, methylglyoxal, and bee defensin-1 peptide possessed antibacterial activity within some forms of honey(23).

Besides its antimicrobial properties, honey can clear infection in a number of ways, including boosting the immune system, having anti-inflammatory and anti-oxidant activites and via stimulation of cell growth (10,24). Studies have demonstrated that low concentrations of honey can stimulate the proliferation of lymphocytes in cell cultures, activate phagocytes in blood (25), reduce the deleterious effects of reactive oxygen species during prolonged inflammation (26).

Manuka honey has been used in various clinical applications for many years. It is sterilized by gamma-irradiation, which does not reduce its activity (27). It has been extensively used in treating non-healing wounds like venous leg ulcers, first and second degree burns, and surgical wounds (28). Recent study with rabbit models showed no evidence of histological epithelial injury to nasal respiratory mucosa with application of manuka honey solution (29).

The cases presented here suggest that Manuka honey can be considered as a potential treatment for patients suffering from AFRS who have failed all alternative treatment regimes. More research using double blinded trials for chronic sinusitis, AFRS and post op cystic fibrosis patients are being conducted at our centre and will be reported on shortly.

References:

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Table 1: Demographics

Patient	Age	Sex	ASA Allergy	Asthma	CA Hx	CT	IgE	Fungus	Eosinophil count	FESS
1	73	M	0	0	0	Bilateral	8	none	0.2	21-Sep-06
2	33	M	0	3	0	Bilateral	2895	Aspergillus	0.2	16-Jan-09

Table 2: Staging results of medical treatments

Patient 1	Week 0		Week 4		Week 12		
	Staging		Staging		Staging		
Treatments	R	L	R	L	R	L	Remarks
Pulmicort MAD	IIIb	IIIb	IIIb	IIIb	IIIb	IIIb	
Honey Irrigation	IIIb	IIIb	IIIa	IIIa	0	0	

Patient 2	Week 0		Week 4		Week 12		
	Staging		Staging		Staging		
Treatments	R	L	R	L	R	L	Remarks
Pulmicort Irrigation	IIIb	IIIb	IIIb	IIIb	IIIb	IIIb	2 courses of pred rescue
Pulmicort MAD	IIIb	IIIb	IIIb	IIIb	n/a	n/a	did not complete treatment, 1 course of prednisone

Sporanox	IIIb	IIIb	IIIa	IIIa	IIa	IIa	stopped b/c of increased LFT, symptoms returned
Honey Irrigation	IIIb	IIIb	Ia	Ia	0	0	

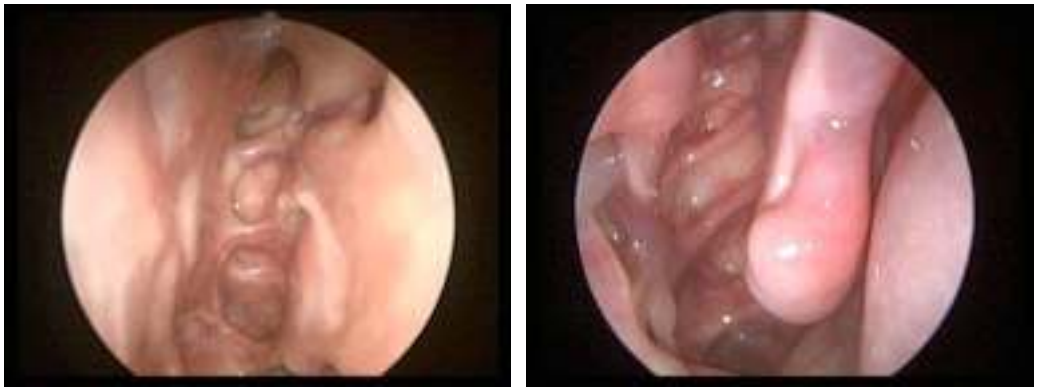


Fig 1. Endoscopic images of the sinus cavities. Top Left: Patient 1 before honey treatment. Bottom Left: Patient 1 after 12-weeks of honey treatment. Top Right: Patient 2 before honey treatment. Bottom Right: Patient 2 after 12-weeks of honey treatment.

Fig 2.

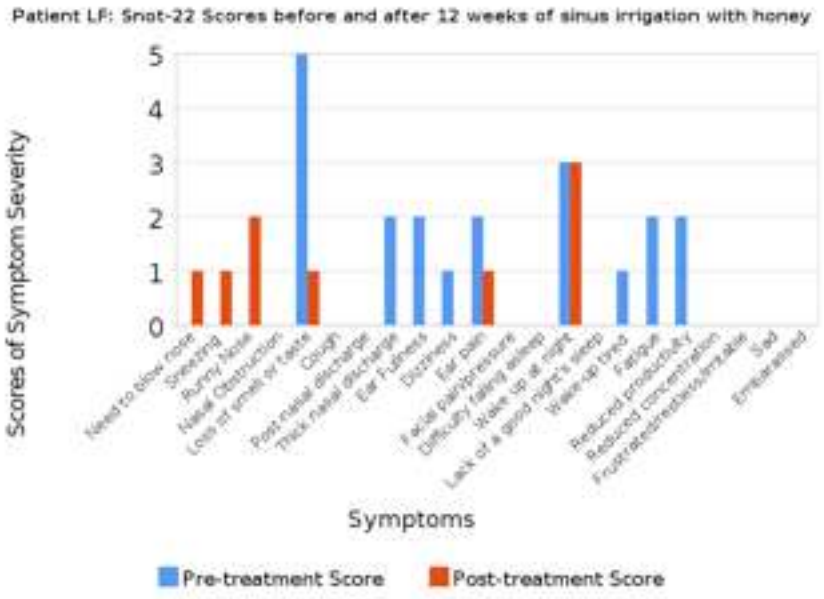
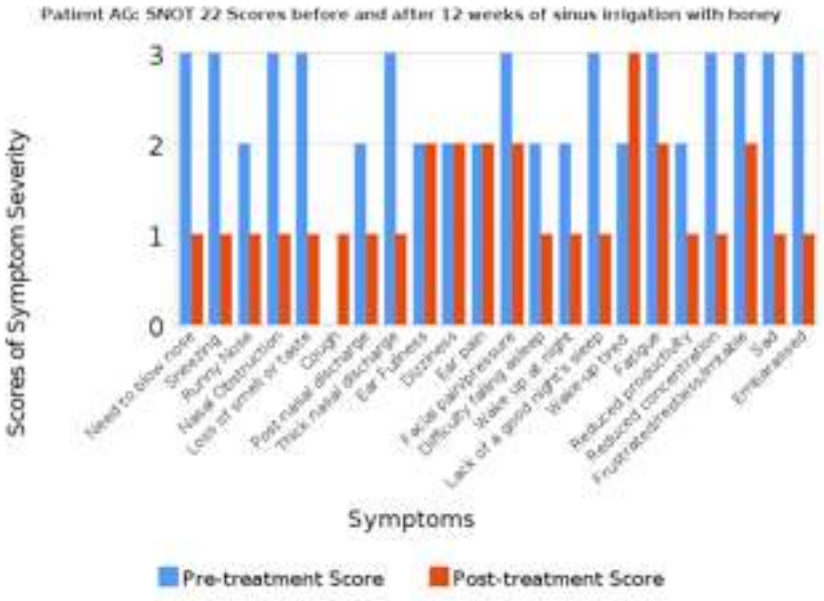

Patient LF: Snot-22 Scores before and after 12 weeks of sinus irrigation with honey
Scores of Symptom Severity
0
1
2
3
4
5
Need to blow nose
Sneezing
Runny Nose
Nasal Obstruction
Loss of smell or taste
Cough
Post nasal discharge
Thick nasal discharge
Ear Fullness
Dizziness
Ear pain
Facial pain/pressure
Difficulty falling asleep
Wake up at night
Lack of a good night's sleep
Wake up tired
Fatigue
Reduced productivity
Reduced concentration
Frustrated/restless/irritable
Sad
Embarrassed
Symptoms
Pre-treatment Score
Post-treatment Score

Fig 3.


Patient AG: SNOT 22 Scores before and after 12 weeks of sinus irrigation with honey
Scores of Symptom Severity
0
1
2
3
Need to blow nose
Sneezing
Runny Nose
Nasal Obstruction
Loss of smell or taste
Cough
Post nasal discharge
Thick nasal discharge
Ear Fullness
Dizziness
Ear pain
Facial pain/pressure
Difficulty falling asleep
Wake up at night
Lack of a good night's sleep
Wake up tired
Fatigue
Reduced productivity
Reduced concentration
Frustrated/restless/irritable
Sad
Embarrassed
Symptoms
Pre-treatment Score
Post-treatment Score