Introduction

Acute Rhinosinusitis
- Sudden onset of symptoms (<12 weeks) include anterior/posterior mucopurulent discharge PLUS nasal obstruction/pressure/pain
- RS is the 5th most common diagnosis in the U.S. for which antibiotics are prescribed
- Typically viral etiology, but can be bacterial, fungal or allergic
- Regardless of etiology, antibiotics are prescribed to 85-98% of patients in the US

Antibiotics
- Antibiotics have been the standard treatment for Acute Rhinosinusitis even though the typical etiology is viral². With the rise of antibiotic resistant organisms, exploring other potential treatment options is important and necessary.

Physical activity
- Physical activity has long been known to improve the general health of individuals who routinely engage in it¹.
- Several recent studies have shown that consistent physical activity can improve the course of several chronic diseases such as cancer¹, diabetes¹, and heart disease¹.
- We hope to determine if chronic physical activity can improve the course of acute cases of rhinosinusitis.

Hypothesis

Our hypothesis is that a recent history of routine physical activity will reduce symptom severity, time to symptom resolution, and inflammatory markers in patients with acute rhinosinusitis in comparison to patients who do not routinely exercise.

Methods

Patients reporting to the clinic with nasal obstruction or facial pain/pressure/fullness AND anterior or posterior mucopurulent drainage were enrolled as patients with acute rhinosinusitis. Patients presenting to the clinic without those symptoms were enrolled as healthy controls. Patients were then asked to report their level of physical activity within the last 6 months and were divided into only 4 groups based on level of physical activity. Patients then monitored and recorded their symptoms every morning and evening for 1 week using the SNOT-20 questionnaire.

Demographics

Physical activity categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Amount of physical activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimal Physical Activity</td>
<td>&gt;30 minutes a week</td>
</tr>
<tr>
<td>Mild Physical Activity</td>
<td>30 minutes 1-2 days a week</td>
</tr>
<tr>
<td>Moderate Physical Activity</td>
<td>30 minutes 3-4 days a week</td>
</tr>
<tr>
<td>Heavy Physical Activity</td>
<td>&lt;1 hour 4 or more days a week</td>
</tr>
</tbody>
</table>

Patient eligibility

Inclusion Criteria
- Ages 18-70
- Presenting with acute RS
- OR healthy (control)
- Independently read the informed consent form

Exclusion Criteria
- Temperature ≥102°F
- Used topical antibiotics within last 30 days
- Taken oral antibiotics within last 15 days
- Has a comorbidity, taking antibiotics or antiviral therapy
- Needs to be hospitalized
- Is currently pregnant, nursing or suspects they may be pregnant
- Bone fractures to the face or neck
- Visible nasal polyps, abscesses, ulcers

Setting

The study is being performed at two sites of a direct-payment outpatient clinic. Both sites are in the same mid-sized, manufacturing and industrial, rural town.
The Effects of Routine Exercise on Acute Rhinosinusitis

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Results

Figure 1. The effect of physical activity level on IL-6 in patients with and without acute rhinosinusitis. Patients with and without acute rhinosinusitis were enrolled in the study. Blood was drawn at the time of presentation, and systemic IL-6 levels were determined via ELISA. Patients also reported their level of physical activity within the last 6 months. Data is represented as a mean ± SD. * indicates a p-value of 0.05

In looking at the IL-6 cytokine when patients were first enrolled in the study we did find that baseline levels of IL-6 were decreased as engaged in greater levels of physical activity. This information is consistent with the current literature which shows that healthy individuals have lower levels of chronic inflammation. However, there was no statistically significant difference between healthy controls and sick patients within the same physical activity group.

Figure 2. The effect of physical activity level on symptom severity during acute rhinosinusitis. Patients with and without acute rhinosinusitis were enrolled in the study. Patients reported their level of physical activity within the last 6 months. Patients were also asked to report their symptom severity using the SNOT-20 questionnaire. This is a 20 parameter questionnaire that ranks symptoms in a score of 0-5 where 0 is "not a problem at all" and 5 is "the worst possible." The scores are then added together with a total possible total symptom score (TSS) of 100. Data is represented as a mean ± SD. * indicates a p-value of 0.05

There is a statistically significant difference in symptom severity in patients with acute rhinosinusitis for every level of physical activity. In addition, the average TTS was similar across all exercise groups. This result indicates that in terms of the patients perceived symptom severity, a history of exercise does not significantly effect how patients feel when initially diagnosed with acute rhinosinusitis.

Results Continued

Figure 3. The effect of facial effleurage on patients with different physical activity levels during acute rhinosinusitis. Patients with and without acute rhinosinusitis were enrolled in the study. Patients reported their level of physical activity within the last 6 months. Patients were also asked to report their symptom severity using the SNOT-20 questionnaire. This is a 20 parameter questionnaire that ranks symptoms in a score of 0-5 where 0 is "not a problem at all" and 5 is "the worst possible." The scores are then added together with a total possible total symptom score (TSS) of 100. The patients were then randomized into one of 8 treatment groups. Some groups received antibiotics. Some groups received Facial Effleurage. Some groups received a sham treatment called physical touch control. One hour after treatment began, the post-treatment TSS was collected. The post-treatment TSS was subtracted from the pre-treatment TSS for each patient. Data is represented as a mean ± SD. * indicates a p-value of 0.05

The larger decrease in TSS indicates a greater resolution of symptoms after 7 days. As shown, patients in the facial effleurage groups showed the greatest symptom reduction. Among those patients, most patients with more than minimal physical activity had the greatest reduction of symptoms.

Discussion

Ultimately, more data is needed before drawing definitive conclusions. However, we are seeing data that corresponds with the literature indicating a decrease in chronic inflammation and general feelings of malaise in healthy individuals who have higher levels of routine physical activity. We are also seeing some encouraging signs that more than minimal physical activity can aid in the resolution of symptoms in acute rhinosinusitis. When collecting our data, one of the biggest weaknesses was the fact that patients self report their level of physical activity. This can easily lead to patients exaggerating their activity levels as well as confusion regarding different definitions of physical activity. However, we hope that by have fairly broad categories for physical activity we can minimize these reporting errors.

References
