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Adding Osteopathic Intervention to Albuterol Nebulization in Ambulatory Asthma Exacerbations

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Citation

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Abstract

Background: Asthma is a chronic obstructive airway disease affecting children and adults world wide. Patients often seek alternative therapies.Objective: We conducted this study to describe osteopathic manipulative treatment (OMT) as an adjunct to traditional therapies in acute asthma exacerbation.Methods: A sample of previously diagnosed asthma patients who were having an acute asthma exacerbation were offered to receive OMT treatment as an adjunct to traditional modalities of treatment for acute exacerbation. Each patient was given an albuterol nebulizer treatment followed by an accepted OMT technique known as “rib raising” maneuver for five minutes. Peak flows were obtained before and after each treatment. Each patient was asked to fill out a symptom score diary rating their asthma symptoms before nebulizer treatment, after nebulizer treatment and after OMT.Results: The data showed an average increase in peak flow rates after nebulizer treatment was 36 L/min with a further average increase in peak flow after OMT of 18 L/min with a net increase of 54 L/min (ANOVA, $p<0.05$). OMT was not associated with any adverse effects or complaints. Study patients reported that the combined nebulizer and OMT treatments made them feel better than in the past when they were offered only traditional albuterol nebulizer treatments. Conclusion: Patients treated for acute asthma exacerbation with nebulizer treatment followed by osteopathic treatment (rib raising maneuver) showed significant improvement in their overall breathing. Unfortunately, lack of a control group in which there would be nebulizer treatment plus no osteopathic treatment makes it uncertain whether this OMT treatment had more than a placebo effect. However, since more patients request alternative therapies more research in OMT techniques should be considered. Offering osteopathic treatments as adjunct to traditional asthma treatment in an acute setting appears to have no adverse effects and may have psychological benefits.

INTRODUCTION

Asthma is a chronic illness affecting children and adults worldwide.[1] There are approximately 14 million asthmatics in the United States today.[2] In 2000, asthma accounted for 1.8 million emergency room visits and 10.4 physician office visits for all age groups.[3] Additionally, it has been associated with increased mortality and morbidity incidence for the past two decades and it is the number one reason for missed school days in children.[4, 5]

Asthma treatments and maintenance medications include inhaled corticosteroids, short-acting inhaled beta-agonists, long acting beta-agonists, leukotriene blocker and oral steroids.[6] Patients with uncontrolled asthma encounter increased direct and indirect costs, including medications, hospitalizations as well as days lost from work.[7,8] Patients unhappy about using daily prophylactic medications and rescue medications often seek alternative therapies.

Osteopathic approach to asthma management is gaining acceptance among medical communities in Europe as well as the United States.[9] Osteopathic manipulative treatment (OMT) is a non-invasive mode of treatment utilized by osteopathic physicians.

In treating asthma, a physician has to consider the respiratory system and its components. The lower respiratory system includes the trachea, bronchioles, alveoli of the lungs, the pleural cavity and the pulmonary circulatory system allowing for gas exchange upon inhalation and exhalation. It is held together by the thoracic cage which includes the ribs, sternum, thoracic spine; clavicles along with the muscular diaphragm separating the thoracic cavity form the abdomen.[10] Osteopathic manipulative treatment focuses in the musculoskeletal system and the over all well being of the patient therefore, by applying the manual contact to the thoracic region will maintain the best possible respiration for patients.[10] Asthmatic patients exposed to

irritants and allergens that cause an asthma attack will trigger an inflammatory response. IL 4, IL9, and IL 13 are believed to play in role in the first phase by stimulating the production on IgE which bind to mast cell receptors.[11] IL5 causes eosinophils to mature and accumulates in lung tissue. [11] These cells produce potent mediators that are damage the surrounding tissues causing inflammation and hyper-reactivity of the airways, which clinically result in shortness of breath, wheezing and anxiety. OMT focuses on stimulating the rib cage muscles by applying pressure to the thoracic region which are postulated to stimulate the thoracic sympathetic chain ganglia and mobilizing the ribs will therefore enhance respiration.[10, 10]

With worsening asthma symptoms patients are often in emotional distress and many find that by simply touching them they experience a relaxing effect.[10]

There are very few studies performed evaluating osteopathic manipulative treatment effects on asthma. One study by Bockenhauer et al.[9] used four osteopathic manipulative treatment techniques that included 1) balanced ligamentous tension in the occipitoatloid and cervicothoracic junctions[12], 2) A. T. Still's technique for upward displacement of the first rib[13]

3) direct action release of the lower rib and 4) the diaphragmatic release This study showed no statistically significant effects on asthma outcomes.[14] Another study by Guiney et al examined the effects of OMT in pediatric asthma using one of the three osteopathic manipulative treatment techniques that included 1) rib raising, 2) muscle energy, 3) myofascial release, and was associated with statistically significant improvements in peak flow rates.[1]

We performed this study to determine the effectiveness of an osteopathic manipulative treatment used as an adjunct to traditional therapy to treat acute asthma symptoms.

METHODS

This study was conducted over a ten month period in an outpatient specialty clinic setting in New York City. All patients have been previously diagnosed with asthma and allergies by our clinic physicians according to the guidelines from the National Institute of Health – National Heart, Lung and Blood Institute.[6] Subjects consisted of adult(>=18 years of age) asthmatic outpatients seeking treatment of acute asthma exacerbations. Patients who were unwilling to undergo Osteopathic Manipulative Treatment, rib raising technique, could not perform peak flow testing, or had a history of back pain or arthritis were not recruited.

Subjects were interviewed and examined informed consent was obtained. After an initial nebulization treatment of 2.5 mg albuterol, subjects received an Osteopathic Manipulative Treatment known as "rib raising" maneuver for 5 minutes. The procedure for this maneuver is described in an osteopathic textbook Foundation for Osteopathic Medicine.[15] Peak flows were measured before albuterol nebulizer treatment, after albuterol nebulizer treatment, and after OMT. Subjective data from each patient was then collected. All patients were asked to fill out symptom scores rating their asthma symptoms before albuterol nebulizer treatment, after albuterol nebulizer treatment, and after OMT using a scale of 1(none) to 5(very severe). The entire process took 30 minutes to complete. In addition, the patient was asked after OMT how his/her breathing had changed in the past 30 minutes using a scale of 1(complete improvement) through 5(no relief or improvement).

STATISTICAL ANALYSIS

Changes over time for peak flows were analyzed using repeated measured ANOVA. Mean differences and 95% confidence intervals were calculated.

RESULTS

45 patients were treated. Each patient filled out a symptom score diary as well for subjective data.

Analysis of the mean difference improvement in peak flow rates after albuterol nebulizer treatment was 36 L/min. The mean difference in peak flow after the OMT was 18 L/min.Subjective data analysis (figures 1 and 2) reported by patients showed improvements in their overall breathing. All patients reported feeling more relaxed and were able to take deeper breaths after OMT. Additionally, figure 2 showed moderate symptom score improvement after both albuterol nebulizer treatment and OMT. 25 of 45 patients reported moderate improvement in their asthma symptoms after both treatments. No adverse effects were reported during the procedure.

The results showed that with OMT addition to standard albuterol nebulizer treatment, there was a significant overall peak flow rates improvement over time in the subjects treated ($p<0.05$). The overall difference from PF Post OMT minus the Initial PF showed a Mean difference (SD) value of 54 (47.7).

Figure 1

Table 1.

Mean Peak Flow (PF) Rates (L/min) for Adult Patients with Acute Asthma Exacerbation Before and after Treatment Protocols N = 45		
	Mean (SD)	Mean (SD) Difference
Initial PF	339 (118)	
Post Nebulizer PF	375 (162)	
Post OMT PF	393 (207)	
Post Nebulizer Treatment (PF Post Neb - PF Initial)		36 (44.9)
Post OMT Treatment (PF Post OMT - PF Post Neb)		18 (26.4)
Overall Difference (PF Post OMT - PF Initial)		54 (47.7)

Figure 2

Figure 1.

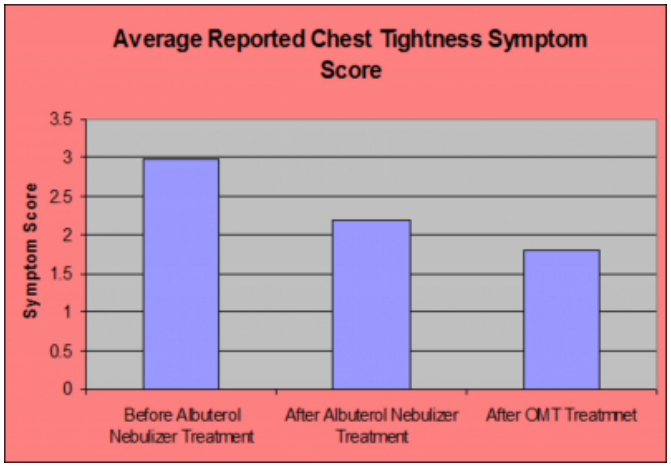
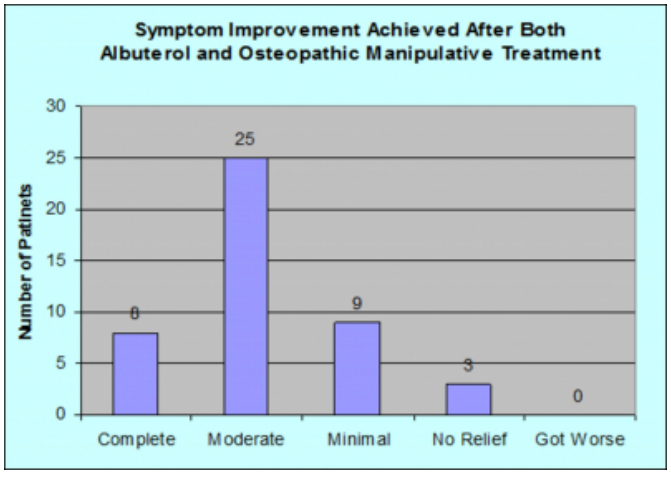


Figure 3

Figure 2.



DISCUSSION

Osteopathic principals stress the importance of the overall well being of patients.[1] Review articles on osteopathic medicine have shown that osteopathic manipulative techniques increase rib cage mobility, vital capacity, diaphragmatic function; help with removing secretions from the lungs as well as assisting in autoimmune function.[4] Osteopathic treatments of asthma aim to enhance movement of the rib cage and the thoracic spine increasing blood flow to the lungs improving respiration.[1] A study by Albones et al. [16] performed on children in Australia showed improvement in lung function after using a rib raising technique.

Furthermore, osteopathic physicians employ patient education in conjunction with manual therapies of the musculoskeletal system to optimizing its motion results in an overall better function.[1] Our study added rib raising technique after one albuterol nebulizer treatment. Statistically significant results showed that OMT may be beneficial in acute asthma exacerbation.

This study demonstrated that after nebulizer and a single osteopathic treatment (rib raising) the overall breathing for all the patients improved ($p<0.05$). All of our patients reported feeling more relaxed with less chest tightness after the post-nebulization rib raising maneuver was performed. Moreover, osteopathic manipulative treatment together with traditional albuterol nebulizer treatment was associated with improved expiratory peak flow in the acute asthma exacerbation setting.

The major limitation of our study is the lack of a control group which in this case would be nebulizer treatment plus no osteopathic treatment or sham treatment Also only one osteopathic manipulative maneuver was used (the rib raising technique), which is in contrast to multiple techniques often used in osteopathic medicine to treat a single problem such as asthma.[9] However, the rib raising osteopathic technique that we studied was not only well tolerated by our patients but “rib raising “ is also commonly taught in osteopathic schools and is published in osteopathic textbooks.[10] Due to the paucity of research on the effects of osteopathic manipulative treatments on asthma, standard guidelines have not been established for employing this modality for this disease. More research needs to be conducted to investigate OMT role in asthma as well as its effects on asthma symptoms in acute setting.

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