



ASTHMA AND ALLERGIC RHINITIS AMONGST CHILDREN HAVING CELIAC DISEASE.

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ABSTRACT... Objectives: Relationship amongst celiac disease (CD) and lung diseases has been discussed in the past. Studies have documented that CD is linked with lung diseases. CD has also been described to complement asthma. This study was planned to document the prevalence of asthma as well as allergic rhinitis in confirmed cases of CD and conducted pulmonary function testing in children aged 5 to 16 years while comparing them with controls. **Study Design:** Cross sectional study. **Setting:** Department of Pediatrics Medicine, Children Hospital Chandka Medical College / Shaheed Mohtarma Benazir Bhutto Medical University, Larkana. **Period:** From 1st January 2018 to 30th June 2018. **Material & Methods:** We enrolled 50 confirmed cases of CD along with 100 controls with non specific abdominal pain. All were aged 6 to 16 years, of both genders. Demographics as well as questions related to asthma and allergic rhinitis were noted. **Results:** Amongst a total of 150 children, 61 (40.7%) male and 89 (59.3%) female. Overall mean age amongst children was 9.80 years with standard deviation of 2.6 years. A total of 40 (26.7%) children who had weight below the 3rd percentile while 36 (24.0%) had height below the 3rd percentile. Most children, 82 (54.7%) had normal BMI. Weight below the 3rd percentile and height below the 3rd percentile were of statistical significance as children with a weight and height below the 3rd percentile were significantly higher in the CD group (P = 0.026 and P = 0.005, respectively). Asthma and allergic rhinitis characteristics were not much different between the two groups (p > 0.05). The Pulmonary function test (PFT) results showed that 7 (14.0%) cases with CD and 12 (12.0%) controls had obstructive pulmonary changes (p > 0.05). **Conclusion:** Rates of Asthma and allergic rhinitis in children having CD were not significantly higher in comparison to controls. No linkage between asthma and allergic rhinitis symptoms was seen children having CD.

Key words: Asthma, Allergic Rhinitis, Celiac Disease, Pulmonary Function Test.

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INTRODUCTION

Celiac disease (CD) was initially discussed in 1887 and is known to be a life-long autoimmune disease. CD is described as damage to the mucosa of small intestinal subsequent to the ingestion of gluten-foods in those individuals who are genetically predisposed.¹⁻⁴ Globally, the prevalence of CD is about 1% in general population whereas in Europe, it is noted to be from 1 to 3%. In children its prevalence is around 0.5% to 1%. It is estimated that amongst children, 90% of CD cases are undiagnosed which means that these children are unable to get any treatment.⁵⁻⁹

The pathogenesis of CD is complex involving factors that are genetic, immunological as well as

environmental. Clinical presentation of CD is not restricted to only gastrointestinal (GI) symptoms as it can exhibit in the form of non GI symptoms as well. Patients without any symptoms but with serology as well as pathology related to small intestine which is correlated with CD portrays that the prevalence is much higher that what is currently considered.¹⁰⁻¹²

Asthma is frequently seen in children and is said to affect 10-20% of children around the globe.^{5,13,14} In Pakistan, its prevalence is around 20% in pediatric population.^{15,16} Allergic rhinitis is described as paroxysmal sneezing, nasal discharge as well as congestion and usually is adjunct to itching related to eyes and nose.¹⁷

Relationship amongst CD and lung diseases was 1st described in the 1970 by Hood et al.¹⁸ Studies have documented that CD is linked with lung diseases. CD has also been described to complement asthma. As CD is described as autoimmune disease, also linked with T helper type 1 and type 2 cells, these are said to play the dominant role in pathophysiology of diseases like asthma as well other allergic disorders.¹⁹⁻²²

While no work finding out the possible association of CD with asthma or any allergic disorder is done in Pakistan, few international studies are there but with inconsistent findings. Some suggested that allergic disorders may occur with autoimmune diseases as both have some common risk factors of genetic and environmental origin. We planned this study to document the prevalence of asthma as well as allergic rhinitis in confirmed cases of CD and conducted pulmonary function testing in children aged 5 to 16 years while comparing them with controls.

MATERIAL AND METHODS

This was a cross sectional study conducted at Department of Pediatrics Medicine, Children Hospital Chandka Medical College / Shaheed Mohtarma Benazir Bhutto Medical University, Larkana. We enrolled 50 confirmed cases of CD along with 100 controls with non specific abdominal pain. All these children were aged 6 to 16 years, of both genders. Demographics as well as questions related to asthma and allergic rhinitis were noted on a designed proforma.

CD was diagnosed on serological testing (IgA and IgG endomysial antibodies (EMA), IgA and IgG gliadin antibodies, and IgA and IgG human tissue transglutaminase antibodies), small bowel biopsy performed during upper endoscopies, and histological evidence of villous atrophy with crypt hyperplasia as well as an increase in intraepithelial lymphocytes.²³ Asthma was noted in children whose parents/guardians informed about history of wheezing at anytime while active asthma was documented with a response of wheezing in the last 1 year. PFT was done and spirometry measurements were noted in every child by a consultant pulmonologist. Best FEV₁,

FVC as well FEV₁/FVC were recorded. An FEV₁ of less than 80% or FEV₁/FVC ratio of more than 80% were noted as obstructive changes.²³ In confirmed cases of CD, adherence to diet was labeled when cases were noted to have answered with gluten-free diet and were found to be negative for EMA-antibody.

SPSS version 20 was used for data entry and statistical analysis. Descriptive statistics were calculated for the study variables chi square test was applied to compare the data between the two study groups while P value less than 0.05 was taken as of statistical significance.

RESULTS

Amongst a total of 150 children (50 cases with CD and 100 controls with non-specific abdominal pain), there were 61 (40.7%) male and 89 (59.3%) female. Overall mean age amongst children was 9.80 years with standard deviation of 2.6 years. A total of 40 (26.7%) children who had weight below the 3rd percentile while 36 (24.0%) had height below the 3rd percentile. Most children, 82 (54.7%) had normal BMI. There were 24 (16.0%) children who had positive parental history of asthma and 28 (18.7%) with positive parental history of allergic rhinitis. In the CD groups, 41 (82%) children were having full adherence to gluten-free diet.

When both groups were compared for demographic features, no statistical difference was found in terms of gender, age, BMI or parental history of asthma or allergic rhinitis ($p > 0.05$) but for weight below the 3rd percentile and height below the 3rd percentile, the difference was of statistical significance as children with a weight and height below the 3rd percentile were significantly higher in the CD group ($P = 0.026$ and $P = 0.005$, respectively).

Asthma and allergic rhinitis characteristics when compared amongst both groups were of not much different as no statistical significance was found between the two groups ($p > 0.05$).

The PFT results amongst the both groups showed that 7 (14.0%) cases with CD and 12 (12.0%)

controls had obstructive pulmonary changes but the difference amongst the both groups were of no significance ($p > 0.05$).

Characteristics	CD Group (n=50)	Controls (n=100)	P-Value
Gender			
Male	22 (44.0%)	39 (39.0%)	0.557
Female	28 (56.0%)	61 (61.0%)	
Age (years)			
Mean + Standard Deviation	10.06+2.7	9.67+2.6	0.396
Weight Percentile			
< 3 p	19 (38.0%)	21 (21.0%)	0.026
Height Percentile			
< 3 p	19 (38.0%)	17 (17.0%)	0.005
BMI			
Underweight	18 (36.0%)	24 (24.0%)	0.069
Normal	20 (40.0%)	62 (62.0%)	
Overweight	8 (16.0%)	11 (11.0%)	
Obese	4 (8.0%)	3 (3.0%)	
Parental History			
Asthma	10 (20.0%)	14 (14.0%)	0.345
Allergic Rhinitis	13 (26.0%)	15 (15.0%)	0.103

Table-I. Demographic data and clinical parameters between CD group and controls

	CD Group (n=50)	Controls (n=100)	P-Value
Wheezing at anytime	8 (16.0%)	13 (13.0%)	0.618
Wheezing in the last 1 Year	4 (8.0%)	7 (7.0%)	0.825
Night Time Coughing	11 (22/0%)	13 (13.0%)	0.156
Physician-Diagnosed Asthma	9 (18.0%)	13 (13.0%)	0.415
Allergic Rhinitis	14 (28.0%)	18 (18.0%)	0.159
Allergic Rhinoconjunctivitis	11 (22.0%)	14 (14.0%)	0.215
Physician-Diagnosed Allergic Rhinitis	5 (10.0%)	12 (12.0%)	0.716
PFT showing obstructive changes	7 (14.0%)	12 (12.0%)	0.728

Table-II. Asthma, allergic rhinitis and PFT in CD group and controls

DISCUSSION

More attention is being given to the linkage between allergic and autoimmune disorders in the recent years. Research evaluating this unique relationship has found that these two distinct disease groups are often seen in conjunction. Although the exact causes of concomitance are unknown but their common prevalence have surely been discussed in the recent years.¹⁹⁻²²

A study from Switzerland²¹ having large number of cases with CD as well controls found an increased hazard ratio of asthma as 1.61 (95%

CI: 1.50-1.72) for cases with CD. Incidence of hospitalization was significantly raised in cases having CD and asthma. Common genetic as well as environmental factors have been argued to be the causes of CD along with asthma. Kero and colleagues²² showed that the risk of asthma was 7.26 times increased in cases who had been diagnosed with CD. Zauli and coworkers²⁴ found a positive association of CD with atopy and noted that an overall prevalence of 1% amongst atopic cases in Italy. The same study also summarized that atopic cases should always be further analyzed for a possibility of CD. In another study,

asthma was found to be present in 28% of cases with CD while 11% in the general population.¹⁹

In our study, most of the children had normal BMI while there was no statistical difference between the two groups. A study done by Venkatasubramani N et al in 2010²⁵ found different results where they noted significant number of obese children having positive associations with CD.

In comparison to previous studies,^{17,23,24} we found somewhat higher rates of physician diagnosed asthma and allergic rhinitis in the present study. We found more cases of CD having asthma and allergic rhinitis features but the difference comparing asthma as well as allergic rhinitis and their characteristics were not statistically different between cases and controls. As compared to previous findings,^{21,23} we found similar rates of asthma and allergic rhinitis symptoms in the present study.

To the best of our knowledge, only one previous study exist²³ enquiring asthma and CD relationship while also looking into PFTs while this was the 1st study of such profile in Pakistan. This study can further add to the baseline figures that exist regarding possible relationship of allergic disease in children having CD and surely will provide interesting insights if compared with the future studies. Although we did not have a huge sample size but CD as a disease has seen very few studies conducted in our area especially in pediatric population. Lack of follow up and data are also limitations of this study.

CONCLUSION

Rates of Asthma and allergic rhinitis in children having CD were not significantly higher in comparison to controls. No linkage between asthma and allergic rhinitis symptoms was seen children having CD. Further studies with big samples having follow-up are needed to evaluated any possible linkage between these diseases.

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2	Fazal ur Rehman	Methodology, Literature Review, Data analysis, Drafting.	
3	Waqas Ali	Methodology, Literature review, Discussion.	
4	Najmi Usman	Methodology, Literature review, Discussion.	
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