

Original Articles

The pattern of Atopy in Childhood Nephrotic Syndrome-A Tertiary Hospital Study

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Abstract

Background: Idiopathic nephrotic syndrome is a common renal disease in children. Various atopic disorders are found in 30%-60% cases with childhood nephrotic syndrome.

Objective: To evaluate the association of atopic disorders with childhood idiopathic nephrotic syndrome.

Methods: This case-control study was conducted in the Department of Paediatrics, Sir Salimullah Medical College Hospital from January 2012 to December 2012. Fifty children of idiopathic nephrotic syndrome between 2 to 10 years of age were included and the diagnosis was based on history, clinical features and laboratory evidence. Age and sex-matched controls were taken from pediatrics outdoor who attended for problems other than nephrotic syndrome. Data regarding atopic disorders in both groups were collected and then analyzed.

Results: Mean ages in this study were 5.32 ± 2.88 years and 5.34 ± 2.87 years in case and control respectively. The male-female ratio was 1.7: 1 in both groups. A positive history of atopy was present in 46.0% of cases and 20.0% in controls. Atopic disorders were asthma (42.0% vs. 20.0%), allergic rhinitis (30% vs. 10%), atopic dermatitis (0.0% vs. 2.0%) and allergic conjunctivitis (0.0% vs. 2.0%) found in cases and controls respectively. Bronchial asthma was frequently (37.5%) found in frequent relapse nephrotic syndrome compared to infrequent relapse and the first attack of nephrotic syndrome.

Conclusion: Children with idiopathic nephrotic syndrome had a higher incidence of atopy. Asthma and allergic rhinitis was found as common atopic disorders associated with childhood idiopathic nephrotic syndrome.

Keywords: Asthma, Allergic rhinitis, Allergic conjunctivitis, Nephrotic Syndrome

Introduction:

Nephrotic syndrome is common in childhood and is fifteen times more common in children than in adults.^{1,2} Childhood nephrotic syndrome is an immune mediated kidney disease associated with T cell dysfunction and disturbance of B cell.^{3,4} The incidence of nephrotic syndrome is 2-3/100000 children per year.² The incidence of steroid responsive

nephrotic syndrome is six-fold higher in Asian than in European children.⁵ Fifty to sixty percent of total indoor bed in pediatric nephrology unit of Bangabandhu Sheikh Mujib Medical University (BSMMU) is occupied by the patients of nephritic syndrome.⁶

Approximately 90% of children with nephrotic syndrome are idiopathic nephrotic syndrome. Patient with idiopathic nephrotic syndrome may show increased serum IgE levels.⁷ There have been numerous reports linking minimal change nephrotic syndrome with atopic disorder and increases in serum IgE.⁸ Atopy refers to a genetically determined predisposition to develop IgE antibodies found in patients with asthma, allergic rhinitis, and atopic dermatitis.⁹ Most patients with allergy

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produce IgE antibodies to the antigens that trigger their illness and often manifest with one or more atopic diseases (asthma, allergic rhinitis and atopic eczema).^{7,10} The prevalence of childhood asthma is 7.4%, allergic rhinitis 20% and atopic eczema 6.5% of school children in Bangladesh.¹¹

Nephrotic syndrome patients have higher allergic disease incidence and have significant elevation in serum IgE.^{7,12,13} Their first degree relatives also have an increased incidence of atopic disorders too.^{14,15} Most studies suggest that 30-40% of children with steroid sensitive nephrotic syndrome have some type of allergic disorder (hay fever, asthma or atopic dermatitis).^{7,16,17} A nasal discharge often is an accompaniment of nephritic syndrome.¹⁸ Bronchial asthma and allergic dermatitis were found in about 63% cases of both steroid resistant and frequent relapse steroid dependent nephrotic syndrome patients- in a study conducted at BSMMU.¹⁹ Nephrotic patients who had decreased proteinuria with therapy there was a concomitant decrease in mean serum IgE level. This finding suggest the possibility that IgE may play a etiological role in the proteinuria of childhood nephritic syndrome.²⁰

Materials & Methods:

This case control study was conducted in the Pediatrics Department of Sir Salimullah Medical College Hospital from January 2012 to December 2012. Fifty children of idiopathic nephrotic syndrome from 2-12 years of age with first attack, infrequent relapse and frequent relapse nephrotic syndrome were included. Childhood Nephrotic syndrome having haematuria, hypertension and some relapsing patients having steroid induced hypertension were excluded. Age and sex matched controls were taken from pediatrics indoor and outdoor who attended for problems other than nephrotic syndrome (viral fever, enteric fever, upper respiratory tract infections, UTI). Nephrotic syndrome was diagnosed on the basis of characteristic history, clinical features and laboratory evidences by heavy proteinuria ($>40\text{mg}/\text{m}^2/\text{hr}$), hypoalbuminemia ($<2.5\text{ gm}/\text{dl}$) and hyperlipidemia. Infrequent relapse nephrotic syndrome was defined as one relapse within 6 months of initial response or less than 4 relapses in any 12 months period and frequent relapse nephrotic syndrome was defined as two or more relapses within 6 months of initial episode or more than 3 relapses in any 12 months period. In this study asthma, allergic rhinitis, atopic dermatitis, allergic conjunctivitis was defined according to The International Study of Asthma and Allergies in Childhood (ISAAC) protocol: Asthma- recurrent (≥ 3 times) wheezy respiratory distress in life; allergic

rhinitis- symptoms of nasal irritation, runny nose, nasal blockage, and sneezing with at least 2 or more of these symptoms lasting more than an hour in a day on most of the days; atopic dermatitis- dryness of skin, intense itching or lichenification with excoriation persists at least 6 months or more with wax wane characteristics; allergic conjunctivitis- sudden lacrimation with itchy red eyes after exposure to pollen or allergen usually associated with rhinitis. Interviews were performed with the parents for presence of any atopic illness using a structured questionnaire. Query about atopic illness in the child, his siblings and parents were done. Physical examinations were done for runny nose, wheeze/ ronchi, red eye and skin lesion. Ethical approval was taken from institutional ethical review board and informed written consent was taken from parents/caregiver of every child before enrollment in this study. Data were analyzed by using SPSS 12.0 Software. Chi-square test was used to compare data between two groups and a p value <0.05 was taken as level of significant.

Results:

In this study, mean age of the study subjects was 5.32 ± 2.88 years and 5.34 ± 2.87 years in case and control group respectively. The majority of patients were in 2-6 years of age group. There was no significant difference in age distribution of two groups. Male to female ratio was 1.7: 1 in both case and control group (Table-I). Family history of at least one atopic condition was present in 28% cases with nephrotic syndrome and in 8.0% controls. The difference was statistically significant. Regarding atopy in family members, allergic rhinitis was the common atopy in both groups without any significant difference (Table-III). Positive history of any atopy was present in 46.0% cases and 20.0% in control group, so atopy was found more in nephritic syndrome which was statistically significant (Table-IV). Regarding different pattern of atopy, bronchial asthma was the common atopy in both groups but significantly higher in case than that of control (42.0% vs 20.0%). Allergic rhinitis was also significantly higher in case than that of control (30.0% vs 10.0%) (Table-V). Regarding pattern of atopy in different types of nephrotic syndrome, 37.5% of frequent relapse patients had bronchial asthma in comparison to 16.0% cases of infrequent relapse and 5.5% cases of first attack nephrotic syndrome. Allergic rhinitis was found to be more common in first attack of nephrotic syndrome. However, the difference between groups was not found significant (Table-VI). There was no significant difference of association between male and female patients of different groups of nephrotic syndrome.

Table I
Demographic profile of the study subjects

	Case (n=50)	Control (n=50)	P value
Age (years)			
2 - 6	30 (60%)	33 (66%)	0.999
6 - 8	9 (18%)	9 (18%)	
8 - 10	6 (12%)	4 (8%)	
>10	5 (10%)	4 (8%)	
Mean± SD	5.32±2.88	5.34±2.87	
Gender	1.000		
Male	32 (64%)	32 (64%)	
Female	18 (36%)	18 (36%)	

Table II
Presence of any atopy in family members of two groups

Any Pattern of atopy	Case (n=50)	Control (n=50)	p-value
Present	14 (28%)	4 (8%)	0.002*
Absent	36 (72%)	46 (92.0)	

Table III
Family history of different types of atopic conditions in two groups

Types of atopy	Case (n=50)	Control (n=50)	p-value
Asthma	7 (14%)	2 (4%)	0.081
Allergic rhinitis	10 (20%)	4 (8%)	0.085
Atopic dermatitis	2 (4%)	0	0.153
Allergic conjunctivitis	2 (4%)	0	0.153

Table IV
Comparison of presence of atopy in two groups.

Atopic disorder	Case (n=50)	Control (n=50)	p-value
Present	23 (46%)	10 (20%)	0.003*
Absent	27 (54%)	40 (80%)	

Table V
Types of atopic disorder in two groups

Type of atopy	Case (n=50)	Control (n=50)	p-value
Asthma	21 (42%)	10 (20%)	0.017*
Allergic rhinitis	15 (30%)	5 (10%)	0.012*
Atopic dermatitis	0	1 (2%)	0.314
Allergic conjunctivitis	0	1 (2%)	0.314

* More than one type of atopic disorder was found in some children in both group

Table VI
Pattern of atopy in different types of nephrotic syndrome

Type of atopic disorder	Infrequent relapse (n=24)	Frequent Relapse (n=8)	First attack (n=18)	P value
Bronchial Asthma	4 (16%)	3 (37.5%)	1 (5.5%)	0.077
Allergic rhinitis	8 (33%)	0	1 (5.5%)	
Bronchial asthma& allergic rhinitis	6 (25%)	2 (25%)	5 (27.7%)	

Discussion:

This study was done to see the association of atopic disorders with childhood nephrotic syndrome. Out of 50 children with nephrotic syndrome 32 were males and 18 were females. Male and female ratio was 1.7:1 which is consistent with previous study of Bagga A.⁴ Nephrotic syndrome was found more common in the age group of 2-6 years. Sixty percent of patients with nephrotic syndrome were found in this age group which is also consistent with an Indian study of Bagga A.⁴ A history of at least one atopic disorder was present

in first degree relatives in 28% cases with nephrotic syndrome and 8% controls (p=0.002). So, family history of atopic disorder was significantly higher in patients with nephrotic syndrome. This is expected in view of the likely genetic influence on atopic diseases and its expression. An increased incidence of atopic diseases in first degree relatives of children with nephrotic syndrome has been also found by Hafez et. al.⁷ and Meadow SR et al.¹⁸

In this study a history of any atopic disorder is significantly more in cases of nephrotic syndrome than

in control subjects. Atopic disorders were asthma (42% vs. 20%, $p=0.017$) and allergic rhinitis (30% vs. 10%, $p=0.012$) in cases and controls respectively. This result supports the study by Meadow and Sarsfield¹⁸ who shows that 34% of children with steroid sensitive nephrotic syndrome (SSNS) had an allergic disorder in comparison to 19% controls ($p=0.01$). Hafez et al.⁷ found 30%- 40% of children with SSNS have some type of allergic disorders (e.g. asthma, atopic dermatitis, hay fever). Davin and Rutjes²⁷ also described that incidence of atopy is reported higher in patients with idiopathic nephrotic syndrome than in healthy subjects ranging from 17%-40% in idiopathic nephrotic syndrome compared to age matched controls. Sarker et al.¹⁷ showed in their study that significant number of children with frequent relapse nephrotic syndrome had history of atopy. We also found higher incidence of asthma in frequent relapse nephrotic syndrome (FRNS) in comparison to infrequent relapse nephrotic syndrome and first attack nephrotic syndrome cases. Though, the difference between groups was not found to be statistically significant. Roy et al. also, found higher incidence of asthma and atopic dermatitis in idiopathic nephrotic syndrome patients in their study.¹⁹

Conclusion

The children with nephrotic syndrome are significantly prone to have atopic disorders. They have significantly higher incidence of Asthma and allergic rhinitis.

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