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Original Research Article.

Effect of Serum IgE Level between Frequent Relapse and Infrequent Relapse Nephrotic Syndrome in Children

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ABSTRACT

Objective: In this study our main objective is to evaluate effect of serum IgE level between frequent relapse and infrequent relapse nephrotic syndrome in children.

Methodology: This Cross-sectional comparative study conducted at the Department of Paediatric Nephrology, Bangabandhu Sheikh Mujib Medical University (BSMMU) and Department of Paediatrics, Dhaka Medical College Hospital, Dhaka from February 1, 2010 to October 1, 2010. During the study, 60 children were included in the study according to judgmental or purposive sampling method and they were grouped as follows: Group A (n = 30): Frequent Relapse Nephrotic Syndrome (FRNS), Group B (n= 30): Infrequent Relapse Nephrotic Syndrome (IFRNS).

Results: During the study, majority (60%) were of age group-A, 2-5. On the other hand in group-B, majority (66.8%) were of age groups 2-5 years followed by (16.7%) were of age group 6-9 years and 5 (16.6%) were of age group 10-15 years. During relapse of the disease serum immunoglobulin E (IgE) level was approximately 3.5 times higher in group A than that of group B which was 1573.60IU/ml (SD ±197.01) vs. 438.46IU/ml (SD ±51.6).

Conclusion: From our study we can conclude that, that serum IgE level in frequent relapse nephrotic syndrome was significantly higher (P < 0.001) in comparison to infrequent relapse nephrotic syndrome in children during both relapse and remission irrespective of history of atopy. So serum IgE level might have an influence for the occurrence of relapse in childhood idiopathic nephrotic syndrome

Keywords: Frequent Relapse and Infrequent Relapse, Nephrotic Syndrome, IgE Level.

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INTRODUCTION

Nephrotic syndrome is a clinicopathological condition which is characterized by heavy proteinuria (urinary protein> 40m g1 m 2 /h our on a 24 hour urine sample, or urine protein of 3+/4+ or spot urinary protein: creatinine ratio of 2mg/mg), hypoalbuminemia (serum album" 2 In < ·5 gm/dl), oedema, hyperlipidemia (serum cholesterol level> 200 mg/dl). [1,2] Nephrotic syndrome is a common problem in children with an annual incidence 9-10 per 100,000 children per year among Asian and African children (8agga and Srivastava 2002). In another study, Mantan and Bagga (2005) reported that annual incidence of nephrotic syndrome ranges from 2-7 per 100,000 children per year and prevalence rate ranges from 12-16 per 100,000 children. Nephrotic syndrome is a disorder of glomerular permeability. It could be subdivided into congenital, primary and secondary nephrotic syndrom.[3] Idiopathic nephrotic syndrome is characterized by primary glomerular abnormality but secondary nephrotic syndrome is caused by renal involvement by several diverse conditions including systemic lupus erythematosus, Henoch-Schonlein purpura, amyloidosis, hepatitis-B, etc. The basic mechanism of idiopathic nephrotic syndrome of childhood is largely unknown and it is often difficult to predict the steroid responsiveness of these patients.[2,3] Idiopathic nephrotic syndrome usually responds to corticosteroid therapy With complete clinical and biochemical remission and has an excellent long term prognosis. [4]

In this study our main objective is to evaluate effect of serum IgE level between frequent relapse and infrequent relapse nephrotic syndrome in children.

OBJECTIVES

General Objective

- To assess effect of serum IgE level between frequent relapse and infrequent relapse nephrotic syndrome in children.

Specific Objectives

- To identify serum IgE level during relapse and remission in patients.
- To detect serum IgE level during relapse in patients

METHODOLOGY

Study Types: Cross-sectional comparative study.

Place of study and Period: This study was carried out in the Department of Paediatric Nephrology, Bangabandhu Sheikh Mujib Medical University (BSMMU) and Department of Paediatrics, Dhaka Medical College Hospital, Dhaka from February 1, 2010 to October 1, 2010.

Study Population: During the study period total 60 children of both sexes with age ranged from 2 to 15 years admitted with the features of frequent relapse nephrotic syndrome (FRNS) and infrequent relapse nephrotic syndrome (IFRNS) were enrolled in non-randomised fashion as study population. Among 60 patients, 30 were of FRNS group and 30 were of IFRNS group.

Grouping of Children: 60 children were included in the study according to judgmental or purposive sampling method and they were grouped as follows:

- Group A (n = 30): Frequent Relapse Nephrotic Syndrome (FRNS).
- Group B (n= 30): Infrequent Relapse Nephrotic Syndrome (IFRNS).

Inclusion Criteria

- Children diagnosed as cases of frequent relapse nephrotic syndrome and
- Infrequent relapse nephrotic syndrome.

Exclusion Criteria

- Age of onset of nephrotic syndrome before 2 year or after 15 years.
- Nephrotic syndrome with atypical presentation.
- Steroid resistant nephrotic syndrome (SRNS)
- Secondary nephrotic syndrome like systemic lupus erythematosus (SLE),
- Henoch Schonlein purpura (HSP), Alpert syndrome, IgA nephropathy, etc.

Sampling Technique: Samples were enrolled in non-random fashion as study population according to purposive and judgmental sampling method. Parents and/or patients were explained about the purpose of the study and when they were convinced and agreed to participate, only then the patients were enrolled in this study. Written consent was taken in prescribed Bangia proforma. All the patients were investigated after enrollment in the study. All the subjects were given the choice of withdrawal from the study whenever they liked.

Determination of Sample Size: Calculation of the sample size

$n=z2pq/e2$

where, n= sample size

z= 1.96 (z- value of standard normal distribution)

p= prevalence of frequent and infrequent relapse nephrotic syndrome=

0.5 (50% because exact prevalence is not known)

q= 0.5 (1-p)

e= 0.05 (it is 10% of p)

So, $n= \{(1.96)^2XO.SXO.S\}/ (0.05)^2 = 384$

As there were time and economical constraints, total 60 patients were taken, of them 30 patients were of Frequent relapse nephrotic syndrome and the others were of Infrequent relapse nephrotic syndrome.

Study Protocols and Procedures: In this cross-sectional study, 60 diagnosed cases having the inclusion criteria of relapsing idiopathic nephrotic syndrome according to the operational definitions were enrolled. Of them 30 patients were Frequent relapse nephrotic syndrome group and 30 patients were of Infrequent relapse nephrotic syndrome group and were designated as group A and group B respectively. Written consent of the parents was taken prior to enrollment in the study. After enrollment, histories of the patients were taken and physical examinations were done in accordance to the data collection sheet. Relevant investigations were done for each patient. From each study subject, total 10 ml of blood samples were drawn from antecubital vein in a plain test tube. Out of this 10 ml, 2ml for haematological investigations, 5ml for all bio-chemical parameters and remaining 3 ml for serum IgE assay.

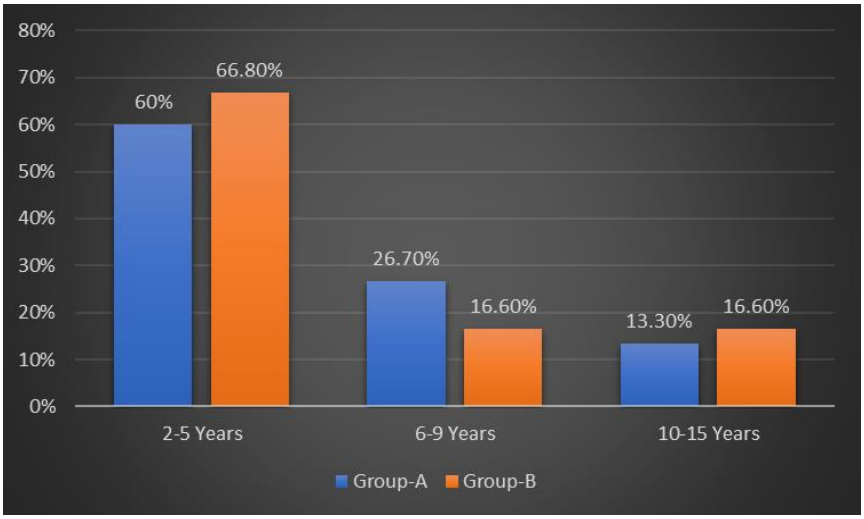

Figure 1: Age distribution of patients

Table 1: Gender distribution of the patients (n = 60)

Sex	Group A (n=30)		Group B (n=30)		P value
	No	%	No	%	
Male	20	66.7	18	60.0	0.592
Female	10	33.3	12	40.0	
Total	30	100	30	100	

Data were analyzed using chi-square test.

Table 2: Comparison of serum IgE level during relapse and remission between two groups (n = 60)

Variable	Group A (Mean ± SD)	Group B (Mean ± SD)	P value
Relapsed (Serum IgE level In IU/ml)	1573.60±197.01	438.46±51.36	0.001
Remission (Serum IgE level in IU/ml)	806.33±107.09	146.40±23.55	0.001

Table 3: Comparison of Serum IgE level during relapse and remission in each group

Group	Relapse (Serum IgE level in IU/ml)	Remission (Serum IgE level in IU/ml)	P value
	Mean ± SD	Mean ± SD	
Group A	1573.60±197.01	806.33±107.09	0.001
Group B	438.46±51.36	146.40±23.55	0.001
	<?tuHnnt's *t' test		

Data were analyzed using Student's *t' test

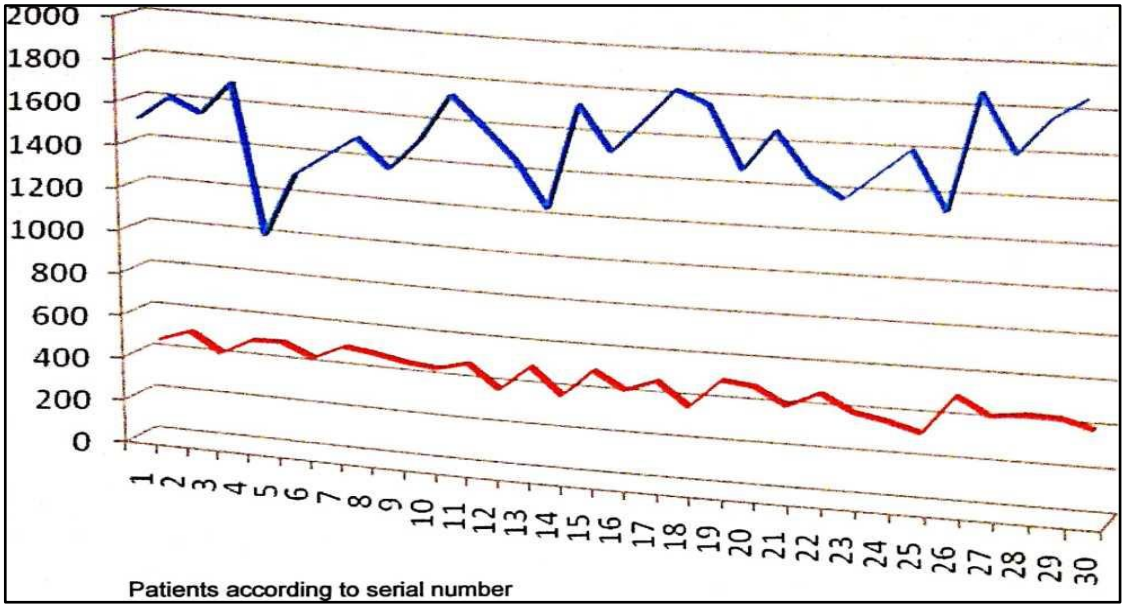

Fig. 1: Comparison of serum IgE level during relapse between two groups

RESULTS

Figure-1 shows the age distribution of patients. Majority (60%) were of age group-A, 2-5 years followed by (26.7%) were of age group 6-9 years and (13 3%) were of age group 10-15 years in group A. On the other hand in group-B, majority (66.8%) were of age groups 2-5 years followed by (16.7%) were of age group 6-9 years and 5 (16.6%) were of age group 10-15 years. The mean age was 6.13 years (SD ± 2.32) in group A and 5.90 years (SD ± 2.36) in group B. The difference was statistically not significant (P>0.05).

In table-1 shows, gender distribution of the patients where, 20 (66.7%) children were male and 10 (33.3%) children were female in group A. In group B 18 (60%) children were male and 12 (40%) children were female.

In table-2 shows comparison of Serum IgE level during relapse and remission in each group, where during relapse of the disease serum immunoglobulin E (IgE) level was approximately 3.5 times higher in group A than that of group B which was 1573.60IU/ml (SD ±197.01) vs. 438.46IU/ml (SD ±51.6). The difference was statistically very highly significant (P < 0.001).During remission of the disease, serum IgE was also approximately 4 times higher in group A than that of group B which was 806.33IU/ml (SD ±107.09) Vs.146.40IU/ml (SD ±23.55). The difference was also very highly significant (P <0.001).

In table-3 shows Comparison of Serum IgE level during relapse and remission in each group where in group A serum IgE was significantly higher in relapse than in remission which was

1573.601U/ml (SD ±197.01) vs. 806.331U/ml (SD±1 07.09) (P < 0.001). On the other hand in group B it was also more in relapse than in remission which was 438.461U/ml (SD ±S1.36) vs. 146.401U/ml (SD±23.SS). The difference was statistically significant (P<O.OS) in both the groups. In group B, serum IgE level revert back within normal limit during remission but in group A serum IgE level remain persistently higher than normal despite remission.

In figure-2 shows comparison of serum IgE level during relapse between two groups. During relapse, serum IgE level is higher than normal in group 8 but in group A it is much higher than group B. In group A (frequent relapse group the values of serum IgE level were between 1000 IU/ml to 1800 IU/ml but in group B (infrequent relapse group) this were around 400 IU/ml. (Normal value of serum IgE is less than 200 IU/ml).

DISCUSSION

Out of these 60 relapsing nephrotic children, majority ie,38 (63.33%) were of age group 2-5 years followed by 13 (21.67%) were of age group 6-9 years and remaining 9 (15%) were of age group 9-15 years. The mean age was 6.13 years (SD ± 2.32) in group A and 5.90 years (SD ± 2.36) in group B. The difference was not statistically significant (P>0.05). The nephrotic syndrome was more common in the age group 2 to 5 years followed by 6 to 9 years. These findings are almost consistent with previous findings.[1,4] Out of 60 children, 38 (66.7 %) were males and 22 (33.3%) were female patients. The male: female ratio was approximately 5:3. Male: female ratio in frequent relapser (FR) group was 2:1, while that in infrequent relapser (IFR) group was 3:2. The difference was statistically not significant (P>0.05). Our findings are roughly consistent with the previous reports, who reported that idiopathic nephrotic syndrome is more common in male than female and male: female ratio is 2:1.[5,6] Another showed that serum IgE levels were significantly raised, particularly in children who had frequent relapse nephrotic syndrome. [6]

The children who had high level of serum IgE measuring >1500 iu/ml, several of them had neither history of atopy nor any other identifiable cause. Fifteen percent of these children had extremely high levels of IgE which were up to a maximum of 10000 IU/ml. In Serum IgE level in relapsing idiopathic nephrotic syndrome rather it may be due to disease activity, as it was suggested according to the previous studies.[6]

According to a study in Taiwan, shown that higher level of serum IgE in nephrotic syndrome was associated with frequent relapse nephrotic syndrome. In our study serum IgE level in frequent relapser group during relapse was also found to be significantly higher than in infrequent relapser group. During relapse, pretreatment mean serum IgE level in frequent relapse nephrotic syndrome group was found to be 1573.60 IU/ml (SD ± 197.01) and in Infrequent relapse nephrotic syndrome group which was 438.46 IU/ml (SD ± 51.36) The difference was statistically significant (P<0.05). These results correlate with the previous research results.[6,5]

On the other hand serum IgE level during remission in patients of frequent relapser group was found staggeringly higher. During remission, post treatment mean serum IgE in frequent relapse nephrotic syndrome group was 806.33 IU/ml (SD ± 107.09) and in infrequent relapse nephrotic syndrome group it was146.41 IU/ml (SD ± 23.55). The difference was statistically significant (P<0.05).

According to the findings of the study, mean serum IgE level in frequent relapse nephrotic syndrome (FRNS) group was significantly higher than that of infrequent relapse nephrotic syndrome (IFRNS) during both relapse and remission. Mean serum IgE level was higher than normal in frequent relapse nephrotic syndrome (FRNS) but it was within normal limit in infrequent relapse nephrotic syndrome (IFRNS) during the period of remission. [7,8] Therefore, serum IgE level in frequent relapse nephrotic syndrome (FRNS) is significantly higher than that of infrequent relapse nephrotic syndrome (IFRNS) during both relapse and remission. During the period of remission, serum IgE level higher than normal is considered to be present only in frequent relapse nephrotic syndrome (FRNS) in children.

CONCLUSION

From our study we can conclude that, that serum IgE level in frequent relapse nephrotic syndrome was significantly higher (P < 0.001) in comparison to infrequent relapse nephrotic syndrome in children during both relapse and remission irrespective of history of atopy. So serum IgE level might have an influence for the occurrence of relapse in childhood idiopathic nephrotic syndrome

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