



The Risk Factors of Frequent Relapse Nephrotic Syndrome (FRNS) and Infrequent Relapse Nephrotic Syndrome (IFRNS) in Children

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Abstract

Objective: In this study our main objective is to detect the risk factor for of frequent relapse nephrotic syndrome (FRNS) and infrequent relapse nephrotic syndrome (IFRNS) 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, mean serum total protein in group A was 41,13gm/L (SD ± 2.21) and in group B was 45.12gm/L (SD ±2.15) respectively. Also, 11 (36.70%) children had atopy in group A and 9 (30%) children had atopy in group B.

In group A mean serum IgE level of atopic children was 1448IU/ml (SD ± 231.50) but that of non-atopic group was 1645IU/ml (SD ± 133 16) The mean serum IgE of atopic children was significantly lower than that of non-atopic children. In group B, mean serum IgE of atopic children was 380IU/ml (SD ± 33.06) and that of non-atopic children was 463IU/ml (SD ± 35.23).

Conclusion: From our study we can conclude that, history of atopy, low serum albumin and total protein level at the time of initial attack and infection were significantly associated with frequent relapse and can be concluded that these are the risk factors for relapse of childhood NS

Keywords: Frequent relapse and infrequent relapse, Nephrotic syndrome, IgE level.

Introduction

NS is considered by massive proteinuria, hyperlipidemia, hypoalbuminemia & edema. It is 15times more frequent in children than adults. It is

a quite common clinical complaint in our country affecting typically the young children. Most children (90%) with NS have a form of Idiopathic NS (INS).^{1,2,3}

Most recurrent type (85%) of INS is minimal change NS (MCNS) & more than 95% MCNS well responded to steroid therapy. But INS is a chronic relapsing disease.

Incidence of relapses is highly variable. In a year, some patients have ≤ 3 (infrequent relapses) where as others have ≥ 4 relapses (frequent relapses). International study of kidney disease in children initially stated a relapse rate of 60% but later data suggests up to 76-90% with frequently relapsing rate up to 50%⁵. Relapse is also higher in our children which is 36.4%⁶,

Infection is an important reason of relapse in MCNS, prevention & treatment of which could decrease proteinuria without necessity of steroid. An Upper Respiratory Tract Infection (URTI) or a febrile episode often precipitates a relapse; infrequently there is no obvious cause.^{4,5}



Figure-1: Ultrasound of a kidney with nephrotic syndrome.⁶

In this study our main objective is to detect the risk factor for of frequent relapse nephrotic syndrome (FRNS) and infrequent relapse nephrotic syndrome (IFRNS) in children.

Objective

General Objective

- To evaluate the risk factor for of frequent relapse nephrotic syndrome (FRNS) and infrequent relapse nephrotic syndrome (IFRNS) in children.

Specific Objectives

- To detect biochemical and hematological parameters in patients

- To identify association between infestation and type of relapse (n = 60)

Methodology

| | |
|---------------------------|---|
| Type of study | Cross-sectional comparative study. |
| Place of study | Department of Paediatric Nephrology, Bangabandhu Sheikh Mujib Medical University (BSMMU) and Department of Paediatrics, Dhaka Medical College Hospital, Dhaka |
| Study period | January 2017 to December 2018 |
| Study population | admitted with the features of frequent relapse nephrotic syndrome (FRNS) and infrequent relapse nephrotic syndrome (IFRNS) were enrolled |
| Sampling technique | Purposive |

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-randomed fashion as study population. Among 60 patients, 30 were of FRNS group and 30 were of IFRNS group. 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) and 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.

Method

In this 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 enrolment, 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 hematological investigations, 5ml for all bio-chemical parameters and remaining 3 ml for serum IgE assay.

Statistical Analysis: First data were edited to the validity and consistency of the data. After proper verification data were coded and entered into computer by using SPSS software programs. Descriptive analysis was done by percentage, mean and standard deviation. Association was observed by appropriate statistical test at 95% confidence interval eg. odds ratio, Chi-square, t-test .

Results

In table-1 shows age distributions of the patients where the age distribution of patients. Majority i.e. 18 (60%) were of age group 2-5 years followed by 8 (26.7%) were of age group 6-9 years and 4 (13.3%) were of age group 10-15 years in group A. On the other hand majority 20 (66.8%) were of age groups 2-5 years followed by 5 (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). The following table is given below in detail:

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

| Age in years | Group A (n=30) | | | Group B (n=30) | | | P value |
|--------------|----------------|------|-----------|----------------|------|-----------|---------|
| | No | % | Mean±SD | No | % | Mean±SD | |
| 2-5 | 18 | 60.0 | 6.13±2.32 | 20 | 66.8 | 5.90±2.36 | 0.701 |
| 6-9 | 8 | 26.7 | | 5 | 16.6 | | |
| 10-15 | 4 | 13.3 | | 5 | 16.6 | | |
| Total | 30 | 100 | 30 | 100 | | | |

In figure-2 shows distribution of the patients according to gender where (66.7%) children were male and (33.3%) children were female in group A. In group B (60%) children were male and (40%) children were female. The difference was statistically not significant (P>0.05).

The following figure is given below in detail:

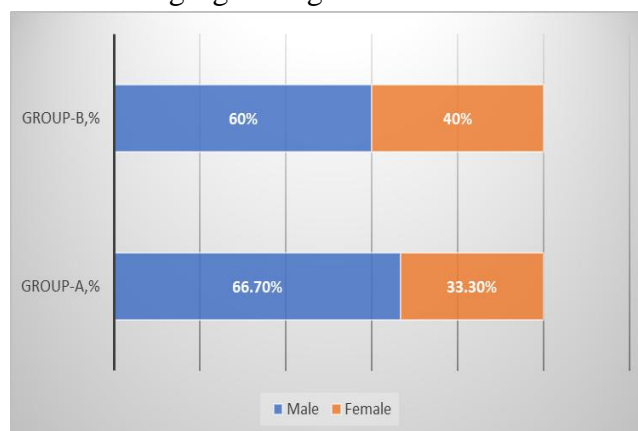


Figure-2: Distribution of the patients according to gender.

In table-2 shows residuals area of the patients where in group-A and group-B 70% and 56% patients were from rural. The following figure is given below in detail:

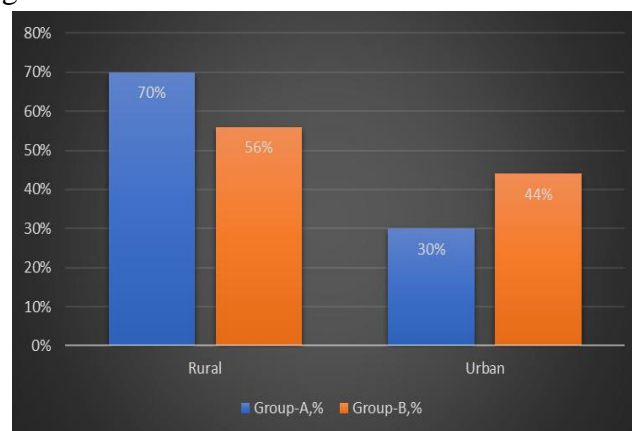


Table-2; residuals area of the patients

In table-3 shows the comparison of the biochemical and haematological parameters

between two groups. Mean serum total protein in group A was 41.13gm/L (SD ± 2.21) and in group B was 45.12gm/L (SD ±2.15) respectively. The difference was not statistically significant (p>0.05). The mean serum albumin in group A was observed to be significantly lower than that of group B which was 13.22gm/L (SD ±0.61) vs.18.73gm/L (SD ±0.82) (p<0.05). The mean serum cholesterol in group A was observed to be significantly higher than that group B which was 473.86mg/dl (SD ±11.60) vs. 300.73mg/dl (SD ±15.96) (p<0.05).

Table-3: Comparison of biochemical and haematological parameters of patients between two groups (n = 60):

| Bio-chemical and hematological parameters | Group A (n=30) Mean±SD | Group B (n=30) Mean±SD | P value |
|---|------------------------|------------------------|---------|
| Serum total protein (gm/L) | 41.13±2.21 | 45.12±2.15 | 0.085 |
| Serum albumin level (gm/L) | 13.22±0.61 | 18.73 ±0.82 | 0.001 |
| Serum cholesterol level (mg/dl) | 473.86±11.60 | 300.73±15.96 | 0.001 |
| Serum creatinine level (pmol/L) | 76.06±4.13 | 74.53±2.58 | 0.090 |
| 24 hour Urinary total protein (gm/day) | 3.70±0.19 | 2.64±0.10 | 0.001 |
| Total Circulating Eosinophils (TCE) (/pL) | 408.66±22.85 | 368.90±14.49 | 0.001 |

Data were analyzed using Student's Y test

In figure-4 shows association between infestation and type of relapse (n = 60) where FRNS group had a significantly higher incidence of UTI and RTI compared to the IFRNS. The following figure is given below in detail:

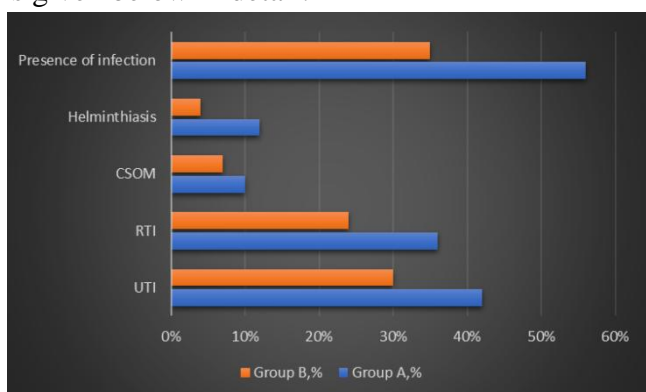


Figure-4 shows association between infestation and type of relapse (n = 100)

Figure-5 shows history of atopy between two groups of patients (n = 60), where (36.70%) children had atopy in group A and (30%) children had atopy in group B. The difference was statistically not significant (P>0.05). The following table is given below in detail:

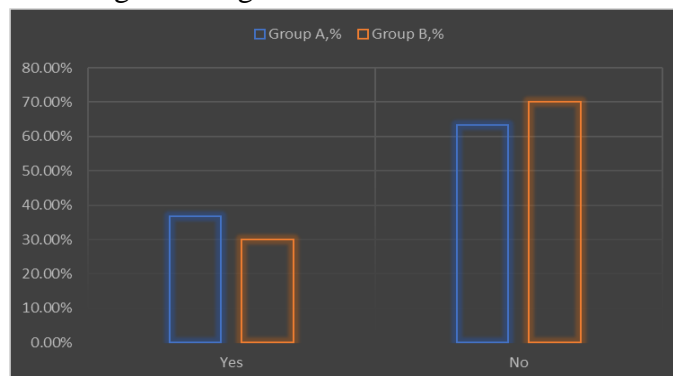


Figure-5: History of atopy between two groups of patients (n = 60)

Table -4 shows comparison of mean serum IgE levels of atopic children vs. nonatopic children of each group. In group A mean serum IgE level of atopic children was 1448IU/ml (SD ± 231.50) but that of non-atopic group was 1645IU/ml (SD ± 133 16) The mean serum IgE of atopic children was significantly lower than that of non-atopic children. In group B, mean serum IgE of atopic children was 380IU/ml (SD ± 33.06) and that of non-atopic children was 463IU/ml (SD ± 35.23). Mean serum IgE level in atopic children was significantly lower than that of non-atopic children in this group also. The following table is given below in detail:

Table-4: Comparison of mean serum IgE levels of atopic and non-atopic children of each group (n = 60):

| Group | Serum IgE level in IU/ml | | P value |
|---------|--------------------------|-------------|---------|
| | Atopic | Non-atopic | |
| Group A | 1448±231.50 | 1645±133.16 | 0.006 |
| Group B | 380±33.06 | 463±35.23 | 0.001 |

Discussion

To identify the risk factor for relapse, total 100 cases of relapsing NS of which 50 with FRNS and 50 with IFRNS were studied. Out of 100 children, majority (67%) were between the age of 2-6 years, this findings is consistent with the other finding.⁶

Significantly low serum total protein and low serum albumin were found in frequent relapser group compared to infrequent relapser group. These were may be due to relatively more attack of relapses of nephrotic syndrome and higher disease activity. Similarly mean 24 hours urinary total protein was significantly high in frequent relapser group in comparison to infrequent relapser group which was also probably due to more attack of relapses of nephrotic syndrome and higher disease activity. Significantly high serum cholesterol was also noted in frequent relapser group compared with infrequent relapser group; this was also probably due to frequent relapses and higher disease activity. All of these findings are comparable with the other studies.^{6,7}

Another article reported that absolute eosinophils counts were significantly high (165.5% of normal) in relapsing idiopathic nephrotic syndrome in children. In our study, mean total circulating eosinophils (TCE) level was found to be significantly high in frequent relapse nephrotic syndrome group than that of infrequent relapse nephrotic syndrome group which was 408.66/pl (SD \pm 22.85) vs 368 90/pl (SD \pm 14.49). The difference was statistically significant (P<0.05). This finding of significantly high total circulating eosinophils count in frequent relapser (FR) group is consistent with the previous findings.^{2,5,7}

One study showed that serum IgE levels were significantly raised, particularly in children who had frequent relapse nephrotic syndrome. 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 our study, mean serum IgE level of frequent relapser group who did not have the history of atopy was much higher (1645 \pm 133.16 IU/ml) compared to those who had the history of atopy (1448 \pm 231.50 IU/ml). In infrequent relapser group who did not have the history of atopy also was found to have significantly higher IgE (463 \pm 35.23 IU/ml)

compared to those who had history of atopy (380 \pm 33.06 IU/ml), (P<0.05). These reports suggest that atopy may not be an important cause of high 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.^{7,8}

Conclusion

In this study, it was found that history of atopy, low serum albumin and total protein level at the time of initial attack and infection were significantly associated with frequent relapse and can be concluded that these are the risk factors for relapse of childhood NS.

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