Urinary tract infection and remission of proteinuria in childhood idiopathic nephrotic syndrome

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Abstract

Background: Nephrotic syndrome is one of the most common renal disease in childhood and infection is one of the most important complication in this disease. Infection increase the mortality and morbidity of this type of patients. Urinary tract infection (UTI) is the most common of the infections. **Objective:** To find out an association between UTI and remission of proteinuria in **childhood idiopathic nephrotic syndrome (INS). Methods:** It was a prospective study conducted in pediatric department in Rangpur Medical College Hospital. Sixty INS patients of both sex aged =12 years were included in this study. Data were collected by history taking, clinical examination, laboratory investigations and followed up. Patients were followed up till cure of UTI and remission of proteinuria. Data were analyzed by computer using SPSS for windows. Chi-square test was applied to verify an association between UTI and remission of proteinuria. **Results:** A total of 60 INS patients, 37(61.6%) patients had UTI and the rest 23 (38.4%) patients had not UTI. Remission of proteinuria occured earlier in 73% (17/23) patients of nephrotic syndrome without UTI. It was 64% (24/37) among the cases with UTI. **Conclusion:** UTI causes delayed remission of proteinuria in childhood idiopathic nephrotic syndrome. It should be screened and treated in every chidhood INS patient.

Key wards: UTI, remission of proteinuria, **idiopathic nephrotic syndrome**.

Introduction

Nephrotic Syndrome is one of the most common renal disease in childhood.The annual incidence of nephrotic syndrome in US ranging from 2-7 new cases in children under 16years per 1 lac children.[1]

Infection is one of the most important complication in childhood nephrotic syndrome.[2] The cause of infection due to: (i) Loss of plasma protein, (ii) Decrease serum immuno globulin A level, (iii) Abnormal functions of T-cell, (iv) Hypoperfusion of spleen, (v) Oedematus fluid which acts as good source of bacterial growth, (vi) Immunosuppressive drugs which are used in treatment of disease.

Of all infections in children, UTI is of special interest because of its association with vesicoureteric reflux and predisposed for long term renal damage.[3] Recurrence and sequlae are common in childhood nephrotic syndrome with urinary tract infection.[4] So UTI in nephrotic syndrome is not only the underlying cause of non response to therapy and relapse but also may induce long term renal damage.

Incidence of infection in nephrotic syndrome in more during proteinuric phase.[5] Urinary tract infection is the top of the list among these infection. Infections are commonest cause of mortality of patients. It also results in significant morbidity & poor response to steroid therapy. It causes delayed remission of proteinuria.[2] So infection is an important factor which affect the mortality and morbidity of patient in childhood nephrotic syndrome.

This study is intended to find out the association of UTI with the remission of proteinuria.

Methods

It was a prospective study conducted in paediatric department, Rangpur Medical College Hospital between July 2007 to December 2007. Sixty Idiopathic nephrotic syndrome (INS) patients of both sex aged =12 years were included in this study. Nephrotic syndrome was diagnosed according to ISKDC criteria i.e. oedema, urinary protein excretion >1gm//day, body surface area, serum albumin <2.5 gm/dl, serum cholesterol > 200 mg/dl and on heat

coagulation test urinary protein > 2+. The patient of nephrotic syndrome associated with systemic manifestation and infection other than UTI were excluded from this study. Fever, anorexia, abdominal pain, vomiting, disuria, significant pus cell (10 leukocyte count/ HPF) in microscopic examination of urine and significant growth (colony count $>10^5$ per ml of urine culture) in urine culture were considered for diagnosis of UTI.[6] Identification of the bacteria was done by standard bacteriological methods.[7,8] Antimicrobial susceptibility test was done by disc diffusion method.[8,9]

The purpose, procedure and time required for this purpose was fully explained to the patients or their legal guardians before requesting to volunteers. Data were collected by data collection sheet which was designed to record age, gender, presenting complaints like swelling of body, scanty micturation, fever and disuria by interview, general and systemic examination, and laboratory investigation through periodic followed up. Patient of nephrotic syndrome with UTI first treated with appropriate antibiotics until followed up culture revealed no growth, After that definitive treatment of nephrotic syndrome were given according to APN protocol that is initial attack 60 mg/m^2/ day for 4 weeks followed by 40mg/ m^2/ alternate day for 4 weeks. Patient were followed for cure of UTI and remission of proteinuria. Data were analyzed by computer using SPSS for windows. Descriptive analytical techniques involving frequency distribution and computation of percentage were applied. Chi-square test was applied to verify an association between UTI and remission of proteinuria.

Results

A total of 60 INS patients, 42 (70.0%) patients were <6 years and the rest 18 (30.0%) were between 6-12 years of age. Mean age of them was 5.6 years. Forty three (43.71%) of the patients were male & 17(28.4%) were female. Male and Female patients ratio was 2.5 : 1. Of the 60 patients, 37 (61.7%) patients had UTI with INS and the rest 23(38.3%) had not UTI.

Table 1. Common presentation of UTI

Clinical features	Frequency of patients N(%)
Fever	31 (83.7)
Anorexia	28 (75.6)
Pain in abdomen	21 (56.7)
Tender abdomen	13 (35.1)
Dysuria	11 (29.7)
Hematuria	7 (18.9)
Vomiting	7 (18.9)
Tender at renal angle	6 (16.2)

In the subgroup of INS patients with UTI, the most commonly complained symptoms were fever (83.8%), followed by Anorexia (75.6%), and Pain in abdomen(56.7%). Other presentations include tender abdomen, dysuria, hematuria, vomiting and tender at renal angle (Table 1).

In urine examination Of the 37 INS patient with UTI, 30(81.1%) patients had significant growth in culture, 34 (91.9%) patients had significant pus cell(10 leukocyte count/ HPF) and 12 (32.4%) patients had RBC. *Escherichia Coli* (27, 90.0%) was the commonest organisms responsible for causing bactertiuria. Others less common bacteria identified causing bacteriuria were *Pseudomonas* (2, 6.7%) and *Staphylococcus (1, 3.3%) species.* Seven (18.9%) of the 37 patients had no growth on urine culture.

More than 73% of the INS patients without UTI remitted the proteinuria within 2 weeks, but only 35.1% of the INS patients with UTI remitted the proteinuria within this time. This difference of protinuria remission between the patients with and without UTI within 2 weeks was statistically significant ($p<0.01$) (Table 2).

Table 2. Remission of proteinuria of nephrotic syndrome patients with and without UTI

Duration	Status of UTI		P value
	With UTI	Without UTI	
<2 weeks	13(35.1%)	17(73.9%)	
>2 weeks	24(64.8%)	6(26%)	<0.01
Total, n = 60	37 (61.7%)	23 (38.3%)	

Note: patients had multiple complains

Discussion

Nephrotic syndrome represents an immuno compromised state predisposing to various types of infections. Infections remain main cause of hospitalization of patients, also cause the recurrence of proteinuria, poor response to steroid therapy and even death of patients. Most common type of infection is UTI nephrotic syndromes. In this study, the association of UTI with remission of proteinuria was analyzed in INS patients.

In present study, regarding gender, male prepondence was noted, 71.6%. Male prepondence (60%) also reported by Hossain et al (1982)[10] among the INS patients admitted in Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka. But reasons from male prepondance is obscure, it is needed to investigate.

Though nephrotic syndrome may occur in any age, but childhood idiopathic nephrotic syndrome occurs mostly (80.0%) between age of 2-6 years.[11] The present study finding also agreed with this.

The prevalence of UTI among INS patients in Bangladeash and India constitutes up to 58.9% - 63.0%, which is consistent with the present study findings.[3,12,13]

In clinical presentation of UTI we had found fever in 31 (83.7%) cases, pain in abdomen in 21(56.7%) cases, dysuria in 11(29.7%) cases, hematuria in 7(18.9%) cases, anorexia in 28(79.6%) cases, vomiting in 7(18.9%) cases, tender renal angle in 6(16.2%) cases and tender abdomen in 13(35.1%) cases.

According to Srivastava and Bagga (2005)[14] common clinical presention of UTI are fever about 80%, flank pain about 40% also may found dysuria. Occasionally may found hematuria. According to Postlethwaite and Necholas (2003)[6] typical presentation of UTI are dysuria, loin pain and generalized symptoms like fever, anorexia, abdominal pain, vomiting. The present study findings is consistent with these findings.

According to Avner et al. (2004)[5] in routine urine examination found pus cell and RBC. Pus cell found in 80-90% and RBC found in 20-30 of symptomatic UTI patients. These observations are consistent with this study findings. According to Avner et al. (2004)[5] in 80% UTI patients urine culture for bacteria is positive and 20% is negative. In this study, it was also observed that 81.1% patients of UTI had significant growth in urine culture and 17% cases had not. This negativity may be due to low bacterial growth or use of antibiotics before culture.

According of Emalia Koch et al. (2004)[15] UTI may delay the remission of proteinuria in childhood nephrotic syndrome. According to report by Bernett (1981)[16] also show the infection can delay remission of poroteinuria. According to Srivastava and Begga (2005)[14] that infection cause immune dysfunction, increase filtration of protein in glomerular basement membrane and thus increase proteinuria result in delayed remission. In the current study, the direction of findings are in line with these previous reports, "UTI in INS may delayed remission of poroteinuria."

This study has some limitations. The sample size was small and follow up period was too short. So a well designed study with large sample is needed in future.

This study suggests that childhood nephrotic syndrome predisposes UTI. And the duration of proteinuria may be reduced by proper screening and treatment of UTI and thus reduce the mortality and morbidity of patients in childhood idiopathic nephrotic syndrome.

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