Original Article

Significance of Biochemical Difference between Childhood Nephrotic Syndrome with UTI and without UTI

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Abstract

Background: *Nephrotic syndrome is one of 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. Most common infection is UTI. So through this study we can able to determine biochemical difference between childhood nephrotic syndrome with Urinary Tract Infection (UTI) and with out UTI patients and its clinical significance.* ***Objective:*** *To determine the biochemical different in childhood nephrotic syndrome patients and its relation with urinary tract infection.* ***Materials and Methods:*** *It is prospective study done in pediatric department in Rajshahi Medical College Hospital, 60 patient of both sex age between 1-12 years, diagnosed as idiopathic nephrotic syndrome with and without UTI were included in this study. Data collection ware done by history taking, clinical examination, laboratory investigations and followed up. Patients were followed up till cure of UTI and remission of proteinuria. After data collection statistical analysis were done by computerized software.* ***Results:*** *In our study we found there were biochemical difference between childhood nephrotic syndrome with UTI and without UTI patients. In patients of nephrotic syndrome with UTI serum albumin decrease significantly and serum cholesterol increase significantly than nephritic syndrome without UTI patients.* ***Conclusion:*** *Child with nephrotic with UTI patients had lower serum albumin and higher serum cholesterol than nephrotic syndrome without UTI patients and it effect the morbidity mortality of this patients.*

Keywords: *Urinary Tract Infection, Nephrotic Syndrome.*

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Introduction

Nephrotic Syndrome is one of the most common renal disease in childhood. The annual incidence of nephrotic syndrome in US range from 2-7 new cases in children under 16 years per 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 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. Infection cause the mortality of patient, it also result significance morbidity of patient. It also causes the poor responses of drug and relapse of proteinurea. So infection in important factor which effect the mortality and morbidity of patient in childhood nephrotic syndrome.[2] Of all infections in

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children, urinary tract infection (UTI) are of special interest because of their 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. In study of shenguttuvan, Revanan et al found that children of nephrotic syndrome with UTI had significantly higher serum cholesterol and lower serum albumin than children of nephrotic syndrome without UTI.[5] According to the study of Raj, Kumar et. al. There were high serum cholesterol and low serum albumin in children with nephrotic syndrome with UTI.[6]

So infection is an important factor which effect the mortality and morbidity of patient in childhood nephrotic syndrome. and serum cholesterol and serum albumin are two important factors for development of UTI in children with nephritic syndrome.

Materials and Methods

It is prospective study, done in department of paediatric in Rajshahi Medical College Hospital between July 2017 to December 2017. The sample size was 60 in number. Patient of both sex, age between 1-12 years, diagnosed as idiopathic nephrotic syndrome with Urinary Tract Infection (UTI) and without UTI were included in this study. Nephrotic syndrome was diagnosed according to International Study of Kidney Disease in Children (ISKDC) criteria like 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 infections other than UTI were excluded from this study. For diagnosis of UTI following criteria are considered like fever, anorexia, abdominal pain, vomiting, dysuria inurine R/E significant pus cell >105 /ml present and urine culture were positive for bacteria.[7]

After taking written consent from patients or legal gardin data were collected by data collection sheet which included age, sex of patients, presenting complaints like swelling of body, scanty micturation, fever, dysuria and by general and systemic examination, laboratory investigations and 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 Association for Pediatric Nephrology (APN) protocol that is initial attack 60 mg/m2/ day for 6 weeks followed by 40mg/ m2/ alternate day for 6 weeks. Patient were followed for cure of UTI and remission of proteinuria.

After collection of data statistical analysis were done by computerized soft were. Statistical significance was determined by chi-square and Z test. P-value ≤ 0.05 was taken as minimum level of significant.

Results

Table - I: Age and sex distribution of patients.

Factors	Number of patients (Total patients 60)	Percentage
Age		
<6 yr.	42	70.0%
>6 yr.	18	30.0%
Sex		
Male	43	71.6%
Female	17	28.4%

Out of 60 patients, 43 patients were male and 17 patients were female. M:F = 2.5 : 1 Regarding age of nephrotic syndrome patients, out of 60 patients 42 patients were below 6 years and 18 patients were between 6-12 years of age. Mean age was 5.6 years. More patients were lower age group (Table I).

Table – II : Number of UTI patients (n-60)

	No. of patients	Percentage	P Value
With UTI	37	61.6	
Without UTI	23	38.3	<0.01

Out of 60 patients UTI developed in 37 patients and no UTI developed in 23 patients. In statistical analyzes Z = 2.72 & P < 0.01 (Table- II).

Table-III : Common presentation of UTI

Clinical feature	No of patients	Percentage
Fever	31	83.7
Pain in abdomen	21	56.7
Dysuria	11	29.7
Hematuria	7	18.9
Anorexia	28	75.6
Vomiting	7	18.9
Tender abdomen	13	35.1
Tenderrenal angle	6	16.2

Table III: shown the common presentation of UTI in NS patients. Out of 37 patient in nephrotic syndrome with UTI, 31 patients presented with fever. Pain in abdomen and dysuria presented in 21 and 11 number of patients respectively.

Hematuria, anorexia presented in 7 and 28 number of patients respectively. Vomiting and tender abdomen developed in 7 and 13 number of patients, respectively only 6 patients developed tender renal angle.

Table IV: Laboratory findings of urine in UTI patients (n=42)

	Positive (%)	Negative (%)
Pus cell	34(84%)	8(16%)
RBC	12(28%)	30(72%)
Bacteria	35(83%)	7(70%)

Table IV: shown the laboratory findings of urine in UTI patients. In microscopic examined of urine pus cell found in 34 patients out of 37 patients. RBC found in 12 patients and bacteria found in 35 patients.

Table-V: Comparism of biochemical values between muse with nephrotic syndrome with UTI and muse nephrotic syndrome without UTI patients.

Variable	UTI n-37	N|U UTI n-23
Blood urea mg/ml	22 ± 0.72	21 ± 0.25
S. creatinine mg/dl	1 ± 0.2	1 ± .3
S. T P (gm/dl)	6 ± 1	6 ± 0.9
S. albumin (gm/dl)	1.8 ± 0.5	2.5 ± 0.6
S. Cholesterol mg/dk	300 ± 2	250 ± 2
24 UTP mg/m2/dy	65 ± 2	65 ± 2

Mean ± SD

Table-V: Shown the biochemical difference between nephrotic syndrome with UTI and nephritic syndrome without UTI patients. Here found in nephrotic syndrome with UTI patients albumin decreases significantly (P value <0.05) and S. cholesterol increases significantly (P value <0.01) than nephrotic syndrome without UTI cases.

Table VI: Remission of proteinuria of nephrotic syndrome patients with and without UTI (n=60)

Duration	with UTI	without UTI	P value
<2 weeks	13(35.1%)	17(73.9%)	
>2 weeks	24(64.8%)	6(26%)	<0.01
Total	37	23	

Table VI: shown here remission of proteinuria of NS patients with and without UTI. Out of 37 nephrotic syndrome patients with UTI remission occured within 2 weeks in 13 patients and remission occurred after 2 weeks in 24 patients. In case of without UTI of NS out of 23 patients remission of proteinuria occurred within 2 weeks in 17 patients and after 2 weeks in 6 patients. In statistical analysis χ=8 and p<0.01.

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 we have analized the biochemical differences between nephrotic syndrome with UTI and without UTI and its significance. In present study, regarding sex, male prepondence was noted, 71.6% Male prepondence also reported by Hossain, Ara et al about 60%. So our study almost similar to this study.[8] Out of 60 patients, the age of 42 (70%) patients were less than 6 years & 18 (30%) patients were more than 6 years. Mean age was 5.6 years. Though nephrotic syndrome may occur in any age, but childhood idiopathic nephrotic syndrome occurs mostly between age of 2-6 years about 80%.[9] So our study also similar to this study.The prevalence of UTI in our study found 61.6% of nephrotic syndrome which is consistent with previous studies 63% by Gulati, Gupta et al., 65.20% by Karim 58.83% by Chowdhury.[3,10,11]

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 common clinical presention of UTI are fever about 80% flank pain about 40% also may found dysuria.[12] Occasionally may found hematuria. According to Postlethwaite and Necholas typical presentation of UTI are dysuria, loin pain and generalized symptoms like fever, anorexia, abdominal pain, vomiting. So our study in consistent with these findings.[7]

According to Avner, Harmon et al. in routine urine examination found pus cell and RBC.[13] Pus cell found in 80-90% and RBC found in 20-30 of symptomatic UTI patients. In our study in microscopic urine routine examination 80% of patients we had found pus cell and 28% RBC. According to Avner Harmon et al. in 80% UTI patients urine culture for bacteria is positive and 20% is negative.[13] This negativity due to low bacterial growth or use of antibiotics before culture. In our study in urine culture we had found 83% cases positive and 17% cases were negative. So our study almost similar to this study. In biochemical parameters of nephrotic syndrome with UTI shown that serum albumin were significantly lower (1.8 gm/ml, P<0.05) serum cholesterol were significantly high (300 gm/ml, P<0.01) than the Nephrotic syndrome without UTI. This type of biochemical change also found in study by Gulati kher et. al. So the study

is supported our study.[3] Hypercholesteremia may have direct role in pricipitation of infection as it inhabit the lymphocyte function Hypoalbuminemia also pricipitale infection due to loss of body immunity.[3]

Out of 60 patients 37 patients were with UTI and 23 patients were without UTI. Out of 37 patients of UTI remission occured before 2 wks 13 patients (35.2%), after 2 weeks 24 patients (64.8%) and out of 23 non UTI patients remission of proteinuria occured before 2 weeks 17 patients (73.9%) and after 2 weeks 6 patients (26.1%). On statistical analysis $\chi = 8$ and $p<0.01$. So it is statistically significant. So UTI may delay remission of proteinuria in childhood idiopathic nephrotic syndrome. According of Emalia Koch et al. UTI may delay the remission of proteinuria in childhood nephrotic syndrome.[14] According to report by Bernett & Edelmann also show the infection can delayed remission of poroteinuria.[15] According to Srivastava and Begga that infection cause immune dysfunction, increase filtration of protein in glomerular basement membrane and thus increase proteinuria result in delayed remission.[12] So these study consistent with these previous study.

Conclusion

Considering above all finding it may be concluded that there is significant biochemical different between childhood nephrotic syndrome with UTI and without UTI patients and UTI may effect the morbidity and mortality of these patients. So by proper treatment of UTI we may reduce the duration of proteinuria and thus reduce the mortality and morbidity of patients in childhood idiopathic nephrotic syndrome.

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