# EDITORIAL BOARD

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**References:**
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Reference citations in the text should be identified by numbers in square brackets. Some examples:

1. Negotiation research spans many disciplines [3].
2. This result was later contradicted by Becker and Seligman [5].
3. This effect has been widely studied [1-3, 7].

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**Book chapter**

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Professor Shireen Afroz
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Transplantation of human organ is undoubtedly one of the greatest medical breakthroughs of this century. However, very few patients are able to benefit from this medical advance. Kidney transplantation is typically classified as deceased donor (formerly known as cadaveric transplantation) or living donor transplantation depending on the source of the donor organ. Deceased donors are people who have been declared brain dead and whose organs are kept viable by ventilators or other mechanisms until they can be excised for transplantation.¹

In 1955, Charles Rob, William James carried out the first deceased donor transplant in United Kingdom, which was unsuccessful. In 1959, Peter Raper performed first successful deceased donor transplant in United Kingdom.¹ Patients with End stage Renal Disease who do not have the options of living donor transplant join the waiting list for a deceased donor. Unfortunately, a huge burden of patients are currently on the waiting list for a deceased donor kidney. The majority of kidney transplanted in United States are from deceased donor. In India Deceased Donor Renal transplantation (DDRT) is still infrequent, constituting less than 5% of the total renal transplant of about 3500 per year. Only 35 out of 200 approved renal transplant centers perform DDRT regularly in India.²

Kidneys from deceased donor have a 50% chance of maintaining their function for 10-20 years post transplant. In contrast, a live donor kidney has a 50% chance of maintaining their function for 20 years, while kidney from a perfectly matched sibling donor last for 35 years on average. In addition, 50-60% of deceased donor kidney are fully functional immediately upon transplantation, versus 97% of live donor organs.³

Bangladesh has a population of around 1.6 million and out of them about 20 million are suffering from kidney diseases and 35,000 of them die of kidney failure every year. The annual demand for the kidney transplant is estimated to be 5000. However, on average only around 100 people can manage kidneys from their relatives to undergo a transplant. Bangladesh Organ Donation Law 1999 allows brain death kidney donation apart from living close relatives, but steps have never been taken to introduce such donation. Since 1982 around 1400 kidney transplantation have taken place in Bangladesh.⁴ However, it’s a matter of fortune that the parliament has passed the “Transplantation of Human Organs (Amendment) Bill, 2018” aimed at providing with better health services on the improvement in technology and medical science in Bangladesh. As per the proposed law, there will be a medical board in every hospital for deciding the transplantation matter and a National Cadaveric Committee to oversee the human organ transplantation in Bangladesh. The proposed law also describes any organ transplantable to the human body could be transplanted after the collection from human bodies having heart beats or in active with life support for transplantation purpose.⁵

According to Bangladesh Passenger Welfare Association (BPWA) Data, over 1500 people were killed in road crashes in the first three month of 2018.⁶ As well as lots of morbid patients are admitted in intensive care unit everyday due to road traffic accident or other acute emergency. Those deceased person could be chosen for candidates of cadaveric renal transplantation.

According to the literature, patient and graft survival is better in living donor than in cadaveric renal transplantation. However, cadaveric renal transplantation revealed satisfactory patient and graft survival despite the high incidence of delayed graft function.⁷

Both developing and developed countries have forged various policies for increase the safety and availability of the organ transplantation to their citizen. The state
government, public and private hospitals and non-governmental voluntary organizations should work together accomplishing their respective defined responsibilities. Programs related to awareness building on organ donation, working with religious leaders to promote donation, enforcement of law against illegal organ trafficking, improving coordination among organ institutes, support from the major stakeholders including the government, equality and improvement of income level specially in developing countries are prerequisites for successful organ transplantation. Although the extent and rapid pace of the treatment method may arise several critical conditions, organ transplantation can save thousands of lives each year and patient can enjoy better quality of life afterwards.

References
3. Renal and pancreatic transplant programme, Deceased Donor kidney Transplant, Colombia university, Department of surgery.
Original Article

Infections Encountered in Frequent Relapse Nephrotic Syndrome.

Md. Firoz Anjum 1, Abdullah Al Mamun 2, Tahmina Jesmin 2, Syed Saimul Huque 3, Afroza Begum 3, Golam MuinUddin 4, Ranjit Ranjan Roy 4, Mohammed Habibur Rahman 4

Abstract

Background: Infections remain an important cause of mortality and morbidity in children with frequent relapse nephrotic syndrome (FRNS). It triggers the relapses and may also be responsible for a poor response to steroid therapy.

Objectives: To determine the frequency and type of major infections in children with FRNS.

Methods: A cross sectional study was conducted in children between 2 to 18 years, attending the Department of Pediatric Nephrology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh from January 2016 to June 2017 were enrolled in this study.

Results: A total of 120 children with FRNS were admitted during the study period. Out of these 51 (42.5%) had evidence of infection and other 69 (57.5%) patients were excluded as they did not have infection. Most common infection was Acute respiratory infection (ARI) 28(54.9%) and this included both upper and lower ARI followed by peritonitis 11(21.5%), urinary tract infection (UTI) 9(17.6%), and cellulitis 3(5.88%).

Conclusions: Infections remain an important complication of FRNS in children, especially during relapses. Early institution of appropriate antibiotics and aggressive management of infections, morbidity and mortality can be attenuated.

Keywords: Children, Infections, Frequent relapse nephrotic syndrome.


Introduction

Infections remain an important cause for morbidity and mortality in children with nephrotic syndrome especially in developing countries.1 Besides being the commonest cause of mortality, infections may also be responsible for a poor response to steroid therapy or induce relapse and prolonged hospitalization.2

Relapses of NS often follow minor infection. It is estimated that 50-70% relapses of NS among children in developing countries follow infections.3 Common infections associated with either during the course of disease which is responsible for a poor response to steroid or induce relapses are acute upper and lower respiratory infections (ARI), UTI, gastroenteritis (watery diarrhea) or dysentery, skin infections including impetigo and cellulitis and primary peritonitis.4-6

Multiple factors contribute to increased susceptibility to infections. These include decreased immunoglobulin (IgG) levels due to impaired synthesis and urinary loss, edema fluid acting as a culture medium, protein deficiency especially low serum albumin, hypovolemia leading to decrease perfusion of spleen, loss of complement factor B and D required for phagocytosis of encapsulated organisms, impaired T-lymphocyte function and effects of immunosuppressive therapy commonly used in these children.7-9

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Immunosuppression may mask the typical clinical presentation of infections in nephrotic syndrome and proper management might be delayed. So, this study was carried out to determine the knowledge of the spectrum of various infections associated with FRNS. This may help for pediatricians, not only from the therapeutic point of view, but also for planning preventative strategies regarding infections in steroid sensitive nephrotic syndrome which may be of help in prevention of relapses.

Methods
A cross sectional study was conducted in children between 2 to 18 years, fulfilling the International study of kidney disease in children (ISKDC) criteria for frequent relapse nephrotic syndrome, attending the Department of Pediatric Nephrology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh from January 2016 to June 2017 were enrolled in this study. Institutional ethics committee approval was obtained. Informed consent was taken in all cases. Children with congenital nephrotic syndrome, nephrotic syndrome with renal impairment and secondary nephrotic syndrome were excluded. Primary objectives were to determine the frequency and type of major infections in children with FRNS. Patients were diagnosed and managed as FRNS as per the ISKDC. Specific major infections were defined as:

Specific major infections

Spontaneous bacterial peritonitis (SBP): Abdominal pain, tenderness, distension, diarrhea, or vomiting and ascitic fluid study showing >100 leukocytes/mm3 with at least 50% neutrophils and/or positive culture.

Pneumonia: Fast breathing and/or chest indrawing with radiological confirmation.

UTI: Bacterial colony count of >10^5/mL in a clean-catch midstream sample with fever (≥38.5°C), dysuria or increased frequency of urination.

Cellulitis: Erythema, warmth, swelling and local tenderness with or without fever.

To establish the diagnosis of infections, all children were evaluated clinically and screened for evidence of infections using one or more of the following investigations were carried out: urine routine and microscopic examination, culture and sensitivity, complete blood count, blood culture, C-reactive protein, erythrocyte sedimentation rate, mantoux test, chest x-ray, pus culture, throat swab culture, ascitic fluid study, cerebrospinal fluid study where necessary.

Data including age, gender, clinical features, laboratory parameters and type of infection, were computed. Descriptive statistics, frequency and percentages were calculated to represent all variables.

Results

<table>
<thead>
<tr>
<th>Parameters</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age</td>
<td>6.87 ± 2.20</td>
</tr>
<tr>
<td>Male</td>
<td>27 (52.9%)</td>
</tr>
<tr>
<td>Female</td>
<td>24 (47.1%)</td>
</tr>
<tr>
<td>Edema</td>
<td>51 (100%)</td>
</tr>
<tr>
<td>Cough and/or tachypnea</td>
<td>28 (54.90%)</td>
</tr>
<tr>
<td>Urinary symptoms</td>
<td>9 (17.64%)</td>
</tr>
<tr>
<td>Skin infection</td>
<td>3 (5.90%)</td>
</tr>
</tbody>
</table>

A total of 120 children with FRNS were admitted during the study period. Out of these 51 (42.5%) had evidence of infection and thus fulfilled the inclusion criteria of study. Other 69 (57.5%) patients were excluded as they did not have infection. There were 27 (52.9%) boys and 24 (47.1%) girls. Their ages ranged from 2-18 years (mean of 6.87±2.20 years). Edema was present in all 51 patients and its severity ranged from mild puffiness of face or pedal edema to generalized edema associated with ascites and scrotal or labial edema. Fever, cough and/or tachypnea, abdominal pain and vomiting or diarrhea, urinary symptoms and skin infection were common presentations observed in 51 (100%), 28 (54.90%), 11 (21.5%), 9 (17.64%), and 3 (5.90%) cases respectively (Table I).
The children who had infectious complications had significantly lower serum albumin levels (P<0.001) and significantly higher serum cholesterol levels, urinary protein creatinine ratio (P 0.005), (<0.001) respectively than children with no infections (Table II).

The spectrum of infections observed in the study population is shown in Fig. III. Most common infection was ARI 28(54.9%) and this included both upper and lower ARI followed by peritonitis 11(21.5%), UTI 9(17.6%), and cellulitis 3(5.88%). This is similar to that seen by Moorani et al was observed that the most common type of infection was acute respiratory infections (54.49%), followed by UTI (8.17%), peritonitis (4.9%), and cellulitis (2.17%).

ARI was the commonest infection in our study 54.9%. Studies from the other south east Asian countries showed similar findings. In both studies, clinical parameters were more or less similar due to similarity of socioeconomic status, ignorance, immuno-compromised, and late presentation. All patients with ARI in the current study had active disease which is similar to as reported from neighboring country. Spontaneous bacterial peritonitis is a serious complication of nephrotic syndrome with an incidence of 2-6%, and overwhelming infection carries a mortality risk of 1.5%. Peritonitis emerged as the second most common infection accounting for 21.5% cases in the present study, similar frequency in other studies 15.7% and 28.8% reported by others. Similar high prevalence of peritonitis has also been reported from India where its frequency was 25.8%. UTI emerged as the third most common infection accounting for 17.6% of cases in the current study. Similar high prevalence of UTI has also been reported in studies from neighboring country where

### Table II

**Laboratory parameters in patients with and without infection**

<table>
<thead>
<tr>
<th>Laboratory parameters</th>
<th>FRNS with infection (n=51)</th>
<th>FRNS without infection (n=69)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum cholesterol (mg/dl)</td>
<td>351.02 ± 35.85</td>
<td>327.13 ± 50.38</td>
<td>0.005</td>
</tr>
<tr>
<td>Serum albumin (gm/L)</td>
<td>19.88 ± 4.83</td>
<td>23.97 ± 4.27</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Urinary protein creatinine ratio</td>
<td>3.86 ± 1.20</td>
<td>2.53 ± 0.66</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Serum creatinine (mg/dl)</td>
<td>0.34 ± 0.11</td>
<td>0.33 ± 0.12</td>
<td>0.720</td>
</tr>
</tbody>
</table>

**Discussion**

Children with Nephrotic Syndrome are more susceptible to various forms of bacterial, viral and fungal infections than the general pediatric population. There are several reasons for the increased predisposition to infections in these children. Infections contribute significantly to the morbidity and mortality of FRNS in children. In the present study, it was observed that 42.5% children had infection. Many studies from developing countries found 33% to 48% incidence of infections in FRNS. In the present study, the mean age (years) was 6.87 ± 2.20. which was in concordance with other studies. In our study most common infection was ARI 28(54.9%) and this included both upper and lower ARI followed by peritonitis 11(21.5%), UTI 9(17.6%), and cellulitis 3(5.88%). This is similar to that seen by Moorani et al was observed that the most common type of infection was acute respiratory infections (54.49%), followed by UTI (8.17%), peritonitis (4.9%), and cellulitis (2.17%). ARI was the commonest infection in our study 54.9%. Studies from the other south east Asian countries showed similar findings. In both studies, clinical parameters were more or less similar due to similarity of socioeconomic status, ignorance, immuno-compromised, and late presentation. All patients with ARI in the current study had active disease which is similar to as reported from neighboring country. Spontaneous bacterial peritonitis is a serious complication of nephrotic syndrome with an incidence of 2-6%, and overwhelming infection carries a mortality risk of 1.5%. Peritonitis emerged as the second most common infection accounting for 21.5% cases in the present study, similar frequency in other studies 15.7% and 28.8% reported by others. Similar high prevalence of peritonitis has also been reported from India where its frequency was 25.8%. UTI emerged as the third most common infection accounting for 17.6% of cases in the current study. Similar high prevalence of UTI has also been reported in studies from neighboring country where

### Table III

**Spectrum of Infections in FRNS**

<table>
<thead>
<tr>
<th>Infection</th>
<th>Male N=27(%)</th>
<th>Female N=24(%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Respiratory infection (ARI)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>URTI</td>
<td>11 (40.7)</td>
<td>10 (41.7)</td>
<td></td>
</tr>
<tr>
<td>LRTI (pneumonia/asthma with secondary infection)</td>
<td>3 (11.1)</td>
<td>4 (16.7)</td>
<td>0.531</td>
</tr>
<tr>
<td>Peritonitis</td>
<td>6 (22.2)</td>
<td>5 (20.8)</td>
<td></td>
</tr>
<tr>
<td>Urinary tract infection (UTI)</td>
<td>4 (14.8)</td>
<td>5 (20.8)</td>
<td></td>
</tr>
<tr>
<td>Cellulitis</td>
<td>3 (11.1)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
</tbody>
</table>

URTI=Upper respiratory tract infection, LRTI=Lower respiratory tract infection

### Table IV

**Urinary tract infections (N=9)**

<table>
<thead>
<tr>
<th>UTI</th>
<th>No. of patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary symptoms</td>
<td>09</td>
<td>100%</td>
</tr>
<tr>
<td>Positive urine culture</td>
<td>05</td>
<td>55.55%</td>
</tr>
<tr>
<td>Negative urine culture</td>
<td>04</td>
<td>44.44%</td>
</tr>
<tr>
<td>Organisms E.coli</td>
<td>05</td>
<td>55.55%</td>
</tr>
</tbody>
</table>

Of the 9 cases with UTI, urine microscopy and culture showed growth in 05(55.55%) cases. E.coli growth was observed in 100% specimens (Table-IV).
its frequency ranged from 22.8% to 46%. Regarding bacteriology of UTI, 55.55% of urine cultures turned out to be positive for E. Coli while 44.4% cases had negative culture. These children when presented with dysuria, fever, loin pain, suprapubic tenderness with documented pyuria in urine, though had negative urine culture, had full treatment. The negativity may be due to prior exposure to antibiotics before admission in the hospital as partial treatment by private practitioners. E. Coli in most studies is still as the most common pathogen of the UTI. 

The proportion of children with cellulitis in our study was low (5.88%), which was correlating with similar studies from India. A relatively better vaccination coverage against pneumococci and better living conditions may be contributing to the low incidence of SBP and cellulitis in our study. The significantly lower serum albumin and higher serum cholesterol levels in children with infections suggest that defects in humoral as well as cell-mediated immunity may predispose children to such infections. The serum albumin levels have been found to correlate well with serum properdin B levels.23

Conclusion
We conclude that infections are an important complication of FRNS in children, being observed in 51 of the 120 children (42.5%) in our study. ARI and peritonitis were the commonest infections in our study population. The children who developed these infectious complications had significantly higher serum cholesterol and lower serum albumin levels.

Early institution of appropriate antibiotics and aggressive management of infections, morbidity and mortality can be attenuated. Infections, which most of the time triggers a relapse, can be aborted and a prolonged remission is ensured.

Funding: No funding sources

Conflict of interest: None declared

References
Pattern of Renal Diseases in the Nephrology In-patient Unit of Dhaka Shishu (Children) Hospital in Bangladesh

Tarannum Khondaker¹, Gulshan Nigar Chowdhury², Tahmina Ferdaus³, Jannatul Ferdaus⁴, Kawser Hossain⁵, Shireen Afroz⁶, Mohammed Hanif⁷

Abstract:
The burden of kidney disease in children in most developing countries is unknown and difficult to estimate due to lack of data on pediatric kidney disease and absence of renal registries in general. Since there is a marked paucity of data from our country, this study was conducted to find out the pattern of patients of renal diseases at a tertiary care hospital. This is a retrospective study done in Dhaka Shishu Hospital from June 2017 to May 2018, among patients of inpatient unit of General Nephrology ward. Among 719 cases male to female ratio is 1.8:1. Overall renal diseases were commonly manifested in child between 5-10 year age group (54%). Mean age group was 6 year 3 month. The commonest renal disease was nephrotic syndrome (68%) and initial episode is more common variety of nephrotic syndrome (40%). Other important renal diseases were AGN, AKI, CKD, UTI, and obstructive uropathy. About 96% patients were improved and 2.7% patients were died. The non-survivors had AKI (35%), RPGN (30%), CKD with complication (20%) and Nephrotic syndrome with complication (15%) cases. Most of the non survivors fall in < 5 Year age group.

Key words: Renal diseases, Nephrology inpatient unit, disease pattern.

Introduction
Kidney diseases are a growing worldwide problem and constitute one of the major public health threats. The pattern of childhood renal disease varies from one geographic region to another even within the same country. This variation is influenced by factors such as genetic predisposition, environmental background, and to a large extent the level of awareness to country. Renal diseases are one of the important causes of hospital admission among children. It constitutes an important cause of morbidity and mortality which imposes a considerable burden on the already strained health services in developing countries. The causes are different in developing countries as compared to developed ones. In general, pediatric renal disease accounts about 4.5-8.7% of total pediatric admissions. The diagnosis of renal disease among hospitalized children can often be missed. Spectrum of pediatric renal diseases start from congenital anomalies of kidney and urinary tract (CAKUT) such as obstructive uropathy and other congenital urological manifestations to acquired kidney disorders such as glomerulonephritis, renal stone diseases and urinary tract infections. In Bangladesh, data regarding pediatric kidney diseases are scanty due to absence of a national registry. Earlier, a study from a district hospital reports, about 4.4% of hospital admission were due to renal related problems. Pediatric nephrology is a new sub specialty in Bangladesh and a few centers are established, those are referral centers also for kidney patients. Few hospital based studies exist and the reported pattern of renal disease in pediatric population is variable. Several studies have so far been done at Dhaka Shishu Hospital on various aspects of kidney disease, but exact pattern of renal diseases is yet to be known. Therefore, this study was...
conducted to see the pattern of renal diseases in children in inpatient unit of Dhaka Shishu Hospital.

**Materials and Methods**

**Study Settings**

This was a retrospective analysis of medical records of patients admitted from June 2017 to May 2018 in the Nephrology unit of the Dhaka Shishu (children) Hospital, the largest tertiary children hospital in Dhaka capital city. Kidney patients are span over 21 fixed bedded General Nephrology ward (Ward 12 and Ward 5), 8 bedded Critical Care Nephrology & Dialysis ward which deals with critical kidney patients who required emergency renal replacement therapy and intensive management, and also occupy beds of other wards & cabins of this hospital. This study was conducted in general nephrology ward which occupied the main bulk of kidney patients.

**Data collection**

During the study period, we used in-patient data from medical registry written at the time of discharge by doctors. All child between age range from 0 to 18 years who were admitted into inpatient unit of general nephrology ward with renal diseases are included in this study. We considered only the first hospitalization for patients admitted several times for the same disease. Patient information were recorded including age, gender, pattern of kidney disease, varieties of disease and outcome. The cases were categorized into: nephrotic syndrome (NS), acute glomerulonephritis (AGN), urinary tract infection (UTI), acute postinfectious glomerulonephritis (APIGN), lupus nephritis, Henoch-Schönlein purpura nephritis (HSP nephritis), acute kidney injury (AKI), chronic kidney disease (CKD), hemolytic uremic syndrome (HUS), and others, using standard definitions.

**Statistical analysis**

Data including age, gender, diagnosis and outcome were collected on a structured preform and analyzed using Statistical Package for Social Science (SPSS) version 16. The results were expressed as mean for quantitative variables like age and percentages were used for qualitative variables like gender, disease pattern and outcome.

**Results:**

During the study period June ’2017 to May ’2018, about 915 patients were admitted in fixed bedded of general nephrology ward (Ward 12, Ward 5). Among them 719 cases (78%) were enrolled for the study after meeting inclusion criteria.

### Table I

<table>
<thead>
<tr>
<th>Age</th>
<th>Freq.</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5 year</td>
<td>248</td>
<td>34.49</td>
</tr>
<tr>
<td>5-10 year</td>
<td>386</td>
<td>53.69</td>
</tr>
<tr>
<td>&gt;10 year</td>
<td>85</td>
<td>11.82</td>
</tr>
<tr>
<td>Total</td>
<td>719</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 1 shows that total 248 patients (34%) belonged to age group of < 5 year, most of the cases 386 patients belonged to the age group of 5-10 year (54%) with mean of 6 year 3 month and 85 patients (12%) belonged to age group of > 10 year.

**Fig.-1: Pie chart showed sex distribution of cases**

Among the study patients 465 (64%) were male and 254 (35%) were female. Male to female ratio were 1.8:1 (Fig.-1).

### Table II

<table>
<thead>
<tr>
<th>Disease</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nephrotic syndrome</td>
<td>491</td>
<td>68%</td>
</tr>
<tr>
<td>Acute</td>
<td>95</td>
<td>13.1%</td>
</tr>
<tr>
<td>Glomerulonephritis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acute Post infectious</td>
<td>40</td>
<td>5.5%</td>
</tr>
<tr>
<td>Glomerulonephritis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rapidly Progressive</td>
<td>14</td>
<td>2%</td>
</tr>
<tr>
<td>Glomerulonephritis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systemic lupus nephritis</td>
<td>10</td>
<td>1.4%</td>
</tr>
<tr>
<td>Henoch schonlein purpura nephritis</td>
<td>19</td>
<td>2.6%</td>
</tr>
<tr>
<td>Ig A Nephropathy</td>
<td>12</td>
<td>1.6%</td>
</tr>
<tr>
<td>Acute kidney injury</td>
<td>43</td>
<td>6%</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>31</td>
<td>5.1%</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>25</td>
<td>3.5%</td>
</tr>
<tr>
<td>Obstructive uropathy</td>
<td>28</td>
<td>3.9%</td>
</tr>
<tr>
<td>Haemolytic uremic syndrome</td>
<td>03</td>
<td>0.41%</td>
</tr>
<tr>
<td>Bartter syndrome</td>
<td>2</td>
<td>0.2%</td>
</tr>
<tr>
<td>Diabetis insipidus</td>
<td>1</td>
<td>0.1%</td>
</tr>
</tbody>
</table>

As showed in Table-II most common renal disease was nephrotic syndrome (68%), followed by AGN (13%), AKI (6%), CKD (5.1%), Obstructive uropathy (3.9%) and UTI were seen 3.5% respectively. Other cases were HUS (0.41%), Bartter syndrome (0.2%) and diabetis insipudus (0.1%). AGN cases were presented as Acute Post infectious Glomerulonephritis 5.5%, Rapidly Progressive Glomerulonephritis 2%, Systemic lupus nephritis 1.4%, Henoch purpura nephritis 2.6% and Ig A Nephropathy 1.6% cases.

### Table III

<table>
<thead>
<tr>
<th>Disease</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nephrotic Syndrome Initial episode</td>
<td>197</td>
<td>40%</td>
</tr>
<tr>
<td>Steroid dependant nephrotic syndrome</td>
<td>108</td>
<td>22%</td>
</tr>
<tr>
<td>Infrequent relapse nephrotic syndrome</td>
<td>85</td>
<td>17%</td>
</tr>
<tr>
<td>Frequent relapse nephrotic syndrome</td>
<td>76</td>
<td>15.2%</td>
</tr>
<tr>
<td>Steroid resistant nephrotic syndrome</td>
<td>20</td>
<td>4.02%</td>
</tr>
<tr>
<td>Congenital Nephrotic Syndrome</td>
<td>3</td>
<td>0.6%</td>
</tr>
<tr>
<td>Not classified</td>
<td>2</td>
<td>0.4%</td>
</tr>
</tbody>
</table>

Among NS cases, first episode was present in 40% cases followed by steroid dependent in 22% cases, infrequent relapse in 17%, frequent relapse in 15%, steroid resistant in 4% cases and congenital nephrotic syndrome in 0.6% cases. (Table III).

Table IV, nephrotic syndrome was common in 5-10 year age group and mean age was 7 year. All the cases of Acute glomerulonephritis were present more common in 5-10 year age group. Mean age was 8 year 5 month. AKI Commonly present in child < 5 year and mean age 1.5 year. Chronic kidney diseases were common in children 5-10 year age group. Mean age was 9 year. Urinary tract infection commonly present in child < 5 year of age and mean age was 2 yr 4 month. Obstructive uropathy was commonly present in child < 5 year age group. Mean age was 1 year. 3 cases were diagnosed Haemolytic Uremic Syndrome presenting at 1 year, 3 year and 7 year of age. 2 cases were diagnosed antenatal Bartter syndrome at 5 month of age and 7 month of age respectively. Diabetes insipidus was diagnosed in one case and the age was 11 year. It was shown that renal disease was more commonly present in child between 5-10 year age group (52%) and mean age was 6 year 3 month.

### Table IV

<table>
<thead>
<tr>
<th>Disease</th>
<th>&lt;5 year</th>
<th>5-10 year</th>
<th>&gt;10 year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nephrotic syndrome</td>
<td>201(28%)</td>
<td>267(37%)</td>
<td>23(3.1%)</td>
</tr>
<tr>
<td>Acute postinfectious Glomerulonephritis</td>
<td>2(0.2%)</td>
<td>28(3.8%)</td>
<td>10(1.4%)</td>
</tr>
<tr>
<td>Rapidly Progressive Glomerulonephritis</td>
<td></td>
<td>9(1.25%)</td>
<td>5(0.7%)</td>
</tr>
<tr>
<td>Ig A Nephropathy</td>
<td>08(1.1%)</td>
<td>4(0.5%)</td>
<td></td>
</tr>
<tr>
<td>Henoch schonlein purpura nephritis Systemic lupus nephritis</td>
<td>10(1.4%)</td>
<td>9(1.2%)</td>
<td></td>
</tr>
<tr>
<td>Acute kidney injury</td>
<td>30(4.1%)</td>
<td>8 (1.1%)</td>
<td>5(0.7%)</td>
</tr>
<tr>
<td>Chronic kidney disease</td>
<td>5(0.7%)</td>
<td>16(2.2%)</td>
<td>10(1.4%)</td>
</tr>
<tr>
<td>Urinary tract infection</td>
<td>12(1.7%)</td>
<td>8(1.1%)</td>
<td>5(0.7%)</td>
</tr>
<tr>
<td>Obstructive uropathy</td>
<td>10(1.4%)</td>
<td>9(1.2%)</td>
<td>9(1.2%)</td>
</tr>
<tr>
<td>Haemolytic uremic syndrome</td>
<td>2(0.2%)</td>
<td>1(0.13%)</td>
<td></td>
</tr>
<tr>
<td>Bartter syndrome</td>
<td>2(0.3%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diabetis insipidus</td>
<td></td>
<td></td>
<td>1(0.13%)</td>
</tr>
<tr>
<td>Total</td>
<td>262(36%)</td>
<td>375(52%)</td>
<td>82(11%)</td>
</tr>
</tbody>
</table>

### Table V

<table>
<thead>
<tr>
<th>Hospital outcome</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved</td>
<td>694</td>
<td>96%</td>
</tr>
<tr>
<td>Referred</td>
<td>5</td>
<td>0.6%</td>
</tr>
<tr>
<td>Death</td>
<td>20</td>
<td>2.7%</td>
</tr>
</tbody>
</table>

Table V showed about 694 (96%) cases were improved, 2.7% were expired and about 0.6% cases required referral in other sub specialities.
The non-survivors had AKI mostly due to sepsis causing multiorgan dysfunction syndrome (35%), RPGN (30%), CKD with complication (20%) and nephrotic syndrome with complication (15%) cases. (Table 6). Among the non-survivors < 5 Year was common age group as showed in diagram 2. Non survivors of CKD and RPGN were present at higher age group. As they presented late the complications were more.

![Fig-2: Relationship of age versus causes of death.](image)

**Discussion:**
This study describes for the first time the pattern and outcomes of renal diseases in hospitalized children in Dhaka Shishu hospital. In this study, male patients were predominant. This is in accordance with other studies from developing countries. The socio-cultural and economic factors favoring males in this setting could explain this gender bias in addition to being a risk factor for kidney disease. In this study most of the cases belonged to the age group of > 5 year (54%) with mean of 6 year 3 month which nearly corresponds to another study done in our country in a tertiary hospital by afroza et al. In these study the spectrum of diseases of the kidney and urinary tract were diverse and included nephrotic syndrome, AGN, CKD, AKI, UTI, Obstructive uropathy, vasculitis, Bartter syndrome and Diabetis insipidus which also nearly similar to other studies of our country as well as other developing countries.

Among the study cases Nephrotic syndrome was the most common presentation and occurred in 491 patients (64%). Primary NS has been reported as the most common renal disorder in pediatric population from all over the world. Its frequency varies from 18.5% to 60% in different studies from various geographical regions. Among the nephrotic syndrome cases first attack was predominant, followed by steroid dependent nephritic syndrome (SDNS), IRNS, FRNS and SRNS. This data relatively similar to other studies done in our country. However some of the study conducted in other developing countries showed AGN as a predominant renal disease.

In present study number of AGN is the second highest common renal disorder which corresponds to other study done in our country. The number comparatively lower than other studies of developing country. This low number may be attributed to the fact that, uncomplicated APSGN usually managed in periphery.

It has been observed in this study that number of AKI patients were relatively higher in comparison to other study. The reason due to our centre is the largest tertiary centre for children and we are getting referral for all subspecialties mostly neonatology, cardiology and paediatric surgery, NICU, Cardiac ICU and PICU for complicated patients with AKI as we have special facilities and set up for renal replacement therapy. Similar result was showed in another study of developing country.

The prevalence of CKD in this study was 5.1%. The number is relatively lower than other studies. The reason for low incidence of CKD due to many factors such as lack of early diagnosis, inadequate management of potential treatable risk factors, the silent evolution of kidney disease making that patients look for hospital only when the disease is manifested and especially financial constraints.

In our study UTI were seen 3.5% patients. The other studies reported relatively higher incidence of UTI and the difference is due to that we are getting complicated UTI being a referral center and many patients of lower UTI did not come for medical treatment and treated at OPD basis. Similar result found in another study done in our country by Qader et al.
In this study IgA nephropathy was reported in only 1.7%. Similar reports obtained from the neighboring country India, but different from reports from Europe where IgA is the leading cause of glomerular disease.19,20

Conclusion:
This study identifies the current pattern of renal diseases in children in pediatric nephrology inpatient unit of a tertiary care hospital in Dhaka city. Nephrotic syndrome is the most common disease followed by acute glomerulonephritis, acute kidney injury, chronic kidney disease, urinary tract infection and obstructive uropathy. It has been found that, boys were presented more commonly than girls in this study. Most of the cases belonged to the age group of 5-10 year.

Limitations:
Our study has some limitations, the retrospective nature in which accuracy of data collection can be doubted. Despite these limitations this study report for the first time the epidemiology and outcome of renal disease amongst children in Dhaka Shishu Hospital. This basic data give information that could help health planners in future to improve the outcome of children in our setting.

Conflict of interest: Not declared

References


Bacteriological Profile and Antimicrobial Susceptibility Pattern of the Isolates of Urinary Tract Infection in Children: A study in a Tertiary Care Hospital in Dhaka, Bangladesh

Quazi Rakibul Islam¹, Gulshan Akhtar², Sayed Samiul Huque³, Abdul Malek⁴, Kazi Yesmia⁵, Shanjoy Kumar Paul⁶

Abstract

Background: Urinary tract infection (UTI) is one of the most common pediatric infection frequently encountered by pediatric health care providers. It may lead to long-term complications including renal scarring, hypertension and loss of renal function. The spectrum of causative agent of UTI and their antimicrobial sensitivity pattern has been continuously changing over the years.

Objective: This study was aimed to determine bacterial isolates and antimicrobial susceptibility pattern of the isolates among pediatric patients with urinary tract infections.

Materials and Methods: A hospital-based prospective descriptive study of 240 children from 2 months to 15 years who visited the pediatric department with features of UTI was done. Urine sample of the suspected UTI cases were collected and processed for isolation of uropathogen. Antibiotic susceptibility test of the isolates were performed as per the Clinical and Laboratory Standards Institute (CLSI) guidelines. Finally, the culture positive UTI (proven UTI) cases were enrolled in the study.

Results: Among the 240 children with clinically suspected UTI, 74 (30.83%) had culture positive infection. Of these culture positive 74 cases, 45 (60.81%) were females and 29 (39.19%) were male child. Escherichia coli (E. coli) was the most commonly isolated uropathogen (71.62%). UTI was found more prevalent (71.62%) among the under five child. Above five years it was more common in females than males (83.33% vs 16.67%). E. coli the most commonly isolated bacteria was found highly resistant to commonly used oral antibiotics such as Cotrim, Amoxicillin, Ciprofloxacin and Cefixime; but showed high level of sensitivity to Nitrofurantoin (77.55%) and Aminoglycosides. Amikacin showed highest sensitivity accounting 89.58% to E. coli and 100% to Proteus spp and Klebsiella spp.

Conclusion: The uropathogens causing UTI are highly resistant to antibiotics commonly used as empirical therapy for UTI in children. Continued large scale studies are required to develop appropriate empirical treatment of urinary tract infection in children.

Key Words: Urinary tract infection, children, bacterial isolates, antimicrobial susceptibility.

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Introduction

Urinary tract infection (UTI) implies the presence of actively multiplaying organisms in the urinary tract causing inflammation with development of signs and symptoms of UTI.¹²³ UTI is a common bacterial infection in children world wide. The male:female ratio of UTI varies with age, sex, race, geographic area and socioeconomic status. Population based studies show that 1-2 percent of boys and 3-7 percent of girls had at least one UTI by 6-7 years of age.⁴⁵ Recurrent UTI may lead to severe complications like renal scarring, proteinuria, hypertension and chronic kidney disease.⁶⁷
Diagnosis of UTI is often difficult as a large number of young child suffering from UTI present with non specific symptoms, such as abdominal pain, poor feeding, vomiting, irritability or fever alone. In older children common other symptoms are dysuria, frequency, foul-smelling urine, back pain or new day time incontinence. In children most often UTI manifests as fever of unknown origin, and a young child with a high fever without other symptoms has 5 percent chance of having UTI. Gram-negative enteric bacilli are the leading pathogens in community acquired UTI in children. Escherichia coli being the most commonly isolated uropathogen accounting 58.9% to 85.0% of the total isolates. Other common pathogens are Klebsiella, Proteus, Enterobacter and Pseudomous. Diagnosis of UTI in young children is important as it may be the marker of urinary tract abnormalities. Early diagnosis and treatment with proper antibiotic is the main stay to preserve renal function of growing kidneys. But inappropriate and widespread use of antibiotics lead to development of multi drugs resistant uropathogens. So, the aims of present study was to find out the distribution of bacterial strain isolated and their antimicrobial sensitivity pattern at our setting.

Materials and Methods
This prospective study was done in Green Life Medical College Hospital, Dhaka from July 2015 to June 2018. 240 urine samples of children aged 2 months to 15 years attending pediatric outpatient department (OPD) or admitted in the pediatric ward with diagnosis of UTI based on clinical feature of UTI such as fever, abdominal pain, dysuria, frequency, urgency, incontinence and those with fever without a focus were collected. After taking through history and clinical examination, they were subjected for urine routine and microscopic examination with culture and sensitivity testing. Finally, the 74 cases with positive urine culture were enrolled in the study. Samples which were reported as mixture of more than two microorganisms were excluded from the study. Verbal contest was taken from the parents or guardian before enrolling them in the study. Clean catch midstream urine samples were collected from older children while transurethral bladder catheterization was done to obtain urine sample in infant and young children. Specimen was collected in sterile, leak proof wide mouth container. The specimens were transported to the bacteriology laboratory immediately or if there was a delay, refrigerated for 4 hours before processing. The samples were inoculated on Blood agar and Mac Conkey agar using calibrated wire loop and incubated at 37°C following standard bacteriological technique. Over night incubation for 24-48 hours colonies were counted to check significant growth. A growth of 10^5 colony forming units/ml or more of a single organism for midstream urine samples and greater than 5×10^4 colony forming units/ml for samples obtained by catheterization was considered significant bacteriuria and UTI. The growth was subjected to identification based on colony characteristics and biochemical tests according to standard microbiological techniques. For susceptibility testing Muller-Hinton agar plate was swabbed with the suspension using sterile cotton swab and the antibiotic discs were placed over agar for diffusion of the antibiotics in the disc. All isolates were tested for antimicrobial susceptibility against different antibiotics using the disc diffusion method. The investigation reports of the patient with UTI were analyzed.

Results
Out of 240 patients who had complaints related to UTI and who were subjected to routine urine and culture, 74 (30.83%) showed significant bacterial growth in urine culture and were diagnosed to have UTI and analyzed. Of the 74 isolates, 29 (39.19%) were males and 45 (60.81%) were females with a male : female ratio of 1 : 1.55 (Figure-1). Age wise maximum patients in our study were in the age group of > 1-5 yrs (52.70%), followed by > 5-10 yrs (24.32%) and > 2 mo-1yr (18.92%) groups respectively. In the > 2mo-1yr, >1-5 yrs and > 5-10 yrs age groups the male:female ratio of proven UTI were 1:1.33, 1:05:1 and 1:5 respectively (Table-I).
Table I

Age and gender wise distribution of culture positive patients (n=74).

<table>
<thead>
<tr>
<th>Age group</th>
<th>Gender</th>
<th>Culture showing significant bacteriuria</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male (n=29)</td>
<td>Female (n=45)</td>
</tr>
<tr>
<td>&gt; 2mo-1yr</td>
<td>6 (42.86%)</td>
<td>8 (57.14%)</td>
</tr>
<tr>
<td>&gt; 1yr-5yrs</td>
<td>20 (51.28%)</td>
<td>19 (48.72%)</td>
</tr>
<tr>
<td>&gt; 5yrs-10yrs</td>
<td>3 (16.67%)</td>
<td>15 (83.33%)</td>
</tr>
<tr>
<td>&gt; 10 years</td>
<td>0 (00%)</td>
<td>3 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td>29 (39.19%)</td>
<td>45 (60.81%)</td>
</tr>
</tbody>
</table>

There was no significant difference in rate of growth positive UTI in two gender (M:49.06%, n=26 and F:50.94%, n=27) below 5 years of age. But among 5-10 years of age, there was a significant difference in growth positivity rate in two gender (M:16.67%, n=3 and F:83.33%, n=15).

Among of the culture positive patients, E. coli was isolates in 53 (71.62%) cases followed by Proteus sps in 06 (8.11%), Klebsiella sps in 04 (5.41%), Staph. Epidermidis in 03(4.06%), Pseudomonas in 02(2.70%), Enterococci sps in 02 (2.70%), Staph. aureus in 02 (2.70%), Enterobacter sps in 01 (1.35%) and Strepto fecalis in 01 (1.35%) patient. E.coli was more commonly isolated in females (M:35.85%, n=19 and F:64.15%, n=34), Proteus was more common in males (M:66.67%, n=4 and F:33.33%, n=2)(Table-II).

The microorganisms isolated in the study showed varied patterns of sensitivity to the antimicrobial agents used against them. But not a single isolate was found resistant to all the antimicrobial agents used in the study. Uropathogens isolated showed high level of resistance to Amoxicillin, Nalidixic acid, Cotrimoxazole, Azithromycin and Ciprofloxacin. High resistance was also showed to 3rd generation of Cephalosporines such as Cefixime and Ceftriaxone. The most commonly isolated uropathogen E. coli was found to be highly sensitive to Amikacin (89.58%), followed by Imipenem (84.21%), Meropenem (81.25%), Nitrofurantoin (77.55%), Amoxiclave (62.16%) and Gentamicin (62%). The present empiric choice of antibiotics such as Cotrimoxazole, Ciprofloxacin, Cefixime, Nalidixic acid and Amoxicillin were found to be 69.05%, 57.14%, 67.65%, 81.58% and 93.75% resistant to E. coli respectively. The isolated Proteus sps was 100% sensitive to Amikacin, Imipenem and Meropenem. It also showed high degree of sensitivity to Nitrofurantoin (80%), Ceftriaxone (80%) and Amoxiclave (75%) in our study. Klebsiella sps isolated here, showed 100% sensitivity to Amoxiclave, Nitrofurantoin, Cotrimoxazole, Ciprofloxacin, Gentamicin, Ceftriaxone, Amikacin and Imepenem. Azithromicin, another commonly used antibiotic in our community showed very high resistance to Klebsiella sps (100%), Proteus sps(100%) and E. coli (72.73%) (Table-III).

Table-II

Frequency distribution of isolates among patients gender

<table>
<thead>
<tr>
<th>Isolates</th>
<th>Male (%)</th>
<th>Female (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=29</td>
<td>n=45</td>
<td>n=74</td>
</tr>
<tr>
<td>E. coli</td>
<td>19 (65.52)</td>
<td>34 (75.56)</td>
<td>53 (71.62)</td>
</tr>
<tr>
<td>Proteus sps</td>
<td>04 (13.79)</td>
<td>02 (4.44)</td>
<td>06 (8.11)</td>
</tr>
<tr>
<td>Klebsiella sps</td>
<td>02 (6.90)</td>
<td>02 (4.44)</td>
<td>04 (5.41)</td>
</tr>
<tr>
<td>Staph. epidermidis</td>
<td>01 (3.45)</td>
<td>02 (4.44)</td>
<td>03 (4.06)</td>
</tr>
<tr>
<td>Pseudomonas sps</td>
<td>01 (3.45)</td>
<td>01 (2.22)</td>
<td>02 (2.70)</td>
</tr>
<tr>
<td>Enterococcus sps</td>
<td>00</td>
<td>01 (4.44)</td>
<td>02 (2.70)</td>
</tr>
<tr>
<td>Staph. Aureus</td>
<td>01 (3.45)</td>
<td>01 (2.22)</td>
<td>02 (2.70)</td>
</tr>
<tr>
<td>Enterobacte sps</td>
<td>01 (3.45)</td>
<td>00</td>
<td>01 (1.35)</td>
</tr>
<tr>
<td>Strepto fecali sps</td>
<td>00</td>
<td>01 (2.22)</td>
<td>01 (1.35)</td>
</tr>
</tbody>
</table>
Discussion

The predominance of female among children suffering from acute UTI in our study with a male : female ratio of 1:1.55 is consistent with many previous reports having M : F ratio from 1:1.3 to 1:2.7,11,12,14,15 This female predominance may be due to shorter female urethra and its close proximity to the anus, which enhances contamination and ascend of faecal flora to the urinary tract.11 In a few studies, higher positive rate among male children compared with female child are also observed.18,19 This could be due to more male children coming to the hospital and giving more preference to males in their society.18 In this study, majority of the growth positive children (71.62%) were in the age group of less than five years like some other studies.10,15,16,20 This can be explained by the fact that the younger children are not well toilet trained and so chance of ascending the faecal flora in to the urinary tract is more in this age group causing UTIs. On the other hand, very high incidence of UTI in females than male among age group of >5 years is due to short urethra and its close proximity to anus in female is also facilitated by the positive effect of circumcision in male child to reduce UTIs.3,4,20 The rate of positive urine culture in this study was 30.83%. which is similar to rates of 26% to 70% in previous studies. 7,10,11,14,15,17,19 However, in some other studies the rate of proven UTI were between 16% to 19% only.1,16,21 In the present study gram-negative (87.84%) organisms were the common uropathogen, among which E. coli was the most commonly isolated organism constituting (71.62%) of all positive samples. This was followed by Proteus sps and klebsiella sps as shown in table 2. This predominance of E. coli is consistent with the results of most of the observers.1,13,14,15,21 Here, E. coli was more commonly isolated in females but Proteus sps was more commonly isolated in males as like other studies.11 This could be due to colonization of the prepuce by Proteus sps in males and easy entrance of gut flora in females urinary tract because of close proximity to anus.

Regarding the antibiotic sensitivity pattern of isolates, E. coli were found to be most sensitive to Amikacin (89.58%), Imipenem (84.21%), Meropenem (81.25%), Nitrofurantoin (77.55%), Amoxiclave (62.16%) and Gentamicin (62%). But in a study from Combined...
Military Hospital (CMH), Dhaka E. coli was found to be most sensitive to Ciprofloxacin followed by Nitrofurantoin, Amikacin and Levofloxacin in descending order. In another study in a tertiary level hospital of Bangladesh E. coli was found 80% sensitive to Amikacin and Nitrofurantoin. In studies from Nepal E. coli were 70-90% sensitive to Amikacin, Ceftriaxone, Cefuroxime, Gentamicin and Nitrofurantoin. But in one study it was 100% sensitive to Nalidixic acid and in other 100% sensitive to Nitrofurantoin. In studies from different region of India maximum sensitivity of E. coli were observed to Imipenem, Amikacin, Nitrofurantoin and Meropenem ranging from 65% to 100% of cases, which are consistent to our study. Studies done in Turkey also reported 97.8% sensitivity of Nitrofurantoin to E. coli. In other studies done in Greece and United Kingdom also reported 95.6% and 93.0% sensitivity of Nitrofurantoin against E. coli respectively.

In our study, the commonly used antibiotics have been shown to be highly resistant to the most commonly isolated bacteria of UTI in children. E. coli were resistant to Amoxicillin (93.75%), Nalidixic acid (81.58%), Azithromycin (69.77%), Cotrimoxazole (69.05%), Cefixime (67.65%), Cefuroxime (65.31%) and Ciprofloxacin (57.14%). As like our observation, in a study of CMH, Dhaka there were high level of resistance to Amoxicillin, Cotrimoxazole, Azithromycin, Cefixime, Cefuroxime and Ceftriaxone. In studies from Nepal, in general high resistance rate (59% to 85%) was also observed to Cefixime, Cotrimoxazole and Ampicillin. On the other hand, as like the sensitivity pattern studies from different corner of India showed different pattern of high resistance of E. coli to Ampicillin (87.5% to 100%), Cotrimoxazole (60.41% to 80%), Ciprofloxacin (79.16% to 86.7%), and Ceftriaxone (55.22% to 66.66%). which were similar to our observation.

In the present study, the 2nd most common isolates Proteus spp showed 100% sensitivity to Amikacin, Imipenem & Meropenem; 80% sensitive to Ceftriaxone and Nitrofurantoin; 75% to Amoxiclave. But were highly resistant to Cotrimoxazole, Nalidixic acid, Cepofloxacin, Amoxicillin, Cefixime and Levofloxacin ranging from 60% to 100% in ascending order. These observations in our study were consistent with studies from other countries also. Klebsiella spp isolated in our study showed very high sensitivity to Amoxiclave (100%), Amikacin (100%), Cotrimoxazole (100%), Ciprofloxacin (100%), Ceftriaxone (100%), Imipenem (100%) and Nitrofurantoin (100%); but were highly resistant to Cefixime (100%) and Amoxicillin (100%).

Through the past few decades drug resistance to uropathogens has increased worldwide because of wide spread indiscriminate use, easy availability and over the counter (OTC) sale of antibiotics. Prior antimicrobial therapy in the sick children and self-medication for shorter than the clinically accepted time length may also be responsible for development of these multi drug resistant (MDR) isolates. The situation is more devastating in the developing countries including Bangladesh.

**Conclusion**

This prospective study was conducted from July 2015 to June 2018 and 74 culture positive UTI cases were enrolled. Here, Escherichia coli was the most commonly isolated uropathogen followed by Proteus spp and Klebsiella spp. E. coli was found highly sensitive to Amikacin, Imipenem, Meropenem, Nitrofurantoin and Amoxiclave. Proteus spp was the second most common organism was found to be most sensitive to the same antibiotics. But in general cotrimoxazole, Amoxicillin, Azithromycin, Cefixime and Ciprofloxacin showed high degree of resistance to commonly isolated uropathogens. So, large scale studies are required to monitor the changes in the antibiotic sensitivity pattern to formulate appropriate empirical therapy.

**References**


Use of Improperly Mixed oral Rehydration Salt (ORS) and Hypernatremia in Children- A Burning Issue
Shireen Afroz

Abstract:
Improperly prepared oral rehydration salt (ORS) solution, such as preparation with incorrect proportions, and excessive intake frequency have often been reported to cause different degrees of severity of hypernatremia. After drinking concentrated ORS children become excessively thirsty, which often results in caregivers’ frequently administering ORS to quench thirst and ultimately leads to severe and extreme hypernatremia. Another faulty believe of using ORS in a little volume of water to avoid cold during winter also aggravates complications. As a consequence young children are presented with severe hypernatremia with dehydration, seizure, coma, acute kidney injury. We need to solve this burning issues immediately. Otherwise lifesaving ORS will emerge as a life threatening one.

Introduction:
Oral rehydration therapy (also called ORT oral rehydration salts or solutions (ORS) or oral electrolyte) is a simple, cheap, and effective treatment for diarrhea-related dehydration, caused by e.g. cholera. It consists of a solution of salts and other substances such as glucose, sucrose, citrates or molasses, which is administered orally. It is used around the world, but is most important in the Third World, where it saves millions of children from diarrhea—still their leading cause of death.

ORT was developed in the late 1960s by researchers in India and International Centre for Diarrhoeal Disease Research in Bangladesh (then East Pakistan), for the treatment of cholera. The Indo-Pakistani War of 1971 provoked a public health emergency in the refugee camps set up to house those fleeing the violence. With cholera spreading rapidly and death rates rising, the head of a medical centre in one of the camps instructed his staff to distribute Oral Rehydration Salts (ORS). In the refugee camps where ORS was being used the death rate was only 3%, compared to 20–30% in those camps using only intravenous fluid therapy.

In 2002, Drs. Norbert Hirschhorn, Dilip Mahalanabis, David R. Nalin, and Nathaniel F. Pierce were awarded the first Pollin Prize for Pediatric Research, in recognition of their work in developing ORT. Between 1980 and 2000, ORT decreased the number of children under five dying of diarrhea from 4.6 million worldwide to 1.8 million—a 60% reduction. According to The Lancet (1978), ORT is “potentially the most important medical discovery of the 20th century”. Today, the total production is around 500 million ORS sachets per year, with the children’s rights agency UNICEF distributing them to children in around 60 developing countries. ORS represents a cheap and effective way of reducing the millions of deaths caused each year by diarrhea

Oral rehydration therapy is widely considered to be the best method for combating the dehydration caused by diarrhea and/or vomiting. Various diseases cause damage to the intestine, allowing water to flow from the blood into the intestine, depleting the body of both fluid and electrolytes. This may be

• a direct destruction of the cells lining the intestine (the enterocytes)
• a toxic effect causing them to loose their microvilli (the brush border)
• a toxic effect (by an enterotoxin) causing them to secrete water.

Infants with moderate-to-severe hypernatremic dehydration are at highest risk for morbidity and mortality, including risk for cerebral hemorrhage,
thrombus, or edema. Their intravascular volume is generally spared. Based on expert opinion and reasoning from first principles, fluid and electrolyte maintenance and deficit needs usually calculate to be D5 ¼ NS K 20 to 40mEq/L (20 to 40 mmol/L) KCl. Deficit replacement should occur over 48 hours, with goal correction of sodium not to exceed 0.5 mEq/L (0.5 mmol/L) per hour.1

In the 1970s many clinical studies were conducted in developing countries to document the safety and efficacy of ORT. As a result, ORT was adopted by the World Health Organization (WHO) in 1978 as its principal strategy for preventing diarrheal deaths. This strategy was quickly adopted by several international agencies including UNICEF and USAID and national programs throughout the developing world. As a result, millions of children were saved. Despite the remarkable success of ORT in developing countries, US pediatricians were reluctant to use ORT among children primarily because of their concern about hypernatremia.

ORT was dismissed as third world medicine. In the 1980s, a number of controlled trials in the United States demonstrated the safety and efficacy of ORT among US children. Based on these studies, the AAP first endorsed the use of ORT for diarrhea in 1985. In 1993, the AAP also published guidelines for the management of diarrhea, which were revised in 1996. Despite the endorsement of the AAP and the CDC, ORT is appropriately used in <30% of cases of diarrhea in the United States.2

**What are the reasons for this gap between the scientific knowledge about ORT and its practical implementation?** Experts at the 25th anniversary meeting noted a lack of training of all categories of health care providers about the proper use of ORT. In addition, appropriate information is not provided to parents and guardians about the use of ORT for treatment and prevention of dehydration. The successful implementation of the guidelines outlined in this manuscript is dependent on the cooperation between the health care providers, parents, health care administrators, and major professional organizations like the AAP, family physicians, emergency medicine, and professional organizations in the field of nursing. These organizations should provide appropriate training opportunities and develop appropriate educational material that can be distributed to parents and practitioners at all levels.

The educational objectives should ensure that health care providers know the following facts about ORT: 1) it is a simple cost-effective method of treating acute diarrhea, regardless of etiology, in patients with mild to moderate dehydration. 2) Vomiting is not a contraindication for using ORT. 3) Rehydration therapy should be instituted as soon as diarrhea begins. 4) Appropriate feeding should be instituted as soon as initial rehydration therapy has been completed. Physicians should provide training to their staff about the appropriate use of ORT. In addition, parents should be given information at well-child visits about the management of diarrhea and the importance of replacing fluid loss as soon as diarrhea begins. Physicians should also encourage parents to keep a supply of ORS at home at all times. In many developing countries, ORT training centers have been created that have been very successful in training providers. For decades, technology has been transferred from the United States to developing countries. However, ORT has been primarily developed in emerging countries and has the potential to benefit enormously the developed world.2

The effectiveness of home management of diarrhoeal diseases is achievable only if caregivers have appropriate information despite varying recommendations on the strategies for diarrhoea therapy. In an African study to evaluate caregivers’ perception and use of ORT fluids for management of diarrhoea in under-five age children, it was found that, access to ORT fluids was high with 73.1% of all children with diarrhoea being offered an ORT fluid at home. However, the method of preparation and administration of fluids was quite unsatisfactory. Previous experience with ORT fluids, higher educational or socioeconomic status did not correlate significantly with better performance.

Despite high level of knowledge and acceptance of ORT among the study population actual practice was not satisfactory. Diverse practices by caregivers which represent the various phases of evolution in the types of fluids promoted for oral rehydration reflect some confusion that require urgent attention. Knowledge and skills of ORT need to be widely promoted on a continuing basis with the need for health workers to ensure that caregivers are taught and adhere to the correct recommendations on oral rehydration therapy.3

Many caregivers did not know the difference between the recommended volumes of water for preparing
Oral Rehydration Salt solution (i.e., 500 millilitres). Consequently, children are offered fluids that are either hypotonic or hypertonic so that otherwise simple acute watery diarrhoea may be converted to hyponatrexmic or hypernatrexmic diarrhoea. Improperly mixed formula or oral rehydration solutions is recognised as one of the commonest causes of hypernatremia due to primary sodium excess. Conversely, administration of water in excess of solutes leading to water gain is cited as a cause of hyponatremia.

Replacing ordinary water completely with improperly reconstituted ORT fluids, may lead to giving children unnecessarily high solute loads when there is no loss via diarrhoeal stools. A recent review suggests that barely 39% of children with diarrhoea in developing countries receive the recommended treatment with little progress made since 2000.

Use of oral rehydration salts is an effective tool to decrease deaths due to diarrheal dehydration. Following concerted educational efforts to introduce oral rehydration therapy, Nicaragua reported a significant decrease in deaths of young children from diarrhoea and dehydration over a 5-year period. Further decline in the mortality rate has not occurred, however, and factors that would affect usage and impact are poorly understood.

A health survey was administered in 155 randomly selected homes in Matiguas, Nicaragua, in July 1990. Caretakers of children were asked about their knowledge, attitudes, and practices in treating diarrhoea in children younger than age 5. They were also asked to demonstrate their knowledge of mixing World Health Organization oral rehydration salts packets. Ninety percent of the respondents said they used oral rehydration therapy. The major reason quoted for not using it was dislike of the taste. Of the three-quarters willing to mix the oral rehydration salts, 62 percent prepared the solution correctly and 38 percent incorrectly. Knowledge about diarrhoea and the role of oral rehydration therapy was high in this population, and those with this knowledge were more likely to use it. Respondents who learned to mix the oral rehydration salts at the health center had more years of education and were more likely to mix the salts correctly. In this study, there is a positive association between contact with the health center and correct use of the rehydration salts. The relationship of this association with morbidity and mortality needs further research.

In a reviews the health services literature regarding care for gastroenteritis in children. United States health care utilization, use of oral rehydration therapy (ORT), and quality of care considerations are described. The literature suggests that some US children may receive too much care while others may not be getting enough and that physician practices continue to differ from expert recommendations.

A wide variation in the level of awareness of signs, causes, and treatment of diarrhea was detected. General knowledge of diarrhea was related positively to accessibility of health information, level of education, ethnicity, and experience with dehydration. General knowledge of diarrhea, adjusted for level of education, was higher in African Americans than in Hispanics. In children, dehydration from diarrhea may be prevented by increasing parents’/caregivers’ general knowledge of diarrhea and dehydration and the appropriate usage of oral rehydration solutions. Intervention programs designed to increase parents’/caregivers’ knowledge must be culturally sensitive and appropriate for diverse educational backgrounds and must assist in improving access to health-related information.

To determine how closely US pediatricians follow the 1985 American Academy of Pediatrics Committee on Nutrition’s recommendations on oral therapy for acute diarrhea, a questionnaire was administered to four groups: New England private practitioners, pediatricians from 27 states attending a postgraduate course, representatives of departments of pediatrics at US schools of medicine, and housestaff at Boston Children’s and Massachusetts General hospitals. The responses from departments of pediatrics and housestaff were not significantly different from those of community practitioners in most categories. The reported rate of use of glucose-electrolyte solutions recommended by the American Academy of Pediatrics was not different from the use of non-physiologic, high-osmolar, low-salt solutions such as sodas and juices. The usage rate for glucose-electrolyte solutions meeting the American Academy of Pediatrics-recommended carbohydrate-to-sodium ratio of less than 2:1 was less than 30%. Other findings included the general lack of agreement on the use of a single type of therapy and the common use of oral therapy only for mild or no dehydration. Although the American Academy of Pediatrics recommends that
feeding be reintroduced in the first 24 hours of a diarrheal episode, the majority of respondents withhold feeding until the second day or later. These findings indicate that educational programs on oral therapy during acute diarrhea are needed in the United States.1,2,10

Hypernatremia is defined as a serum sodium concentration of more than 145 mEq/L. It is characterized by a deficit of total body water (TBW) relative to total body sodium levels due to either loss of free water, or infrequently, the administration of hypertonic sodium solutions.11

Hypernatremia represents a deficit of water in relation to the body’s sodium stores, which can result from a net water loss or a hypertonic sodium gain. Net water loss accounts for most cases of hypernatremia. Hypertonic sodium gain usually results from clinical interventions or accidental sodium loading. As a result of increased extracellular sodium concentration, plasma tonicity increases. This increase in tonicity induces the movement of water across cell membranes, causing cellular dehydration. Hypernatremia causes decreased cellular volume as a result of water efflux from the cells to maintain equal osmolality inside and outside the cell. Brain cells are especially vulnerable to complications resulting from cell contraction.

Severe hypernatremic dehydration induces brain shrinkage, which can tear cerebral blood vessels, leading to cerebral hemorrhage, seizures, paralysis, and encephalopathy. The following three mechanisms may lead to hypernatremia, alone or in concert:

- Pure water depletion (e.g., diabetes insipidus)
- Water depletion exceeding sodium depletion (e.g., diarrhoea)
- Sodium excess (e.g., salt poisoning).12

Because of certain physiologic characteristics, infants are predisposed to dehydration. They have a large surface area in relation to their height or weight compared with adults and have relatively large evaporative water losses. In infants, hypernatremia usually results from diarrhea and sometimes from improperly prepared infant formula or inadequate mother-infant interaction during breastfeeding.

In patients with prolonged hypernatremia, rapid rehydration with hypotonic fluids may cause cerebral edema, which can lead to coma, convulsions, and death. Patients usually recover from hypernatremic dehydration. Patients with recurrent hypernatremia dehydration develop neurologic sequelae, especially infants with diabetes insipidus.13

In children with acute hypernatremia, mortality rates are as high as 20%. Neurologic complications related to hypernatremia occur in 15% of patients. The neurologic sequelae consist of intellectual deficits, seizure disorders, and spastic plegias. In cases of chronic hypernatremia in children, the mortality rate is 10%. Although seizures can occur because of hypernatremia per se, this is rare. They usually occur during the treatment of hypernatremia because of a rapid decline in serum sodium levels. Therefore, slowly correcting hypernatremia is important. Other complications include the following: Mental retardation, intracranial hemorrhage, intracerebral calcification, cerebral infarction, cerebral edema, especially during treatment, Hypocalcemia, Hyperglycemia.14

In the pediatric population, hypernatremia usually affects new-borns and toddlers who depend on caretakers for water, as well patients of any age who have significant underlying medical problems such as a chronic disease, neurologic impairment, a critical illness, or prematurity.15,16

Consequences of use of improperly mixed ORS

Chisti et al. reviewed 2 data sets of children <15 years admitted to the in-patient ward of the Dhaka Hospital of International Centre for Diarrhoeal Disease Research, Bangladesh (icddr, b) with diarrhea and hypernatremia (serum sodium level 150 mmol/L): (a) March 2001 to March 2002 (n = 371) and (b) March 2009 to August 2011 (n = 360). The prevalence of hypernatremia was 5.1% (371/7212) and 2.4% (360/15 219), case fatality rate was 15% and 19%, respectively. The risk for death significantly increased in association with serum sodium level 170 mmol/L, nutritional edema, hypoglycaemia, respiratory distress, and absent peripheral pulses and reduced with the sole use of oral rehydration salts (ORS) or ORS following intravenous fluid, if indicated (for all, P< .05).17

In another study between 2 months to 18 months old children 93% of post diarrhoeal hypernatremia cases were under 1 year. Forty seven percent patients were in Failure stage of AKI, 47% in Injury and 1 patient in
Risk stage. Out of 15 cases 93% had severe hypernatremia. In 67% cases the causes of hypernatremia were intake of concentrated oral rehydration solution (ORS) and found more in winter season. Regardless of cause overall 47% survived with normal renal functions and 53% died. Intake of concentrated ORS and diarrhea during winter seasonal occurrence of diarrhea are the most important cause of hypernatremia in infancy. Hypernatremia with AKI stage III (Failure) had poorest outcome.

A 6-month-old Asian Bangladeshi girl of middle-class socioeconomic status was admitted to the intensive care unit of International Centre for Diarrhoeal Disease Research, Bangladesh (icddr, b) in 2012 with acute watery diarrhea, lethargy and hypernatremia (208 mmol/L serum sodium). She had a history of taking excess oral rehydration salt: five packets each, inappropriately prepared and consumed within a very short period and consequently developed hypernatremia acutely.

A study was undertaken in 1980 in Cairo, Egypt to assess the use of ORS. The study included 100 children under age 1, mean age 6.7 months, with dehydration secondary to diarrhea, and 17% were hypernatremic on admission, 27% hyponatremic and 56% isonatremic; the hypernatremic infants were found to be more dehydrated than the others. 24% of the hypernatremic infants had taken Rehydral whereas only 5% of the others had taken it and none had been given the medication in a proper fashion. Of the 17 with hypernatremia 16 completed the course of oral rehydration therapy and 63% had normal serum sodium values by 6 hours of therapy. It was found that the treatment of hypernatremic infants with ORS was successful while with the unsupervised use of Rehydral the risk of this condition was enhanced; errors made in the home included prolonged use of the solution and failure to use water. It is believed that because of widespread illiteracy sole reliance upon written instructions is potentially dangerous.

How could we overcome this burning issue?
Physicians should provide training to their staff about the appropriate use of ORT. In addition, parents should be given information at well-child visits about the appropriate preparation of ORS. The pharmacy sales man should have adequate orientation about the accurate measurement of diluent water to be mixed with ORS and must disseminate this knowledge to each buyer. Awareness build up is necessary at every health care level. Media could play a key role in this regard.

References:


Review Article

Constipation in Children: Evaluation and Management

Md. Benzamin, Md. Rukunuzzaman, Md Wahiduzzaman Mazumder, ASM Bazlul Karim

Abstract:

Constipation is a common health issue for frequent visit to pediatrician during childhood. Among the childhood constipation, most children don’t have any physical problem and here functional constipation account 95%. Constipation with “red flag” signs warrant investigations to find out organic cause. Proper evaluation and multifaceted management assure successful outcome.

Key word: Childhood, management, functional constipation.

Introduction:

Constipation is a common chronic disorder of paediatric age group, affecting 1% to 30% of children worldwide. In Asia prevalence is between 0.5% to 29.6%. Constipation more common in toddlers and preschool children and 17% - 40% children experienced constipation in 1st year of life. It is frequent in 3 times: during transition to solid food, during toilet training, after starting school. Constipation accounts for 3-5% of visits to pediatric outpatient clinics and 35% of referrals to pediatric gastroenterologists. Management of children with constipation cost 3 times more than the children without constipation. The common believe is that constipation is not common in South-Asian countries like Bangladesh as here diet is rich in fiber. There are very few studies & very little information about constipation in developing countries specially in South-Asian countries. Recent study showed that it is not uncommon in sub-continental countries. Normal bowel habit in children have a considerable variation & stool frequency is age dependent. The normal frequency of bowel movements at different ages are sumerized (Table 1).

Due to this wide variation of normal defecation pattern, it is difficult to define constipation & often leads to over diagnosis specially in infant. For constipation there are several diagnostic criteria like the Iowa criteria, PACCT (The Paris Consensus on Childhood Constipation Terminology Group) criteria, Rome II critetria, Rome III criteria & latest Rome IV criteria. NASPGHAN (North American Society for Pediatric Gastroenterology, Hepatology and Nutrition) defines constipation as a delay or difficulty in defecation, present for 2 or more weeks and sufficient to cause significant distress to the patient.

Classification:

According to duration constipation may acute or chronic. If symptoms duration- less than 2 weeks it is acute constipation & more than 2 weeks it is chronic constipation. According to presenting symptoms, constipation may occult or overt. There is constipation but patients or

<table>
<thead>
<tr>
<th>Age</th>
<th>Mean number of bowel movement per week</th>
<th>Mean number of bowel movements per day</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 3 months: breast feed</td>
<td>5 to 40</td>
<td>2.9</td>
</tr>
<tr>
<td>0 to 3 month ; formula-fed</td>
<td>5 to 28</td>
<td>2.0</td>
</tr>
<tr>
<td>6 to 12 month</td>
<td>5 to 28</td>
<td>1.8</td>
</tr>
<tr>
<td>1 to 3 years</td>
<td>4 to 21</td>
<td>1.4</td>
</tr>
<tr>
<td>More than 3 years</td>
<td>3 to 14</td>
<td>1.0</td>
</tr>
</tbody>
</table>

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parents do not complain about constipation it is occult constipation and if patients or parents complaint about symptoms/constipation it is overt constipation. In occult constipation parents &/or children is not aware about it and presents with abdominal pain or fecal soiling.

According to etiology, constipation may Functional or Organic.20

**Etiology:**
Regarding etiology of constipation 95% cases are functional constipation & 5% due to organic causes9 and from organic causes Hirschsprung’s disease is the most common.13

Acute constipation due to changes in diet or place, drugs, anal fissure, perianal inflammation etc. Chronic constipation in >90% cases functional.21

Here the common causes of constipation summarized in table-II.

**Table-II**
*Common causes of constipation in children*10,12,13,22,23

<table>
<thead>
<tr>
<th>• Functional constipation of childhood</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Motility related: Hirschsprung disease, myopathy</td>
</tr>
<tr>
<td>• Congenital anomalies: Anal stenosis, anteriorly located anus, spinal cord anomalies (meningomyelocele, myelomalacia, spina bifida)</td>
</tr>
<tr>
<td>• Neurological: Cerebral palsy, mental retardation</td>
</tr>
<tr>
<td>• Endocrine/metabolic: Hypothyroidism, renal tubular acidosis, diabetes insipidus, hypercalcemia, hypokalemia</td>
</tr>
<tr>
<td>• Drugs: Anticonvulsants, antipsychotic, codein, anti-diarrheal, vit-D toxicity.</td>
</tr>
<tr>
<td>• Others: Abuse: physical, sexual, emotional</td>
</tr>
<tr>
<td>Cystic fibrosis</td>
</tr>
<tr>
<td>Gluten enteropathy</td>
</tr>
<tr>
<td>Heavy-metal poisoning</td>
</tr>
</tbody>
</table>

**Risk Factors:**10,20,24

- Low fiber diet
- Psychological stress
- Cow’s milk protein allergy
- Familial predisposition
- Prematurity
- Living in urban areas
- Not enough exercise/physical activity
- Holding in stool
- Change in daily routine

**Pathophysiology:**
Functional constipation usually initiates with a painful bowel movement which leads to voluntary withholding of stools to avoid painful defecation.25 These events leads to large, hard stool & passage of such stool causes further pain & child become frightens, then avoid defecation by all means.

**Fig. 1 Pathogenesis of functional constipation**

Painful defecation → Fear and withholding → Stool retention → Rectal Distention → Decrease sensation → Training ceases → Water absorption → Hard stool → Painful defecation Thus a vicious cycle set in16.

**Diagnosis:**
Diagnosis of constipation is done by careful history, thorough physical examination (including DRE) & relevant investigation.

**History & physical examination:**
Careful review of frequency, consistency & size of stools, age of onset of symptoms, timing of meconium passages after birth, recent stress, previous & active therapies, presence of withholding behavior, abdominal pain & systemic symptoms.10

Physical examination should include height, weight, abdominal examination, ulceration of perianal area, DRE, thyroid gland, examination of spine & neurological evaluation of lower limb.26

Chandra et al shown that; among functional constipation 80% had stool frequency of <3 per week.
58.4% had retentive behavior in the form of abnormal posturing, 44% had Fecal soiling, 30.6% had recurrent abdominal pain as the presenting complaint, 10.8% had blood streaked stools. Another study shown that 33% had non specific abdominal pain, 68% experienced painful defecation. There is common presentation including retentive posture, history and physical examination are summarized in table -III.

<table>
<thead>
<tr>
<th>Presenting features</th>
<th>Clinical history</th>
<th>Clinical history</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reduce defecation frequency</td>
<td>• Onset of symptoms</td>
<td>• Onset of symptoms</td>
</tr>
<tr>
<td>• Pain/ crying during defecation</td>
<td>• Duration of symptoms</td>
<td>• Duration of symptoms</td>
</tr>
<tr>
<td>• Fecal incontinence</td>
<td>• Timing of passage of meconium</td>
<td>• Timing of passage of meconium</td>
</tr>
<tr>
<td>• Stool withholding behavior</td>
<td>• Detail history of bowel habit</td>
<td>• Detail history of bowel habit</td>
</tr>
<tr>
<td>• Occasional passage of large volume stool</td>
<td>- stool frequency</td>
<td>- stool frequency</td>
</tr>
<tr>
<td>• Straining</td>
<td>- Consistency</td>
<td>- Consistency</td>
</tr>
<tr>
<td>• Bleeding per rectum</td>
<td>- Incontinence</td>
<td>- Incontinence</td>
</tr>
<tr>
<td>• Abdominal pain</td>
<td>- Stool withholding behavior</td>
<td>- Stool withholding behavior</td>
</tr>
<tr>
<td>• Abdominal distension</td>
<td>- Pain/ crying during defecation</td>
<td>- Pain/ crying during defecation</td>
</tr>
<tr>
<td>• Urinary incontinence</td>
<td>- Blood in stool</td>
<td>- Blood in stool</td>
</tr>
<tr>
<td>• Refractory vulvovaginitis</td>
<td>• Family history</td>
<td>• Family history</td>
</tr>
<tr>
<td></td>
<td>• Dietary habits</td>
<td>• Dietary habits</td>
</tr>
<tr>
<td></td>
<td>• Past medical &amp; surgical conditions</td>
<td>• Past medical &amp; surgical conditions</td>
</tr>
<tr>
<td></td>
<td>• Psychological history</td>
<td>• Psychological history</td>
</tr>
<tr>
<td></td>
<td>• Social history</td>
<td>• Social history</td>
</tr>
<tr>
<td></td>
<td>Common retentive posture</td>
<td>Common retentive posture</td>
</tr>
<tr>
<td></td>
<td>• Stand on tip toe</td>
<td>• Stand on tip toe</td>
</tr>
<tr>
<td></td>
<td>• Squatting</td>
<td>• Squatting</td>
</tr>
<tr>
<td></td>
<td>• Cross ankle</td>
<td>• Cross ankle</td>
</tr>
<tr>
<td></td>
<td>• Stiffening the body</td>
<td>• Stiffening the body</td>
</tr>
<tr>
<td></td>
<td>• Tightening the buttock</td>
<td>• Tightening the buttock</td>
</tr>
<tr>
<td></td>
<td>• Holding on to furniture</td>
<td>• Holding on to furniture</td>
</tr>
<tr>
<td></td>
<td>• Flash, sweating &amp; crying</td>
<td>• Flash, sweating &amp; crying</td>
</tr>
<tr>
<td></td>
<td>• Hiding in corner during defecation</td>
<td>• Hiding in corner during defecation</td>
</tr>
</tbody>
</table>

**Functional constipation** is diagnosed by Rome IV criteria with absence of “red flag” signs like passage of meconium >48 hours in a term newborn, constipation straining in first month of life, family history of Hirschsprung’s disease, ribbon like stool, blood in stools in absence of anal fissure, failure to thrive, bilious vomiting, severe abdominal distention, abnormal thyroid gland, abnormal position of anus, absent anal or cremasteric reflex, decrease lower limb strength/ tone/reflex, sacral dimple, tufts of hair on spine, gluteal cleft deviation, anal scar etc. Here is Rome IV criteria for diagnosis of functional constipation in children in table-IV.
The symptoms cannot be fully explained by another medical condition.

If criteria not fulfilled but there is abdominal pain or fecal soiling and plain x-ray of abdomen shows fecal impaction diagnosis of occult constipation can be made. If there is only fecal soiling one should exclude non-retentive fecal incontinence as per ROME IV criteria.

As Hirschsprung’s disease is the most common organic cause of constipation, it must differentiate from functional constipation (table V).

Investigations:
For diagnosis of Functional constipation no investigation is needed. laboratory investigation is done if there is Red flag sings, to exclude organic causes.
Plain x-ray abdomen is often done in functional constipation but it is not a diagnostic tool, it is useful tool for the diagnosis of fecal impaction and improved confidence in management plan, despite evidence that radiographic findings poorly correlate with clinical severity.

Table-IV
*Rome IV criteria for the diagnosis of functional constipation in children*

| Infants and toddlers up to 4 years old; At least two of the following present for at least one month |
| Two or fewer defecations per week |
| History of excessive stool retention |
| History of painful or hard bowel movements |
| History of large-diameter stools |
| Presence of a large fecal mass in the rectum |
In toilet-trained children, the following additional criteria may be used:

| At least one episode/week of incontinence after the acquisition of toileting skills |
| History of large-diameter stools that may obstruct the toilet |

| Children with developmental age of at least 4 years; At least two of the following present at least once per week for at least one month* |
| Two or fewer defecations in the toilet per week |
| At least one episode of fecal incontinence per week |
| History of retentive posturing or excessive volitional stool retention |
| History of painful or hard bowel movements |
| Presence of a large fecal mass in the rectum |
| History of large-diameter stools that may obstruct the toilet |

*The symptoms cannot be fully explained by another medical condition.

If criteria not fulfilled but there is abdominal pain or fecal soiling and plain x-ray of abdomen shows fecal impaction diagnosis of occult constipation can be made. If there is only fecal soiling one should exclude non-retentive fecal incontinence as per ROME IV criteria. As Hirschsprung’s disease is the most common organic cause of constipation, it must differentiate from functional constipation (table V).

Table-V
*Difference between functional constipation and Hirschsprung disease*

<table>
<thead>
<tr>
<th>Features</th>
<th>Functional constipation</th>
<th>Hirschsprung disease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Delayed passage of meconium</td>
<td>None</td>
<td>Common</td>
</tr>
<tr>
<td>Onset</td>
<td>After 2 years</td>
<td>At birth</td>
</tr>
<tr>
<td>Fecal incontinence</td>
<td>Common</td>
<td>Very rare</td>
</tr>
<tr>
<td>History of fissure</td>
<td>Common</td>
<td>Rare</td>
</tr>
<tr>
<td>Failure to thrive</td>
<td>Uncommon</td>
<td>Possible</td>
</tr>
<tr>
<td>Enterocolitis</td>
<td>None</td>
<td>Possible</td>
</tr>
<tr>
<td>Forced bowel training</td>
<td>Usual</td>
<td>None</td>
</tr>
<tr>
<td>Abdominal distension</td>
<td>Rare</td>
<td>Common</td>
</tr>
<tr>
<td>Rectal examination</td>
<td>Stool</td>
<td>Empty; after removing finger gush of liquid stool came out.</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>None</td>
<td>Possible</td>
</tr>
</tbody>
</table>
For diagnosis of Occult constipation who present with only abdominal pain and/or fecal soiling plain x-ray abdomen can be done to see fecal impaction.\textsuperscript{10}

Investigations to find organic cause:\textsuperscript{10,16,20,22}

Plain X-ray abdomen erect posture
S.TSH, T\textsubscript{4}

Barium enema without bowel preparation—in suspected Hirschsprung disease
Rectal suction biopsy—in suspected Hirschsprung disease
X-ray lumbo-sacral spine both view and MRI of spine in neurological deficit/alarming sign
Anorectal manometry—screening of Hirschsprung disease
Colonic manometry—in intractable constipation
S.Calcium
S.Electrolytes
Colonic transit time study—to differentiate between functional constipation and functional nonretentive fecal incontinence
S.lead level
S.tTG Ig A for Coeliac disease
Sweat chloride test—for Cystic fibrosis
Urine RME and C/S—as fecal impaction predispose to UTI

Treatment:
Treatment of constipation in children depend on etiology and requires multifaceted approach

Constipation due to organic cause should treat the cause first.

Functional constipation should treat on following step and duration may month to year.\textsuperscript{10,16,22,32}

\textbf{Counseling to parents}—with pathophysiology, plan of treatment, prognosis with treatment and consequence, if not treated properly.

\textbf{Disimpaction of fecaloma}: If there is hard fecal mass on lower abdomen/rectum or evidence on plain x-ray abdomen. Polyethylene glycol (PEG) with or without electrolytes 1-1.5 gm/kg/day for 3-6 days or sodium phosphate enema 2.5ml/kg ,max 133ml / dose for 3-6 days. Glycerine suppositories are used in infant. Enema and Glycerine suppositories are contraindicated if anal fissure present.

\textbf{Maintenance therapy to prevent re-accumulation}: From the day after disimpaction, Polyethylene glycol (PEG) 0.4 to 0.8 gm/kg/day or lactulose 1-2 gm/kg, 1-2 doses. Maintenance treatment should continue for at least 2 months or after all symptoms of constipation resolved then 1 month. Treatment should be decreased gradually.

\textbf{Dietary modification}: Normal fiber and fluid intake, avoid junk food & fast food, cows milk.

\textbf{Toilet training}: In developmental age 4 years or more. Encouraged and praise the child to sit on toilet for 5 to 10 min,3 to 4 times immediately after major meal. Early toilet training favour constipation. Physical activity—normal activity recommend

\textbf{Behavioral therapy}: If behavioral abnormalities. Child should never blamed for soiling and removal of stressful condition. Toileting at school must address.

\textbf{Others}: No prebiotics and probiotics

\textbf{Table VI}

\textit{Dosages of most frequently used oral and rectal}\textsuperscript{12}

<table>
<thead>
<tr>
<th>Drug class and Drug</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osmotic laxativesLactulose,\textit{PEG 3500PEG 4000Milk of magnesia(magnesium hydroxide)}</td>
<td>1-2 gm/kg, once or twice/day; maintenance: 0.4-0.8 g/kg/day; fecal disimpaction: 1-1.5 g/kg / day(with a maximum of 6 consecutive days)</td>
</tr>
<tr>
<td>Faecal softenersMineral oil</td>
<td>1-18 y: 1-3ml/kg/day, once or divided, max. 90 ml/day</td>
</tr>
<tr>
<td>Stimulant laxativesBisacodyl SennaSodium picosulfate</td>
<td>3-10 y: 5 mg /day; &gt;10 y: 5-10 mg /day2-6 y: 2.5-5 mg once or twice/day; 6-12 y: 7.5-10 mg /day; &gt;12 y: 15-20 mg /day1 month-4 y: 2.5-10 mg once/day; 4-18 y: 2.5-20 mg once/day</td>
</tr>
<tr>
<td>Rectal laxatives/enemasBisacodyl Sodium docusateSodium phosphate Sodium ChlorideMineral oil</td>
<td>2-10 y: 5 mg once /day; &gt;10 y: 5-10 mg once /day&lt;6 y: 60 ml; &gt;6y: 120 ml1-18 y: 2.5 ml/kg, max. 133 ml/dose Neonate &lt;1 kg: 5ml, &gt;1kg: 10 ml; &gt;1 y: 6 ml/kg once or twice/day2-11 y: 30-60 ml once/day; &gt;11 y: 60-150 ml once/day</td>
</tr>
</tbody>
</table>
### Table VII

**Complications if untreated**

- Pain: Anal or abdominal
- Anal fissure
- Encopresis
- Enuresis
- Urinary tract infection/ureteral obstruction
- Rectal prolapse/solitary ulcer
- Stasis syndrome
  - Bacterial overgrowth
  - Carbohydrate fermentation, maldigestion
  - Bile acid deconjugation
  - Steatorrhea
- Social exclusion/depression/anxiety

### REFRACTORY CONSTIPATION:

When there is no response conventional treatment for at least 3 months it is considered as refractory constipation [10]. About 20-30% cases remain as refractory constipation [10,33]. Organic causes and motility disorders and disorders of stool expulsion are causes of refractory constipation.

### Table VIII

**Causes of refractory constipation**

- Hirschsprung disease
- Hypothyroidism
- Celiac disease
- Hypercalcemia
- Spinal cord abnormalities
- Slow transit constipation
- Dyssynergic defecation
- Internal anal sphincter achalasia
- Sphincter dysfunction

### Follow-up:

Initially, monthly till a regular bowel movement is achieved. After that, 3 monthly for 2 years and then yearly. [34,35]

### Prognosis:

Prolong treatment required in most of the children with functional constipation and have relapse. [35] Approximately 50% children achieved successful outcome after 1 year therapy & 65-70% after 2 years therapy. [7]

50% recurrence of constipation after initial successful treatment within 1 year of stopping therapy, and relapse is more common in boys than girls. [36] Age of onset <4 years of age with fecal incontinence, symptoms >6 months is considered as a poor prognostic factor. [10]

### Conclusion:

Constipation is a common chronic disorder in children. Constipation has a huge impact on quality of life. Functional constipation is most common and it is diagnosed by Rome IV criteria & easily distinguished from organic causes by history, thorough physical examination. If there is a Red flag sign, investigations are warranted. Multifaceted management approach with counseling, disimpaction followed by maintenance therapy with dietary & behavioral modification, adherent with regular follow up can give good outcome.

### References:

33. Southwell BR, King SK, Hutson JM. Chronic constipation in children: organic disorders are a major cause. J Pediatr Child Health. 2005;41:1
Septicemia is An Unusual Presentation of Infantile Lupus Nephritis - A Case Report

Shabnam Shahidullah¹, Md. Habibur Rahman², Afroza Begum³, Abdullah Al Mamun⁴

Abstract:
Systemic lupus erythematosus is an autoimmune disease with variable clinical presentation. Children and adolescents present with more severe forms than in adults. Among them infants with lupus nephritis develop disease progression more quickly. Here we are reporting a case of lupus nephritis at the age of only 7.5 months. She was serologically positive for SLE. Her renal biopsy revealed stage I of lupus nephritis which was successfully treated with immunosuppressives along with other supportive treatment.

Keywords: Infantile lupus, Cyclophosphamide, Lupus nephritis, Methylprednisolone.

Introduction:
Systemic lupus erythematosus (SLE) is a multisystem autoimmune disease in which children affected more. Severity of the disease has multisystem damage which is more in children in comparison with adults.¹ The prevalence of SLE is approximately 40 per 100,000 children in Europe and North America although the prevalence in developing countries yet not known.² The female to male ratio in prepubertal children is 2:1, 4.5:1 in adolescents and 8:1 in adults.³ The children varies in presentation of SLE by gravity of symptoms and diversity of clinical manifestations involving various systems. Furthermore the disease affecting multiple organs not only acutely but also severely in them.⁴ Infantile SLE is extremely rare that bears higher rates of mortality and morbidity than those with adults.⁵ There are only very few cases have been reported till now. Some were died and some developed end stage renal disease and also other systemic complications⁶. Here we are reporting a case of an infant who initially presented to us only with prolonged fever but on subsequent evaluation diagnosed as a case of infantile lupus nephritis. So the aim of this case report is to raise the awareness among paediatricians about infantile lupus nephritis that may occur rarely but not impossible.

Case Report:
A 7.5 months old infant admitted in the Paediatric Nephrology Department of Bangabandhu Sheikh Mujib Medical University with the complaints of high grade, intermittent fever for 20 days, highest recorded temperature was 103°F, not associated with chills and rigor and not responding with adequate dose of antibiotics. Her mother gave no history of any rash, haematuria, convulsion and other systemic manifestations.

On examination, the infant was conscious, moderately pale, not cyanosed, no lymphadenopathy and skin lesion. Her blood pressure was 90/60 mm of Hg (lies between 50th to 90th centile), heart rate- 150 b/min, respiratory rate- 70 breaths/min, capillary refill time-<3 second, temperature- 103°F and oxygen saturation was 92% on room air. Her weight was 7.2 kg (weight for age Z score lies on 25th centile) and length was 61 cm (length for age lies on 3rd centile), bed side urine albumin was +. Her liver was enlarged 5 cm from right costal margin along midclavicular line and
spleen was 3 cm from left costal margin. Apex beat lies on left 4th intercostals space medial to midclavicular line. Gallop rhythm was present and there was also crepitation on both lung fields. On the basis of history and physical examination initially she was diagnosed as a case of septicemia with heart failure and treated with injection ceftriaxone, meropenem, digoxin, paracetamol and calcium. After 5 days, features of heart failure was subsided but still febrile inspite of getting adequate dose of injectable antibiotics. Her investigation revealed urine for routine examination- protein+, pus cell- 4-6/HPF, RBC- 1-3/HPF, urinary protein creatinine ratio was 4.09 . Her haemoglobin was 10.3 g/dl, ESR was 53 mm in 1st hour, total count was 20,000/cmm, platelet count was 2,60,000/cmm, neutrophil count 53 % and lymphocyte count was 39%, peripheral blood film showed neutrophilic leukocytosis. Serum cholesterol was 89 mg/dl, albumin was 24 g/L, serum electrolyte showed, sodium- 130 mmol/L, potassium- 4.8 mmol/L, chloride- 97 mmol/L, TCO2- 22.6 mmol/L, serum creatinine 0.3 mg/dl. Chest x-ray revealed consolidation and blood culture showed no growth. After improvement of clinical condition and completion of investigation she was discharged with advice but readmitted after three days with fever and severe skin manifestations. Her skin survey revealed diffuse, scaly, nonpruritic lesion all over the body. On subsequent evaluation revealed serum C 3 level was 1.32g/L, C4 level was 0.34 g/l. Her antinuclear antibody was positive17.2 U/ml in Indirect Immunofluorescence method, anti double stranded DNA was also positive (45.9 IU/ml), ENA profile was negative and anticardiolipin antibody was positive(20.38 U/ml) which was done by ELISA method. Her SGPT level was 70 U/L, HBsAg was negative and blood and urine culture showed no growth. Ultrasonography of kidney showed cystitis and chest x-ray and echocardiography revealed normal findings. After diagnosing as a case of infantile lupus she was treated with hydroxychloroquine, oral prednisolone, aspirin along with other medications. Emollients and other topical ointments were applied according to the opinion of the Dermatologist. Gradually she became afebrile and rashes were subsided. Then renal biopsy was done which revealed focal increase of mesangial cells, presence of hyaline cast. Cryostat section showed deposition of IgG, IgM, IgA, and C3 deposition. Her serological profile became normal after one month.

Discussion:

Lupus nephritis is unusual in the first year of life unless it is inherited or associated with complement deficiency. Although there are no known unique physiological or genetic pathways of the variability in disease phenotypes, children may present with
more acute illness and multisystem involvement at the time of diagnosis compared to adults.\textsuperscript{8}

Our patient, a 7.5 months old girl, with class I lupus nephritis initially presented with prolonged fever, organomegaly and scaly skin lesion which is rare at this age. We treated her with proper nutritional support, intravenous broad spectrum antibiotics, immunosuppressive therapy along with other supportive management. Her clinical condition including fever, pallor, infection skin lesion improved tremendously and biochemical and serological profile became normal after one month of treatment.

Gunawat et al, reported a case of two months old female infant of lupus nephritis whose maternal grandmother was diagnosed to have SLE at 30 years of age but the mother had no manifestation of SLE.\textsuperscript{9}

This patient had no family history of SLE and her mother’s urine analysis, serological profile revealed normal findings.

Kaye M et al reported a case of 3 months old male infant with lupus nephritis who developed scaly rashes over the cheeks. Our patient also developed diffuse, scaly rash all over the body which gradually faded after treatment.

Myelopathy in very young children may be seen as a rare complication of SLE. Although central nervous system involvement may occur within first decade, spinal cord involvement has rarely been documented. Kaye et al observed a 2 month old infant anti Ro/SSA positive in SLE associated with delayed walking, hyperreflexia, spasticity.\textsuperscript{10} Fortunately, we did not find any neurological findings in that patient.

Circulating ANA are present in 95\% of SLE patient in children.\textsuperscript{11} The consideration of disease activity, renal, neurological involvement are strongly correlated with anti dsDNA. It has been found in 50 \% of SLE patient.\textsuperscript{12} Most studies suggest that anti ds DNA antibody to be more common in paediatric SLE than adult SLE and 92\% infant found anti dsDNA positive.\textsuperscript{13} This patient was also found ANA and Anti dsDNA positive initially which became negative on subsequent follow up.

The passage of maternal anti Ro/SSA and anti La/SSB antibody to the child is associated with transient cutaneous and cardiac manifestation. Immunglobulin and complement deposition were noted on a 3 day old infant by which authors suggested a causal relationship between the passively transferred antibody and cardiac symptoms.\textsuperscript{14} In our patient’s Anti Ro/SSA and Anti La/SSB were negative but Anticardiolipin IgM was positive. Her echo-cardiography revealed normal findings.

It has been observed by different authors that both pulse methylprednisolone and cyclophosphamide have synergistic beneficial effect to induce remission.\textsuperscript{15} However, the effectiveness of I/V cyclophosphamide treatment for infantile SLE is not fully understood. There is only one previous report of successful I/V cyclophosphamide treatment in a 10 month old infant with SLE having WHO class IV lupus nephritis, achieved complete clinical and serological remission for 2 years.\textsuperscript{16} As the patient’s histopathology revealed only minimal change we did not treat her with I/V cyclophosphamide.

Renal involvement usually indicates the severity and associated with high rate of mortality.\textsuperscript{17,18} The 10 years survival rate was 81-90\% and 20 year survival rate was 73-80\%.\textsuperscript{19,20}

Infection remains an important cause of early mortality and cardiovascular complication for late mortality for lupus patient.\textsuperscript{21} Yap et al conducted a study with 230 lupus nephritis patient with class III/IV and found that death due to infection was 50\%, cardiovascularcular complication 20.8\% and malignancy 12.5\%.\textsuperscript{22}

The overall prognosis of infantile SLE is very poor. As our patient presented with minimal change disease and had some immune deposition, her prognosis was guarded.

**Conclusion:**

Infantile lupus nephritis is a very rare condition and bears a worse prognosis. This case report illustrates such a rare event who was successfully treated with methylprednisolone and hence achieved full remission.

**References:**


Collodion Baby - A Case Report

Abul Kalam Azad¹, Rownak Jahan²

Abstract:
The term collodion baby is used for newborns in whom all the body surface is covered by thick skin sheets, so called “collodion membrane”. The frequency of Collodion baby is very low (1:300,000 births). When diagnosed in a newborn, two forms can be identified: collodion baby and its most severe form, harlequin fetus. In both cases, clinical manifestations are thick and hard skin with deep splits.

We report a case of collodion baby born in a private clinic at Chittagong, Bangladesh. The child was treated successfully with supportive measures like antibiotics, intravenous fluids, humidification, application of emollients and oral retinoids.

Keywords: Collodion baby, Ectropion.

The causes of congenital ichthyoses have been reported to be due to mutation of Transglutamase 1 gene localized on 14q11.¹

The infant has a collodion membrane, the tension that it exerts distorts the features of the face and fingers. Rarely the shedding of the membrane results in a normal integument because shedding of the membrane results in erythema of varying intensity.⁷ Due to the impairment of the skin barrier function, collodion babies are at risk of a number of complications, including hypernatremic dehydration, hypothermia, skin infections, skin fissures, sepsis, eye complications, fluid and electrolyte imbalances, constrictive bands of the extremities resulting in vascular compromise and oedema. Treatments are largely palliative.⁸,⁹ Systemic retinoids are currently a preferred treatment.¹⁰

We report a unique case of a female baby that was born on 13/08/2015 as a Collodion baby at a private clinic in Chittagong, Bangladesh.

The Case:
An appropriate-for-gestational-age female baby of non-consanguinous parents was born at 37 weeks’ gestation to a 30-year old female, 2nd gravida with an unremarkable pregnancy. The mother received regular antenatal care including vitamins and iron during pregnancy. There was no family history of skin disease. She was negative for HIV, VDRL and hepatitis B. Apgars were 9 and 9 at 1 and 5 minutes respectively. Elective cesarean section was done due to previous history of caesarean section.

Introduction:
The term collodion baby applies to newborns who appear to have an extra layer of skin (known as a collodion membrane) that has a collodion-like quality. It is a descriptive term, not a specific diagnosis or disorder (as such, it is a syndrome)¹. At birth, infants are covered by a thick, taut membrane resembling oiled parchment or collodion, which is subsequently shed. Affected neonates have ectropion, flattening of the ears and nose, and fixation of the lips in an O-shaped pattern². There are at least 20 varieties of ichthyosis, including inherited and acquired forms³. Ichthyosis can be classified into three groups: 1) true ichthyosis, 2) ichthyosisiform states, 3) epidermolytic hyperkeratosis. Among the true ichthyoses are three subgroups as follows: autosomal dominant ichthyosis (ichthyosis vulgaris, ichthyosis simple, fish skin disease) X-linked recessive ichthyosis (ichthyosis nigricans, ichthyosis of the male, sauroderma) and autosomal recessive ichthyosis (laminar ichthyosis, non bullous congenital ichthyosiform erythroderma.)⁴ Most cases (approximately 75%) of collodion baby will go on to develop a type of autosomal recessive congenital ichthyosis⁵.

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². Associate Professor, Department of Gynae and obs. Rangamati Medical College, Rangamati.
Correspondence to: Dr. Abul Kalam Azad, Associate Professor, Department of Paediatrics, Rangamati Medical College, Rangamati. email: akactg@yahoo.com
Collodion phenotype was noted at birth. On physical examination whole body was covered with thick, parchment like membrane, eye lids everted, mouth opens with difficulty, restricted joint movements. Skin sloughed at abdomen. Weight was 3000gm, length 50 cm and OFC 34cm. Vitals were within normal limit. Other physical examinations were unremarkable. No other congenital anomalies were noted. After initial stabilization in a radiant warmer, the baby was given breast milk and a 10% concentration of dextrose water was started at a rate of 60 ml/kg per day. The complete blood count was unremarkable. Prophylactic antibiotics consisted of cefotaxime and amikacin. Retinoids (Roaccutane-10 microgram) daily for 4 weeks was given. Emollients (olive oil) were applied over skin and antibiotic ointment (fusidic acid) over raw areas. Artificial tear and antibiotic drops were applied in eye. Baby was shifted to NICU for incubator management. Consultations from dermatologist and ophthalmologist were taken. Follow up was done after one week and improvement was satisfactory.

In the study by Van Gysel et al babies received treatment on the basis of emollients as topical prophylaxis. Despite this, systemic infections were reported. The patient we are reporting received skin lubrication by olive oil and systemic antibiotic prophylaxis. The fissures were treated by fusidic acid ointment and no infectious complications were reported. Ectropion if not treated may lead to dryness of eyes, known as Xerophthalmia followed by keratitis and finally death. We treated our case by artificial tears and antibiotic eye drops.

In the collodion babies with localized lesions local retinoic acid and calciptriol have been reported to be successful. Systemic retinoids which are currently a preferred treatment method giving impressive results in cases with generalized lesions and decreasing mortality rates. In a study acitretin has been used at the dose of 0.5-0.75mg/kg/day and the mortality rate of collodion babies has decreased to 11% (1986) compared to numbers in 1960(50%). We started systemic retinoids in this case. The progress presented by this patient was satisfactory and similar to that reported by other authors.

Conclusion:
As this is a rare disease, clinical and statistical data are scanty. These babies should be managed in neonatal ICU. Humidified and neutral thermal environment is maintained in Incubator. Other supportive treatments such as intravenous fluid and tube feeding are often necessary. The collodion membrane should not be debrided. Literature review does not offer much information, making it important that these experiences be shared.

References:


Case Report

Congenital Chylous Ascites in Infancy: A Case Report
Luthfun Nahar¹, Md. Rukunuzzaman², Afsana Yasmin¹, Kamrun Nahar¹, Sayma Rahman Munmun¹, ASM Bazlul Karim³

Abstract:
Chylous ascites is a rare form of ascites as the extravasation of milky or creamy appearing peritoneal fluid rich in triglycerides, caused by the presence of thoracic or intestinal lymph in the abdominal cavity. It develop due to disruption of the lymphatic system, following traumatic injury or obstruction (either benign or malignant cause). The pathogenesis of congenital chylous ascites starts since birth. We have to report a case of congenital chylous ascites where continuous intravenous infusion of somatostatin analogue; octreotide have been used.

Key words: Congenital, Chylous ascites, Infant, Octreotide, Peritoneal fluid.

Introduction:
Chylous ascites is a rare form of ascites characterized by milky white appearing peritoneal fluid. It contains high level of triglycerides. The incidence of chylous ascites ranges from 1 in 20,000 to 1 in 1,87,000 admissions at large tertiary referral hospitals.¹ On the basis of etiology chylous ascites can be devided into congenital and acquired type.² Morton had reported the first case of chylous ascites in 1694 in a child who died with tuberculosis. The pathogenesis of congenital chylous ascites is the leakage of lymph from malformed lymphatic vessels in the peritoneal cavity with or without fistula. Acquired chylous ascites occurs due to secondary infiltration in lymph node which obstruct the lymph flow and also when direct disruption of lymphatic drainage occur due to trauma or surgery. There are different etiologies of chylous ascites² (Table 1).

Congenital

- Congenital lymphangiectasia
- Primary lymphatic hypoplasia
- Primary lymphatic hyperplasia
- Yellow nail syndrome

Acquired

- Cirrhosis
- Malignancy
- Infection: TB, filariasis
- Cardiac: congestive cardiac failure, constrictive pericarditis
- Inflammatory: Pancreatitis
- Hyperthyroidism
- Trauma: Surgery, blunt trauma

Table-I
Etiology of chylous ascites:

1. Phase B Resident, Department of Pediatric Gastroenterology and Nutrition, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.
2. Associate Professor, Department of Pediatric Gastroenterology and Nutrition, Bangabandhu Sheikh Mujib Medical University, Dhaka, Bangladesh.
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Congenital chylous ascites occurs due to abnormal development and maturation of lymphatic vessels. Dysplastic lymphatic vessels, both hypo and hyperplastic favour lymphatic leakage due to increase pressure in the lymphatic system and lymphatic congestion.³

Chylous ascites is diagnosed by ascitic fluid study (Triglyceride level) followed by others investigation to identify the etiology as abdominal sonography, lymphoscintigraphy, lymphangiography, computer tomography with intravenous and intralymphatic contrast and laparoscopy. Magnetic resonance imaging may also be helpful.⁴
Congenital chylous ascites is not common in tertiary care hospital of Bangladesh, so we want to report this case so that we can diagnosis this case earlier.

**Case report:**
A 11 months old infant of non consanguinous parents got admitted with progressive painless abdominal distension since birth. She had no history of contact with tuberculosis patient, jaundice, hematemesis, melena, swelling of body, scanty micturition, sib death, abdominal trauma or surgery or positive family history of such type of illnesses. She lives in well ventilated tin shade house. On general examination she was afebrile, anicteric, mildly pale, vitally stable, well thriving and developmentally age appropriate. She had no stigmata of chronic liver disease, lymph

### Table-II

*Laboratory investigations of patient:*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Findings</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hemoglobin (gm/dl)</td>
<td>10.8</td>
<td>13.5±1.3</td>
</tr>
<tr>
<td>TC of WBC (×10^9/L)</td>
<td>10×10^9</td>
<td>7.0±3</td>
</tr>
<tr>
<td>Differentials:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neutrophil</td>
<td>53%</td>
<td>40-80%</td>
</tr>
<tr>
<td>Lymphocyte</td>
<td>38%</td>
<td>20-40%</td>
</tr>
<tr>
<td>Eosinophil</td>
<td>3%</td>
<td>1-06%</td>
</tr>
<tr>
<td>Monocyte</td>
<td>4%</td>
<td>2-10%</td>
</tr>
<tr>
<td>Peripheral blood film</td>
<td>Microcytic hypochromic anemia</td>
<td></td>
</tr>
<tr>
<td>Platelet count</td>
<td>365×10^9/L</td>
<td>150-400×10^9/L</td>
</tr>
<tr>
<td>ESR (mm in 1st hour)</td>
<td>15</td>
<td>0-10</td>
</tr>
<tr>
<td>Serum albumin (gm/dL)</td>
<td>4</td>
<td>3 - 5</td>
</tr>
<tr>
<td>Serum alanine aminotransferase (U/L)</td>
<td>36</td>
<td>30 – 65</td>
</tr>
<tr>
<td>Random blood sugar (mmol/L)</td>
<td>5.2</td>
<td>&lt; 7.8</td>
</tr>
</tbody>
</table>

**Serum lipid profile:**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Findings</th>
<th>References</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total cholesterol (mg/dL)</td>
<td>170</td>
<td>&lt;200</td>
</tr>
<tr>
<td>HDL cholesterol (mg/dL)</td>
<td>27</td>
<td>&gt;40</td>
</tr>
<tr>
<td>LDL cholesterol (mg/dl)</td>
<td>112</td>
<td>&lt;130</td>
</tr>
<tr>
<td>Triglyceride (mg/dL)</td>
<td>153</td>
<td>&lt;150</td>
</tr>
<tr>
<td>Serum creatinine (mg/dl)</td>
<td>0.4</td>
<td>0.4 -1.4</td>
</tr>
<tr>
<td>Mantoux test (mm)</td>
<td>2</td>
<td>&gt; 10</td>
</tr>
</tbody>
</table>

**Chest X-ray**

Normal

**Plain X-ray of abdomen**

Diffusely increased density of the abdomen

**Ultrasonography of whole abdomen**

Huge ascites

**CT scan of abdomen**

Ascites

**Upper GI endoscopy**

Snowflake spot

**Histopathology**

Chronic non specific duodenitis

### Table-III

*Biochemical findings of ascitic fluid:*

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Milky white</td>
</tr>
<tr>
<td>Cytology</td>
<td>Cell: 2460/cmm</td>
</tr>
<tr>
<td></td>
<td>Lymphocyte predominant (98%)</td>
</tr>
<tr>
<td>Protein (gm/dL)</td>
<td>4.5</td>
</tr>
<tr>
<td>Triglyceride (mg/dL)</td>
<td>1613</td>
</tr>
<tr>
<td>Glucose (mg/dL)</td>
<td>146</td>
</tr>
<tr>
<td>Adenosine Deamynase(U/L)</td>
<td>14.8</td>
</tr>
<tr>
<td>Cytospin for malignant cell</td>
<td>Negative</td>
</tr>
</tbody>
</table>

Triglyceride level (1613 mg/dl) of ascitic fluid confirmed the diagnosis of chylous ascites (triglyceride >200mg/dl).
nodes were not palpable, edema absent, BCG mark was present, bed side urinary albumin was nil. On abdominal examination there was no organomegaly but sign of ascites was present (Figure: 1). There were no abnormalities in other systems. Complete blood count was normal other than mild anemia. Liver function test, fasting lipid profile, blood glucose and serum creatinine was normal. Mantoux test report was 2mm. Chest and abdominal X-ray were normal. Ultrasonography (USG) and computer tomography (CT scan) of whole abdomen showed only marked ascites without any organomegaly or tumor (Table: 2). Paracentesis was performed where ascitic fluid was milky white (Figure: 2), with lymphocyte predominant and triglyceride level was very high and negative for malignant cell (Table: 3). Upper gastrointestinal endoscopy showed snowflake spots (Figure: 3) and biopsy specimen had taken from 2nd part of duodenum. Histopathology of duodenal tissue had shown partial villous atrophy with moderate infiltration of chronic inflammatory cell in lamina propria which was suggestive for chronic non specific duodenitis. Lymphoscintigraphy and lymphangio- graphy was not done due to lack of facilities. We have finally diagnosed this case as congenital chylous ascites. We had treated the patient with supportive therapy along with medium chain triglyceride based diet and therapeutic paracentesis and somatostatin analogue, injection octreotide. Octreotide was given with 5% dextrose: 0.25 µg/kg/hour on day 1; 0.5 µg/kg/hour on day 2; 1 µg/kg/hour on day 3-7, then gradual tapering with 0.5 µg/kg/hour on day 8, 0.25 µg/kg/hour on day 9 and day 10 (Figure: 4). Patient was frequently monitored for adverse effects of drug such as vomiting, diarrhoea, constipation, hypo and
hyperglycemia, hypotension or hypertension. She had no complication during the treatment. Though it is due to congenital cause and we didn’t find out the specific leakage site. So we had discharged the patient with proper counseling to the parents about nature of disease, treatment options, prognosis and follow up plan.

Discussion:
Chylous ascites is a rare clinical condition which occurs due to extravasation of triglyceride rich milky fluid deriving from the mesenteric lymphatic vessels into the peritoneal cavity. Diagnosis of chylous ascites is based on triglyceride level of ascitic fluid above 200 mg/dL or above 110 mg/dL with the presence of chylomicron; which is typically 2-8 times higher than those in plasma. In our case triglyceride level in ascitic fluid was 1613 mg/dl and it is more than 10 times higher than patient’s plasma triglyceride level.

Congenital cause is most common in children for chylous ascites and it accounts for about 84%. Chylous ascites presents with history of progressive painless abdominal distension, abdominal pain with features of underlying etiology such as anorexia, malaise, fever, cough, weight loss, night sweat, history of trauma or surgery etc. Among the congenital causes, intestinal lymphangiectasia usually presents before 3 years of age and acquired cause present at any age. Lymphangiectasia is the pathological dilatation of lymphatic vessels in intestine with or without associated thoracic duct obstruction and patients usually presents with chronic diarrhea, features of malabsorption (steatorrhea, growth failure), features of hypoalbuminemia (edema, ascites, pleural effusion), abdominal pain, lymphopenia and hypogammaglobulinemia. It is diagnosed by endoscopic observation of white villi/white spot/snow flake on duodenum and histologically presence of dilated mucosal and submucosal lymphatic vessels with polyclonal normal plasma cells. Endoscopy may be negative if intestinal lesions are segmental or localized. Computer tomography of abdomen may show diffuse small bowel thickening. Our reporting case presented with history of progressive painless abdominal distension since birth, her endoscopy showed snowflake spots though histopathology report was not suggestive for lymphangiectasia.

Lymphoscintigraphy and Lymphangiography can detect the leakage site. Lymphangiography has also the therapeutic role. Sometimes laparoscopy and laparotomy may be needed. Treatment of chylous ascites mainly supportive therapy and treatment of underlying etiology. Among the supportive treatment nutritional, pharmacological and surgical therapies are available options. Bowel rest followed by total parenteral nutrition (TPN) may be needed. Dietary therapy with high-protein and low-fat diet with medium-chain triglyceride is also beneficial.

Pharmacotherapy as somatostatin analogue like octreotide along with total parenteral nutrition are effective. Others drug as orlistat can also be used. Octreotide can be given by continuous infusion at 1-8 µg/kg/hour over 10 days or subcutaneously. But different studies reported that continuous infusion with 0.5-2 µg/kg/hour has good efficacy, low cost and less adverse effects. The reported case treated by continuous infusion of octreotide at a dose of 0.5-1 µg/kg/hour over 10 days with 5% dextrose with proper monitoring. Octreotide suppress the secretion of insulin, glucagon, gastrin and other peptides. As a results pancreatic juice, gastric juice and small bowel secretion reduce. It also reduces the splanchic blood flow and augments the closure of any leakage in the lymphatic vessels, all these help to reduce ascites. The prognosis of chylous ascites basically varies based on the underlying cause. Congenital chylous ascites is rarely cured but can remain in remission for long time with supportive treatment. Our patients ascites was reduced but not completely resolved.

Consequences have been observed due to loss of chyle lead to deficiency of essential proteins, lipids, immunoglobulins, vitamins, electrolytes and water. So it is very important to provide nutritional support to replace fluid loss, vitamin deficiencies and electrolyte. We advised to take high protein with medium chain triglyceride based diet along with multiple vitamin to maintain patient’s nutrition and to prevent complications. Follow up of chylous ascites should be based on clinical, laboratory and ultrasonography findings. Our follow up plan was to evaluate the patient clinically 1 month after discharge.
**Conclusion:**
Patient presented with ascites at very early age without other clinical features, congenital chylous ascites should be considered as a differential diagnosis as a cause of ascites along with other causes.

**Limitation:**
Lymphoscintigraphy and lymphangiography not performed due to lack of facilities.

**References:**
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