Nephrology & Urology Abstracts

Acute kidney injury in children with acute gastroenteritis

Moghtaderi M, Yaghmaii B, Allahwerdi B, Gorgi M, Javadilarijani F, Malekzadeh I, Taravat Sadrosadat S, Sabery nejad J
Children's Medical Center, Tehran University of Medical Sciences, Iran

Background: This study was done in Children's Medical Center Hospital affiliated with Tehran University of medical science, Tehran, Iran.
Methods: The patients were 140 children who were admitted for gastroenteritis and we detected acute kidney injury in them. All of the patients were admitted and managed in the emergency department, and were evaluated for symptoms of AKI including dehydration, renal function tests, electrolytes, and urine output.
Findings: The median age of the children with gastroenteritis and AKI was 2.5 years (ranging from 2 months to 12 years) and 78.6% of them were male. Acute kidney injury (AKI) was present in 116 (82.9%) patients at admission with 53 (37.8%) patients in the "failure" category (RIFLE). Twelve children had anuria and 54 patients had oliguria. At presentation, 24 patients (15%) had serum BUN levels between 30-75 and creatinine levels in the range of 0.9-2.1mg/dl. One patient had HUS that was excluded from this study. Seventy-six children had symptoms of severe dehydration and metabolic acidosis. After adequate fluid therapy, 30 children had polyuria of 6.4 (range 4-9) cc/kg/min. Twenty-three patients (16.4%) had hyponatremia and 41 patients (29.2%) had hypernatremia. Nine children (6.4%) suffered from hypokalemia. Some children had received ORS at home. All of them were managed in the emergency ward and discharged with normal GFR without any electrolyte abnormalities. The patients were fallowed for 3-6 months and all of them had normal renal function at the end of the study.
Conclusion: Early diagnosis and urgent management of gastroenteritis and dehydration can prevent AKI.
Keywords: Acute Kidney Injury, Child, Gastroenteritis

Antimicrobial resistance among children with urinary tract infection: A single center study

Safaei Asl A
17 Shahrivar Hospital, *Gilan University of Medical Sciences, Iran*

Background: It was suggested that the prevalence of antimicrobial resistance in young children with UTI is dramatically increasing and varies among different geographical and regional locations. The aim of this study was to assess the resistance patterns of uropathogens during the last 4 years in children with acute urinary tract infection presenting to the department of paediatrics and private office.
Methods: The study population were 137 children aged from 2 months to 14 years during 4 years (2009-2013) were admitted or as outpatient visited in 17 shahrivar hospital and private offices with their first symptomatic upper and lower urinary tract infection. Standard techniques were used for culture and identification of pathogens. Following common antimicrobials were tested: ampicillin, coamoxyclav, cotrimoxazol, ceftazidime, ceftriaxone, nitrofurantoin, Amikacin, Cephalexin, Cefixime Ceftizoxime, Gentamycin, Nalidixicacid, Ofloxaciline, Ciprofloxacilin. Statistical analysis was performed by SPSS version 16 and using Chi Square test. P value of less than 0.05 was considered statistically significant.
Findings: During the study period, a total of 137 consecutive children, 98(71.5%) girls and 39 (28.5%) boys were included. Escherichia coli (E. coli) was the leading cause of UTI (67.1%), followed by Proteus mirabilis (8.7%), Pseudomonas aeruginosa (2.1%), Enterococcus species(5.1%), Klebsiella(10.9%), citrobacter(1.4%), Coagulase Negative staphylococcus(1.5%), candida(0.7%), and Staphylococcus aureus(1.4%). Imipenem was the most active agent against E. coli isolates (susceptibility, 92.4%), followed by ciprofloxacin (87.4%) and amikacin (81.2%). Ampicillin,amoxicillin,Trimethoprim-sulfamethoxazole, cefalotine, and cephalexin were the least active agents, with 53.4%, 58.2%, 68.2%, and 71.2%. Isolated pathogens were highly resistant to ampicillin, cotrimoxazole, and cephalexin (64%–82%), intermediate sensitivity to third-generation cephalosporins, and highly sensitive to ciprofloxacin (82.4%), amikacin (79.8%), and nitrofurantoin. Imipenem and ceftizoxime were the most effective antimicrobial agents against Enterobacter, with sensitivity rates of 86.3% and 74.2%, respectively. Nitrofurantoin, cefalotine, and ceftazidime were the least active antimicrobial agents against Enterobacter, with resistance rates of 76.2%, 63.7%, and 58%, respectively. 94 patients underwent cystourethrography during followup. Of 94 patients, 21 had (22.8%) had VUR. Neurogenic bladder was reported in 4 patients.
Conclusion: A comparison of these data with those of other centers showed that there was considerable geographic and local variation in bacterial patterns of sensitivity and resistance properties.
Keywords: Urinary Tract Infection, Antibiotic, Resistance, Sensitivity

Hyperuricemia in adolescents with primary hypertention: how and when to intervene

Assadi F
Department of Pediatric Nephrology, Rush University Medical Center, USA

Background: Hypertension (HTN) is the leading risk for cardiovascular disease (CVD), kidney failure, and death worldwide. Recent studies suggest increased serum uric acid (UA) level is a predictor of incident HTN and CVD. UA-induced HTN is mediated through the activation of the renin-angiotensin-aldosterone system (RAS), and vascular endothelial dysfunction. Angiotensin-converting-enzyme (ACE) inhibition in combination with allopurinol may reduce BP more effectively than ACE inhibitor alone in adolescents with primary HTN associated with hyperuricemia.

Methods: Forty four adolescents, 12-19 years old, with newly diagnosed and never treated stage-1 primary HTN and serum UA levels ≥ 5.5 mg/dL participated in this study. Patients excluded if they had pre-HTN, stage-2 HTN, white-coat HTN, hemoglobin A1C >6%, CVD, or known renal, endocrine or hepatic dysfunction. Patients were randomly alternated between two groups to receive either enalapril alone (Group 1; n=20) or combination of enalapril and allopurinol (Group 2; n=24) for 8 weeks.
Findings: Baseline mean blood pressure (BP), age, and body mass index were similar between the two groups. After 8 weeks treatment, the mean blood pressure (BP) reduction in group 2 was greater ($p<0.001$), serum UA level was lower ($p<0.002$) compared with group 1. There were no drug adverse effects during the course of therapy.
Conclusion: Allopurinol enhances the BP lowering effect of enalapril in hyperuricemic adolescents with stage 1 primary HTN by reducing serum UA level. Strategies to reduce the risk of CVD in hypertensive adolescents should include monitoring serum UA levels.
Keywords: Adolescents, allopurinol, primary hypertension, hyperuricemia

Prehypertention: how to halt progression and cardiovascular risk?

Assadi F
Department of Pediatric Nephrology, Rush University Medical Center, USA

Background: Prehypertension is a major risk factor for development of hypertension, and cardiovascular disease. The incidence of prehypertension is rising, the outcomes are poor, and the costs are high.
Methods: The fourth Task Force Report on High blood pressure (BP) in Children and Adolescents does not consider prehypertension to be a disease category, but rather a designation to identify individuals at high risk of developing hypertension, so that both patients and clinicians are alerted to this risk and encouraged to intervene and prevent or delay the disease from developing.
Findings: Children and adolescents with prehypertension can develop target organ damage including left ventricular hypertrophy, increased intima-media thickness and diastolic dysfunction. The goal of prehypertension treatment in adolescents is to reach a BP level of <120/80 mm Hg. Physical activity and lifestyle modifications are the foundation of treatment for prehypertension. Lifestyle interventions include weight reduction for overweight children, a regular aerobic exercise regimen, salt restriction, and adopting DASH diet (Dietary Approaches to Stop Hypertension). Achieving a normal body weight (BMI 18.5 to 24.0 kg/m^2) may reduce systolic BP as much as 20 mm Hg and adopting DASH could result in a drop in systolic BP as great as 14 mm Hg. Keeping stress levels down also can help prevent progression of prehypertension to full-blown hypertension. Pharmacologic therapy is recommended for prehypertension associated with diabetes, chronic kidney disease cardiovascular disease or those who exhibit insufficient response to lifestyle modifications after 4 to 6 months.
Conclusion: The recent findings in the management of prehypertension in adolescents provide preventive strategies including lifestyle modifications and hypotensive therapy to reduce prehypertension risk and progression.
Keywords: Adolescents**,** prehypertension**,** prevention

Screening of blood pressure in high school of Yazd city

Shajari A[1], Shajari H[2]
[1]Department of Nephrology, Yazd Branch, Islamic Azad University, [2]Department of Neonatology, Tehran University of Medical sciences, Iran

Background: Nowadays some issues related to the chronic diseases including arthrosclerosis as well as high blood pressure are considered to be a crucial hygienic problem of the society in different countries all over the world. In contrast to adults high blood pressure is not a common problem in children, however, in the view of the fact that this problem is usually a basic disease, it is recommended to measure the blood pressure of the children who are 3 or more each year.
Methods: In this research, which was done in some elementary as well as high schools of Yazd city from Sep to Mar 2009, 1600 students between the age of 7 to 17 were chosen randomly. By measuring their heights and weights, we got to their general body Mass (BMI). That we measured their blood pressure via a mercurial pressure gauge. Finally by analyzing the BMI and blood pressure data, we got to a reasonable relation, and regarding the rules, we got to the following.
Findings: Normal blood pressure regarding the age and gender is less than 90 percentile. Normal high blood pressure is between 90 to 95 percentile. High blood pressure is above 95 percentile. In another part of this experiment, we provided some some students at the age of 17 with a digital pressure gauge in order to make a comparison between a mercurial and digital pressure gauge. We got to this point that a digital pressure gauge is much more precise and reliable that the other one.
Conclusion: It is recommended to equip all the school with digital pressure gauges, and frequently examine the students with high BMI in order to diagnose the high blood pressure as soon as possible.
Keywords: Blood Pressure, Screening, High School

Diagnosis of autosomal dominant polycystic kidney disease in utero and follow up in a 2 month infant, a case report

Akhavan Sepahi M
Qom University of Medical Sciences, Iran

Background: Polycystic kidney disease (PKD) is classified renal cystic disorders that lead to accumulation of cystic in kidney. This disorder is inherited as both autosomal dominant and recessive. ADPKD is most common inherited kidney disease in humans and the commonly in adults, with an incidence of 1/500 to 1/1,000. Autosomal dominant polycystic kidney disease (ADPKD), once thought to be a disease of the adult, is now being reported with increasing frequency in childhood. This disorder is inherited as both male and female equally. The diagnosis is based on clinical,radiologic and genetic evaluation.
Case presentation: We describe a 2-month old female with fever and discomfort in urination as referred to nephrology clinic. In prenatal sonography multicysts have been reported in kidney and in postnatal sonography multicysts were reported in bilateral kidney.
Keywords: Polycystic kidney, autosomal dominant, disease

The effect of prematurity and IUGR on renal function

Bazargani B
Childrens' Medical Center, Tehran University of Medical Sciences, Iran

As nephrogenesis continues until 36 weeks of gestation, very preterm babies (gestational age <32 weeks) are likely to show a nephron deficit at birth. In addition, preterm birth is known to be associated with impaired nephrogenesis and limited postnatal kidney growth until the age of 18–24 months. Birth weight appears to be a strong determinant of renal size, nephron number, glomerular volume, albuminuria and systolic blood pressure. These findings add weight to the hypothesis that IUGR carries a risk of renal function loss as a result of nephron deficit, loss of filtration surface area, hyperfiltration, glomerular hypertension, and glomerular damage. In the period immediately after birth, the short-term renal-related consequences of low birth weight are an increased risk of acute renal failure as well as transient imbalance of fluid and electrolyte homeostasis. When the number of nephrons is diminished, single-nephron GFR increases as the kidney works to compensate. In long term, this compensatory hypertrophy causes the glomeruli to function under increased intracapillary hydraulic pressure, which over time causes damage to the capillary walls. This abnormal process leads to progressive glomerulosclerosis, proteinuria, hypertension and chronic kidney disease. Over the past 20 years, evidence has been accumulated indicating that intrauterine growth restriction (IUGR) affects normal development of the kidneys and vascular system, thereby increasing the likelihood of hypertension and/or cardiovascular diseases. Impaired fetal kidney development leading to nephron deficit is considered an important pathway in the development of hypertension after IUGR birth. Apart from IUGR, premature birth may contribute to the development of disease at adult age.

Keywords: Premature birth, IUGR, nephron number, hypertention, chronic kidney disease

Pediatric ambulatory blood pressure monitoring

Hajizadeh N
Children's Medical center, Tehran University of Medical Sciences

Pediatric hypertension (HTN) is a growing concern and should be diagnosed and treated aggressively to reduce the global disease burden. Ambulatory blood pressure monitoring (ABPM) is a useful clinical tool providing a more accurate description of the patient's blood pressure (BP) than office BP measurements, and can be considered the "gold standard" in the evaluation of the pediatric patient with a concern for HTN. Routine use of ABPM is recommended among clinicians to better evaluate and assess the severity of a child's HTN, and for proper management in order to prevent target organ damage and the resulting sequelae, thereby reducing the burden of cardiovascular risk in hypertensive children and adolescents. Significant data exist that link elevated BP levels measured in childhood and future target-organ damage. Untreated hypertensive children had lower cerebral artery reactivity than normotensive control subjects, which may explain the lower scores on cognitive tests found in children with elevated BP. Indications for routine performance of ABPM : To confirm the diagnosis of hypertension (R/O WCH), To evaluate for the presence of masked HTN, To assess BP patterns in high-risk patients, To evaluate effectiveness of drug therapy for HTN. Expert opinion in pediatric ABPM recommends that at least 1 or 2 valid readings should be obtained per hour over the entire 24 hours. Interpretation of ABPM studies is usually based on a combination of criteria, including mean SBP or DBP and BP loads. BP load is then calculated as the proportion of readings above a threshold (usually the pediatric 95th percentile).

Keywords: Hypertension, Ambulatory Blood Pressure Monitoring, Children, Cardiovascular Risk

Comparison of two intravenous fluid maintenance treatment with different sodium concentrations in hospitalized children: a randomized trial study

Fahimi D, Aghajani Delavar M, Kahroodi M
Bahrami Hospital, Tehran University of Medical Sciences, Iran

Background: The studies have demonstrated that the use of hypotonic intravenous fluid can cause some degree of hypothermia. Chronic or severe hyponatremia (a sudden drop of sodium concentration levels) refers to the serum sodium levels less than 135 mEq/ L, due to an excess of water in relation to sodium in the extracellular fluid; which may lead to irreversible neurological damage and even death. Accordingly, the present study investigated and compared the effects of intravenous fluid maintenance treatment with different concentrations levels of sodium in children over one year of age. In an investigative study to evaluate children admitted to the pediatric intensive care unit (PICU) of Bahrami Children's Hospital (2013-2013) which required intravenous fluid therapy were evaluated. These Children were randomly divided into two groups: fluid treatment with 50 mEq/L (group I) or 100 mEq/L (group II) sodium concentrations. The hypotonic intravenous (IV) fluids were calculated according to the recommendation made in 1957 by Holliday and Segar. Sodium of plasma [P (Na)] and Urine specific gravity were measured at the time of admittance to the study and a second specimen collected 24 hours after starting the fluid treatment. P (Na), and urine specific gravity measured for all patients. The collected data were recorded on the appropriate forms.

Findings: Of the one hundred and eight children were admitted into the study, significant differences were noted in the second urine specimen P (Na) levels collected versus the first specimen collected at the time of admission ($P<0.008$ and $P<0.011$); the readings were as follows: in the first and second group of the study, three cases of hyponatremia (P Na <135 mmol/L) were reported, however, this was not symptomatic in the study. The dissimilarities of the first and second urine specimens collected and analyzed were greater in group I ($P< 0.023$).

Conclusion: According to the results, the correlation relating the intravenous sodium fluids and decreased P (Na) concentration levels of the children who were undergoing intravenous fluid therapy was not a symptom dependent to fluid volume. There were no symptomatic hyponatremia cases reported, due to the decrease of P (Na), nor in the 48 hours following the intravenous therapy treatment.

Keywords: Fluid Treatment, Hypotonic Fluid, Urine Specific Gravity, Plasma Sodium, Hyponatremia

Clinical characteristics and metabolic abnormalities in pediatric urolithiasis in South East Iran (Zahedan)

Sadeghi-bojd S, Zarifi E
Zahedan University of Medical Sciences, Iran

Urinary calculi in children is relatively infrequent but its incidence has increased in recent decades. The aim of this study was to investigate the clinical presentation, metabolic risk factors and urinary tract abnormalities in paediatric urolithiasis.
Methods: Between 2011 and 2012, a total of 100 children (53 boys and 47 girls) were treated for urolithiasis. Clinical presentation, urinary tract infection status, calculus localisation, presence of anatomic abnormalities and urinary metabolic risk factors were retrospectively evaluated.
Findings: The most common clinical features on admission were restlessness/irritability (62%), flank pain (33%) and gross hematuria (4%). Twenty-one % of cases were detected incidentally during evaluation for other medical conditions. Urine analysis revealed metabolic abnormalities, including hypercalciuria (56%) and hypocitraturia (64%), in most of the cases. Anatomic malformation (32%) and urinary tract infections (UTI) (9%) were also another presentation.
Conclusion: We conclude that the majority of patients were symptomatic and that hypocitraturia was the most common risk factor.
Keywords: Urolithiasis, Pediatric, Metabolic Abnormalities