

Editorial

Pediatric Urolithiasis: Pros and Cons of a Paradigm Shift in Childhood Kidney Disease

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This editorial focuses on recent changes in the pattern in paediatric urolithiasis as well as incidence and prevalence of this disease. Very few researches are found in Bangladesh about urinary tract stone burden in paediatric age group. A retrospective study conducted by Prof. Afiquor Rahman et al. demonstrates the five most common urological diseases in children among which stone disease was not present.¹

Urolithiasis, a disease of the genitourinary system, may be defined as the presence of urinary stones at any location in the urinary tract, resulting in the precipitation reaction of chemical compounds.²

In the past, urolithiasis was characterized by bladder calculi in children of developing countries. The incidence of upper tract calculi used to occur mainly in industrialized areas, which was much lower in children than in adults. Also, in contrary to adult stone formers, children are more likely to demonstrate risk factors other than the metabolic factors such as UTI, anatomical abnormalities, and surgical alterations in the urinary tract. Nowadays, the incidence of upper tract calculi in children without these predisposing factors is rising globally, and the patterns are also changing.^{3,4}

Based on the studies on adult populations, nephrolithiasis affects men more than women, whereas, pediatric nephrolithiasis is more commonly found in girls as per recent data.⁴ Changing socio-economic conditions caused changes in the prevalence, incidence and

distribution for age, sex and type of urolithiasis in terms of both the site and the physiochemical composition of the calculi.⁵ Although pediatric urolithiasis is less frequent than adult stone disease, it still plays a crucial and increasing role, not only in parts of the world with a high incidence of stone disease such as the Near and Far East, but also in the industrialized countries.⁶

Despite the achievement of great progress during the past few decades in a better understanding of the etiology, pathophysiology, treatment and prevention of urolithiasis, many aspects regarding childhood urolithiasis still are controversial and are also dependent on obvious regional diversities of stone disease.⁷

Pediatric urolithiasis is endemic in low-resource countries where infants constitute 17–40% of all children with urolithiasis.⁸ The so called 'Afro-Asian stone-forming belt' extends from Sudan, the Arab Republic of Egypt, Saudi Arabia, the United Arab Emirates, the Islamic Republic of Iran, Pakistan, India, Myanmar, Thailand, and Indonesia to the Philippines.^{9,10}

Calculi observed in developing countries are often limited to the bladder and comprise mostly of ammonium acid, urate, and uric acid, and seem to be related with a low dietary phosphates.¹⁰ In addition, in the United States, calculi are found mainly in the kidneys or ureters, comprising of either calcium oxalate or calcium phosphate, and often associated with a metabolic abnormality.^{10,11}

Risk factors associated with the formation of urinary calculi can be divided into two main categories - intrinsic or extrinsic factors. Age, gender, ethnic and familial backgrounds constitute the intrinsic factors; while the latter group consists of climate and environment, lifestyle and dietary habits, occupation and education level. The most important factors which determine the prevalence, incidence, recurrence rates and constituent of calculi, are climate and dietary habits.¹⁰

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Conservative treatment of urolithiasis and prevention of stone formation in children usually require adequate fluid intake, low salt and animal protein diet in all stone formers. Individuals with calcium-oxalate stones need a diet containing a proper amount of dairy product, low oxalate diet, if indicated: thiazide diuretics, magnesium salts, citrate. In uric acid stones, patients are advised for low purine diet, alkalization of urine up to pH 6.5-7.0, if indicated: allopurinol. Treatment of infection stones require treatment of the urinary tract infection, low phosphate diet. In case of cystinuria: low animal protein diet, alkalization of urine up to pH 7.0, if indicated: captopril, d-penicillamine.¹³

Shock wave lithotripsy (EWL) is currently the procedure of choice for treating most of the urinary stones in children. Shock wave lithotripsy should be the treatment modality for all renal stones that are less than 1 cm or < 150 mm², soft renal stones. Indications for Percutaneous nephrolithotomy (PCNL) in children are similar to those in adults and include large burden stone more than 2cm, hard renal stone (> 900HU on CT scan) between 1 to 2cm, significant renal obstruction, urinary infection, failure of SWL and significant volume of residual stones after open surgery. Vesical stones can be managed by transurethral or percutaneous suprapubic lithotripsy.¹⁴

Uteroscopy is the treatment of choice for calculi, particularly located in the distal and mid ureter and is more efficient than ESWL.¹⁵

Although incidence of urolithiasis in children is increasing day by day, studies related to this disease are still less in number. To know more about the underlying risk factors, pathophysiology, evaluation and treatment of this disease, the field of Paediatric Urology should be paid more attention globally and as such adequate measures should be also be taken in Bangladesh.

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