

Urolithiasis Associated Morbidity in Children

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Abstract

Background : To determine the various types of medical complications associated with urolithiasis in children.

Methods: In this descriptive study 60 children of 1 month to 12 years age with haematuria, abdominal pain, history of passing stone or retention of urine and confirmed as suffering from renal calculi on radiological examination were selected. Initial investigations included urine routine examination, culture and sensitivity, blood urea, serum creatinine, serum electrolytes, plain x-ray Kidney, Ureter and Bladder and ultrasound for KUB. Further investigation like IVP, MCUG, nuclear scans such as DTPA, DMSA , MAG3 and metabolic screening for stones were done where required.

Results: Majority (66%) were boys, with male: female ratio 2:1. Acute renal failure was present in 33% of the patients, and urinary tract infections in 23% of the patients. Many patients had more than one complication. Calculus anuria was seen in 3(5%) patients. Hypertension and urosepsis were observed in 1.6%, each. Fifteen patients had calcium stones and six patients had oxalate stones

Conclusion: Acute renal failure is the most common renal complication which can be prevented with early diagnosis and management.

Key Words: Urolithiasis, Acute renal failure.

Introduction

Urinary calculi or urolithiasis has plagued man since history began. Paediatric urinary stone disease is a relatively infrequent medical problem in children from developed countries. In different series of patients of all ages with renal lithiasis, prevalence in children ranges from 2 to 2.7%.^{1,2} The diagnosis of urolithiasis in children is gaining importance due to increasing incidence of the disease in paediatric population.³⁻⁷ Importance of urolithiasis in children cannot be underestimated because of its various complications such as severe abdominal colic, haematuria, hydronephrosis, urinary tract infection and acute or chronic renal failure

Recent studies have shown that the annual incidence

in children may be increasing in western population.^{8,9} The rate of hospital admissions due to renal stone disease varies widely in different geographic region, from 0.001 to 0.1% in the USA to 7% in Asia.^{10,11}

Patients and Methods

In this descriptive study of one year (January 2007 to January 2008), sixty patients of age group 6 months to 12 years, with gross hematuria, abdominal pain, history of passing stone or retention of urine and confirmed as suffering from renal calculi on radiological examination were selected. Complete history and physical examination was carried out in all selected patients. Initial investigations included urine detail report, culture and sensitivity, blood urea, serum creatinine, serum electrolytes, plain x-ray Kidney, Ureter and Bladder and ultrasound for KUB. Further investigations like IVP, MCUG, nuclear scans such as DTPA, DMSA , MAG3 and metabolic screening for stones like serum calcium, serum phosphorus ,uric acid and 24 hours urinary calcium, oxalate, creatinine, citrate and uric acid were performed in relevant cases. Patients with history of any specific therapy taken for stones were excluded .

Results

Between January 2007 to January 2008, a total of sixty patients with urinary calculi were studied. Majority (66%) were boys, with male: female ratio 2:1. Their ages ranged from 1 month to 12 years and majority of them (33%) were below 5 years . Acute renal failure was present in 33%. One child had hypertension (Table 1). Many patients had more than

Table 1 Complications of urolithiasis in children

Complications	No(%)
Acute renal failure	20 (33)
Urinary tract infections	15 (23)
Chronic renal failure	10 (16)
Hydronephrosis	10 (16)
Calculus anuria	3 (5)
Hypertension	1 (1.6)
Urosepsis	1 (1.6)

one complication. Calculus anuria was seen in 5%, while hypertension and urosepsis were observed in 1.6%, each. E. coli was the most common organism seen while others were Klebsiella and Enterobacter species.

Fifteen patients had calcium stones, six patients had oxalate stones and four patients had low citrate on metabolic screening respectively. No metabolic risk factor was found in 35 patients (Table 2).

Table 2 Single urine metabolic risk factors

Metabolic risk factors	No (%)
Hypercalciuria	15 (25)
Hyperoxaluria	6 (10)
Hypocitraturia	4 (6.66)
No risk factors	35 (58.33)
Total patients	60 (100)

Discussion

Although urolithiasis is a urological problem managed mainly in surgical or urological units, but it has been found the third most common problem (14%).¹² This is consistent with an overall high prevalence of urolithiasis in Pakistan, "A stone belt country".¹³ Such a high prevalence has been shown in many studies, where Sindh has been shown highest prevalence of stone disease in the world.

Acute renal failure is the most common (33%) complication of urolithiasis in our study. This is comparable to another study where acute renal failure due to urolithiasis was 21.42%.¹⁴ Acute renal failure is a serious condition with high morbidity and mortality (30-50%) requiring hospitalization, close observation and early intervention in the form of acute peritoneal or hemodialysis.

Overall incidence of ARF has significantly decreased, particularly ARF caused by acute gastroenteritis which was common before 1980. This may be due to widespread use of oral rehydration therapy and better case management of diarrhoea. Renal stones have been shown as cause of calculus anuria in adults and in paediatric patients as well. Hemolytic uremic syndrome (HUS) secondary to shigella dysentery was common cause of ARF in children till 1990s, but has significantly decreased over last 5 years in India and Bangladesh.¹⁵

Nephrolithiasis is one of the most frequent pathology of urinary tract. The risk of CRF is significantly high in children with multiple bilateral or recurrent stone and acute renal failure at the time of presentation. In this study CRF was the fourth common complication (16%) which is consistent with recent studies in which 22% &

21.7% of children had CRF.¹⁴ This is comparable with another other local study which was conducted at Sindh Institute of Urology and Transplant, it was the most frequent cause of ESRD affecting 20% of the patients.¹⁶ The high prevalence of urolithiasis may be due to multiple factors including high environmental temperature with unavailability of water, particularly in rural areas, increased consumption of wheat based diet, recurrent diarrhoea in malnourished children, congenital obstructive malformation in infectious stones.

Conclusion

1. Acute renal failure is the most common renal complication which can be prevented with early diagnosis and management.
2. Prophylactic and therapeutic use of antibiotics against urinary tract infection in children with urolithiasis can reduce morbidity and mortality related to urolithiasis.

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