Case Report

Pediatric Urolithiasis in an obese adolescent

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Abstract

Pediatric urolithiasis is associated with considerable morbidity and recurrence. Since the aetiology is multi-factorial, a thorough work-up is necessary to enable risk stratification. We report a case of a 14 year old obese male with symptomatic right ureteric calculus and right hydroureteronephrosis with as yet unidentified risk factors for susceptibility to stone formation. A month after undergoing a ureteroscopy with stenting elsewhere, he presented at our centre with complaints of flank pain and haematuria. Radiography revealed a mid-ureteric calculus with a stent in situ. The preliminary blood/urine work-up yielded no significant findings except for mild abnormalities in the lipid profile and red blood cells in the urine. A ureteroscopic lithotripsy was undertaken; however, a thorough metabolic work-up had to be deferred, as the required 24-hour urine samples have to be collected when the patient is on a daily routine. This case is being reported owing to its implications in the management of pediatric urolithiasis where a causative risk factor is yet to be recognized.

Keywords: children, renal calculi, urolithiasis

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Introduction

Childhood urolithiasis is associated with considerable morbidity and recurrence.[1] A host of risk factors have been identified which makes a thorough evaluation of patients necessary.[1,2] The causative risk factors are metabolic, genetic, anatomic, dietary and environmental in nature.[1] A metabolic aetiology is more common in pediatric urolithiasis than in adult stone disease.[3] This report presents a rare case of urolithiasis in an obese child whose preliminary work-up did not yield any identifiable risk factor to explain the susceptibility to stone formation.

Case description

A 14 year old obese male had presented with complaints of severe right loin pain, burning micturition and fever at another centre one month before he reported to our institution. He was diagnosed to have a right proximal ureteric calculus, 12 mm in diameter, with hydroureteronephrosis. A right ureteroscopy and double J stenting was performed to relieve the obstruction, following which his symptoms improved.

One month after the procedure, the patient reported to the department of Pediatrics at the Melmaruvathur Adhiparasakthi Institute of Medical Sciences and Research, Melmaruvathur, with complaints of pain in the right flank of two weeks duration and passing red-coloured urine occasionally, which was associated with burning micturition. There was no history of fever, vomiting or dribbling of urine. There was no history of recurrent urinary tract infections or a family history of urolithiasis. Medical history was negative for diabetes, hypertension,

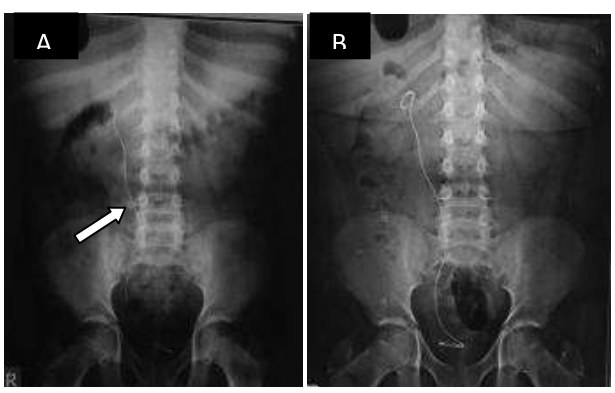
tuberculosis and epilepsy. Developmental history was normal and immunization had been administered up to age.

On examination, the boy was alert, comfortable and cooperative. With a weight of 59.7 kg and a height of 140 cm, his BMI was around 30. General and systemic examinations yielded normal findings. The abdomen was soft and non-tender.

The hematological tests and biochemical work-up were normal except for the complete lipid profile wherein a mildly elevated total cholesterol and LDL level were noted. Thyroid function was normal. Serum calcium level was within the normal range. The routine urinalysis results were normal except for presence of red blood cells in the urine.

A repeat radiograph showed the stent in position and a calculus impacted in the mid-ureter, suggesting that the calculus may have migrated proximally during the ureteroscopy performed earlier and moved to the mid-ureter subsequently with the stent in situ (Figure 2A). The patient was then admitted in the department of Urology for a right ureteroscopic lithotripsy. Under general anaesthesia, the stone was lithoclasted using a 6F ureteroscope and Ho:YAG laser. The ureter was restented to facilitate the clearance of fragments. The plan was to remove the stent after ensuring complete stone clearance. The patient was advised to continue taking potassium citrate and tamsulosin until the follow-up consultation.

Figure 2: Radiographs of the abdomen (A) before the surgery showing a mid-ureteric calculus (arrow) and a double J stent in situ and (B) after the ureteroscopic lithotripsy with a double J stent in situ



Discussion

Radiography alone was sufficient for the detection of the calculus in our case. The sensitivity of ultrasonography for detecting ureteral calculi is poor.[4] Non-contrast computed tomography remains the gold standard and is indicated in children with persistent symptoms of urolithiasis and a non-diagnostic ultrasonography.[5] A serum creatinine assay is essential to evaluate for possible acute kidney injury or chronic kidney disease.[4] Serum calcium, phosphorus, bicarbonate, magnesium and uric acid levels comprise the screening work-up.[4] A 24-hour urine collection should be analyzed for calcium, oxalate, uric acid, sodium, citrate, creatinine levels, volume, pH and cystine.[5] Macroscopic or microscopic haematuria can occur in up to 90% of children with urolithiasis.[6]

Urolithiasis has been associated with an identifiable metabolic abnormality in 40% to 50% of children.[5] Moreover, children with an identifiable metabolic abnormality have an increased risk of having a recurrence as compared to children with no identifiable metabolic disorder.[7] A metabolic work-up before the surgical procedure had to be deferred, since at least two 24-hour urine samples have to be collected when the patient is on his routine diet and not on any medication. Emphasizing the need for the work-up and regular follow-up consultations, the patient was advised to report for the pending evaluation at his earliest convenience. He was prescribed potasssium citrate, an alkali agent that has been shown to reduce the recurrence of calcium oxalate stone formation (the most common stone worldwide) and tamsulosin, an α_{1A} blocker that relaxes the ureteric smooth muscle, favouring stone clearance.

The major metabolic abnormalities associated with renal calculi include hypercalciuria, hyperoxaluria, hypocitraturia, cystinuria and hyperuricosuria.[5,8] The most common cause in children and adults is idiopathic hypercalciuria, wherein normocalcemic hypercalciuria occurs with no identifiable cause.[5] The associated defect can be impaired renal tubular calcium reabsorption (renal hypercalciuria) or enhanced intestinal calcium absorption (absorptive hypercalciuria).[3] Identification of a causative risk factor in our patient is to be undertaken pending a review consultation.

Conclusion

The evaluation of urolithiasis in children differs from that of adults as the prevalence of metabolic risk factors and the significant risk of recurrence in this population necessitate a thorough metabolic workup. Medical as well as surgical approaches have to be considered once the causative risk factors are identified.

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Conflicts of interests: Nil

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