CASE REPORT

Bladder calculus leading to acute renal failure in a girl child: a rare cause

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SUMMARY

A 10-year-old girl presented with acute renal failure (ARF) with a serum creatinine of 7.5 mg/dL. Imaging showed bilateral hydronephrosis and a large bladder stone (75×55 mm). The large bladder stone was probably the aetiology of bilateral hydronephrosis and ARF as no other cause could be found. An open cystolithotomy was performed. Ten days after the surgery, serum creatinine decreased to 0.7 mg/dL. In this report, we highlight an unusual cause of renal failure.

BACKGROUND

Bladder stones usually present with pain, urinary infection and haematuria. We report a case of acute renal failure (ARF) in a girl child with a large bladder calculus. Bladder stones in girls are less common, although recent data are lacking.¹ Bladder stone causing ARF in the paediatric population is unknown.

CASE PRESENTATION

A 10-year-old girl from low socioeconomic status presented with increased frequency of micturition

Figure 1 X-ray and ultrasound kidney, ureter, and bladder (KUB) showing large bladder calculus and bilateral hydronephrosis.

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Figure 2 Non-contrast CT scan showing large bladder calculus with bilateral hydronephrosis.

for the past 6 months. She started having suprapubic pain, continuous urinary incontinence, fever, nausea, vomiting and generalised body swelling since the past 1 month. She was vegetarian (mainly white rice), with occasional consumption of seasonal vegetables and milk (once weekly). Her diet was low in protein and calcium with low intake of fluids and calories. Her weight was 23 kg (below the fifth centile for her age). On physical examination, a hard lump was palpable in the suprapubic region.

INVESTIGATIONS

Plain kidney, ureter, and bladder (KUB) X-ray showed a large radio-opaque shadow in the pelvis, and KUB ultrasound scan showed bilateral hydronephrosis with a large vesical calculus measuring 75×55 mm (figure 1). Perurethral catheterisation was attempted but was not successful as virtually there was no space in bladder. Non-contrast CT scan showed a large bladder calculus (75×55 mm) filling almost the entire urinary bladder with bilateral hydronephrosis (figure 2).

Evaluation revealed a haemoglobin of 6.5 g/dL, a serum creatinine of 7.5 mg/dL, a blood urea of 105 mg/dL and a potassium of 6.0 mmol/L. Serum sodium, ammonium, citrate, uric acid, magnesium, proteins and cystine were normal. Urinary pH was 7.0. Urine concentration of phosphate was normal. Urinary calcium and oxalate were low (0.62 and 0.12 mmol/L, respectively). *Escherichia coli* growth was seen on urine culture.

DIFFERENTIAL DIAGNOSIS

Not relevant.

Figure 3 Intraoperative image of removal of bladder calculus by suprapubic open cystolithotomy.

TREATMENT

Broad-spectrum parenteral antibiotics were started according to urinary culture sensitivity. The patient was managed by suprapubic cystolithotomy (figure 3).

OUTCOME AND FOLLOW-UP

Serum creatinine decreased to 0.7 mg% within 10 days. Bilateral hydronephrosis almost recovered by 2 weeks. Analysis revealed a mixed stone including ammonium acid urate and calcium phosphate. After 6-months follow-up, the patient was doing well with normal renal function.

DISCUSSION

Paediatric urolithiasis has wide epidemiological variation in developed and developing nations with a prevalence of 1–5% to 5–15%, respectively.² Bladder calculi in paediatric population are mostly found in endemic areas. In these endemic areas, boys are affected more than girls with a ratio of 12:1 with peak age being between 2 and 4 years.¹ Reason for endemic bladder calculi is dependency on only one cereal and low calcium intake.³ She belonged to low socioeconomic status with a diet similar to the diet described for children with endemic bladder stone.

Bladder stones (even large) are not rare. However, renal failure due to large bladder stone alone has rarely been reported.^{4–5} We could find only six articles in the English literature in which it was shown that bladder calculus caused renal failure.^{4–9} In all these reported cases, the patients were men and the minimum age was 39 years. Our report is probably the first case where a bladder calculus has led to renal failure in a female patient. Our patient was in advanced uraemia at presentation but had a fast recovery of renal function. Probably, this patient, due to the unbalanced diet, exhibited high urinary pH (7.0). Owing to this, the development of bacterial infections was favoured. The aetiology of renal failure seems multifactorial. The contributing elements could have been bladder wall thickening, direct obstruction of both ureters by the stone, coexisting

infection and dehydration. Renal failure responded well by removal of stone, proper bladder drainage, correction of dehydration and treatment of infection. Diet modification was also advised. She was advised to include milk and adequate fluid consumption in her diet.

Learning points

- ▶ Bladder calculus is not uncommon in paediatric population, especially in developing countries.
- ▶ Bladder calculus leading to acute renal failure in a paediatric female patient is rare.
- ▶ Once the diagnosis of bladder calculi is made, it is necessary to treat the bladder calculi as well as the underlying pathology that led to the formation of stone to prevent recurrence of disease.
- ▶ Suprapubic open cystolithotomy can be considered for large calculus.
- ▶ Proper diet modification including milk and adequate fluid should also be recommended.

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Patient's perspective

Our child was very ill when we came to hospital. We were worried about her life. We were very surprised to know that a stone was the cause of her severe illness. Now she is advised to take proper diet including milk and adequate fluid consumption.

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