Electronic Journal of General Medicine
2023, 20(2), em457
e-ISSN: 2516-3507
https://www.ejgm.co.uk/

MODESTUM

Case Report **OPEN ACCESS**

An atypical presentation of urolithiasis with pyonephrosis in a child: A case report

Siti Nur Syakinah Md Sabudin [1], Lili Husniati Yaacob [1]*, Nani Draman [1]

[1] Department of Family Medicine, School of Medical Sciences, Universiti Sains Malaysia, Kubang Kerian, Kelantan, MALAYSIA
***Corresponding Author:** husniati@usm.my**

Citation: Md Sabudin SN, Yaacob LH, Draman N. An atypical presentation of urolithiasis with pyonephrosis in a child: A case report. Electron J Gen Med. 2023;20(2):em457. https://doi.org/10.29333/ejgm/12852

ARTICLE INFO

Received: 05 Dec. 2022

Accepted: 10 Jan. 2023

ABSTRACT

Background: Childhood urolithiasis is previously rare but increasingly recognized nowadays. Presentation varies, and often children, do not present with the classical symptoms commonly seen in adults.

Case report: This case was initially presented to the emergency department with atypical symptoms of nephrolithiasis. Therefore, he was treated for acute appendicitis before an ultrasound abdomen revealed there is gross hydronephrosis, which is secondary to pelvic-ureteric junction obstruction. CT abdomen was then proceeded, found right nephrolithiasis and vesicoureteric calculus with right hydroureter and gross hydronephrosis. Retrograde pyelography (RPG), ureteroscopy (URS), and insertion of the stent for right pelvic-ureteric junction obstruction were performed and subsequently, he developed complications.

Conclusion: The initial presentation of this case is common however not a classical presentation of renal stone. Therefore, evaluation of the symptoms and initial investigations should be done properly, so that we will not miss this common disease with the rare presentation, especially in children.

Keywords: pediatric urolithiasis, hydronephrosis, pyonephrosis

INTRODUCTION

Urolithiasis in the pediatric population is an important cause of morbidity worldwide. Childhood urolithiasis is previously rare but increasingly recognized nowadays [1]. Urolithiasis presentation varies, and often children, do not present with the classic acute onset of flank pain commonly seen in adults. As a result, children are frequently evaluated for other conditions before the diagnosis of urolithiasis is made [2]. An underlying risk factor is identified in 75 to 85% of children with urolithiasis. Predisposing conditions include a urinary metabolic abnormality, infection, and structural abnormality of the kidney or urinary tract [2]. Idiopathic hypercalciuria and hypocitraturia are the most frequently reported metabolic abnormalities in pediatric urolithiasis [3].

CASE REPORT

A 10-year-old boy, initially presented to the emergency department with right abdominal pain, throbbing in nature associated with nausea, vomiting, and loose stool for two days. On examination, there was a palpable mass over the right hypochondriac region. Initially, he was treated conservatively for acute appendicitis. However, an ultrasound was done showing gross hydronephrosis, secondary to pelvic-ureteric junction obstruction. CT abdomen was then proceeded, finding right nephrolithiasis and vesicoureteric calculus with right hydroureter and gross hydronephrosis, which can be secondary to the right vesicoureteric junction or pelvic-ureteric junction stricture. Therefore, an urgent surgical intervention with retrograde pyelography (RPG) and ureteroscopy (URS) was done with the insertion of a ureteral stent under general anesthesia. Postoperatively, he was well and had no immediate complications. Therefore, he was allowed discharge home. However, three days after discharge, he presented back with a complaint of fever, hematuria, and dysuria. He was admitted and treated for right pyelonephritis. However, after five days, his condition did not improve despite the high dose of antibiotic given.

On examination, he was alert, and conscious, with good hydration, and not tachypneic. He was still febrile with a temperature of 39.9. Blood pressure 110/70 mmHg, pulse rate of 134 beats per minute, and pain score of 4/10. Abdominal examination revealed a ballotable right kidney and positive right renal punch. Other examinations are unremarkable.

Blood investigations showed worsening white cell count, rising from 19.39×10^9/L to 25.13×10^9/L, C-reactive protein (CRP) was still high at 182.4 despite the patient already on antibiotics for five days. Urine full examination and microscopic examination (UFEME) showed positive nitrate, the presence of leucocytes, hematuria, and proteinuria. Urine culture and sensitivity (C&S) revealed an extended-spectrum beta-lactamase (ESBL) organism that is pseudomonas aeruginosa. Abdominal X-ray showed ureter stent is in-situ and there are two clusters of multiple small radio-opaque lesions over the right renal representing the nephrolithiasis (**Figure1**).

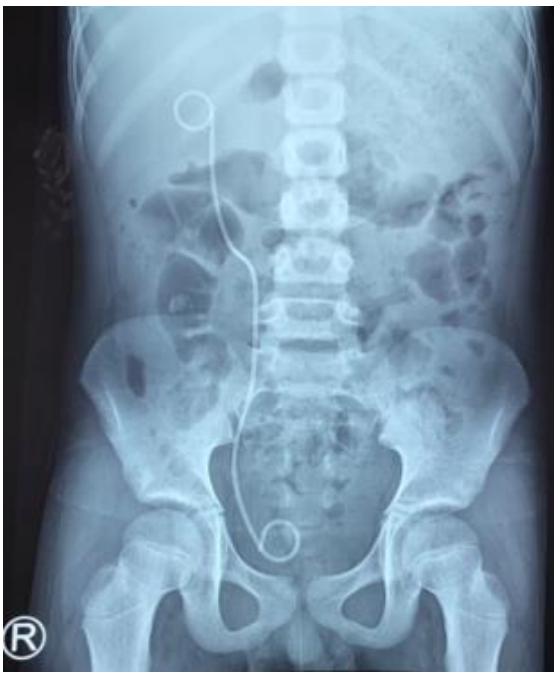

Figure 1. Abdominal X-ray showed ureter stent is in situ. There are two clusters of multiple small radio-opaque lesion over right kidney probably nephrolithiasis. No stone noted along ureter (reprinted with permission of the patients' parents)

Ultrasound abdomen repeated this time revealed right hydronephrosis, slightly less than the previous study, and internal echo within the dilated system that may represent pyonephrosis.

Based on the organism in the urine culture result, the antibiotic was escalated to intravenous meropenem 20 mg/kg. Clinically patient and blood parameters showed improvement after 48 hours on meropenem. Urine C&S repeated also showed the urine was clear and no more organisms isolated. After completing meropenem for seven days, he was then discharged with oral ciprofloxacin 250 mg twice daily for three weeks for better treatment coverage because of the presence of ESBL organism in the urine previously.

The final diagnosis, in this case, was right pyonephrosis with extended-spectrum beta-lactamase *pseudomonas aeruginosa* with underlying right nephrolithiasis and vesicoureteric calculus.

DISCUSSION

Presentation of childhood urolithiasis may vary and be different than in an adult. Children usually do not present with the classical acute onset of flank pain commonly seen in adults. As a result, children are frequently evaluated for other conditions before the diagnosis of urolithiasis is made [2]. Obtaining a thorough medical history followed by careful examination is essential for establishing an accurate diagnosis. Information about family history of renal calculi, haematuria, and renal failure is important to identify those patients at high risk. In one case series, 16% of children had first-degree relatives and 17% had second-degree relatives with urinary stones [4].

The commonest symptom of urolithiasis is abdominal pain. In one report, abdominal pain was present in 40% of school-aged children with urolithiasis [5, 6]. However, in infants and children, the pain is only relatively recognized as "non-specific" abdominal pain and thus difficult to differentiate from acute appendicitis [7]. For haematuria, its prevalence as a presenting symptom for childhood urolithiasis varied from 30-55%. Furthermore, only 10% of children with urolithiasis present with symptoms of dysuria and urgency, which is more suggestive of a urinary tract infection (UTI) instead of urolithiasis in this group [5, 6]. In this case, he has no haematuria or UTI symptoms upon initial presentation. Furthermore, his abdominal pain was not the classical colicky flank pain, which made it challenging for the physician to diagnose him with urolithiasis in the first place.

There have been other cases that reported the delay in diagnosis of urolithiasis in children due to atypical presentations [8, 9]. In a case like ours, a boy was initially diagnosed with appendicitis before a stone was detected on the ultrasound [8]. Another case reported a boy who presented with non-specific abdominal pain for two weeks before he was referred to the hospital for further evaluation and he was then found to have ureteral stones [9].

Concerning the interventions for pediatric urolithiasis, there are three treatment modalities, which are extracorporeal shock wave lithotripsy (ESWL), percutaneous nephrolithotomy (PCNL), and ureteroscopy lithotripsy (URS) [10]. Stone location, size, anatomy of the collecting system, presence of obstruction or infection, and if known, stone composition are important factors in selecting the modalities [11]. For the stone size, if the stone's size is less than 20 mm, ESWL has similar efficacy with ureteroscopy. For stones greater than 20 mm in diameter in the kidney, PCNL is the preferred modality. As for the stone's location, ureteroscopy is the preferred intervention for the stone in the lower pole. Distal ureteral calculi are also more effectively removed with ureteroscopy than ESWL. Children with underlying structural abnormalities prevent the effective passage of the stone. Therefore, in children with pelvic-ureteric junction obstruction, either PCNL or ureteroscopy is used for stone removal [10].

However, in a case reported in Turkey, a child with a stone greater than 20 mm in the right renal pelvis, was treated with laparoscopic pyelolithotomy (LP) instead of PCNL [12]. It is because the use of PCNL in children is controversial due to the risks of major complications, including parenchymal damage and effects on kidney function, radiation exposure, sepsis, and bleeding [13]. It has been shown that LP can be performed safely even in children younger than two years old. However, the role of laparoscopic surgery in the management of renal stones is still under development [14]. Another similar case in Saudi Arabia in 2019 reported they used ESWL in a girl with multiple stones of different sizes in the right kidney, which caused mild hydronephrosis after she underwent a ureteral stent [15].

Patients with complicated obstruction need prompt decompression of the urinary tract with either placement of an indwelling ureteral stent or percutaneous nephrostomy. In the pediatric population, a study compared acute drainage of bilateral obstructing ureteral calculi with unilateral nephrostomy to bilateral ureteral stenting, percutaneous nephrostomy tube insertion was associated with more complications compared to the ureteral stent [16]. As for this case, the indication of the ureteral stent was for drainage of the obstructed right ureter. This is similar to a case mentioned

above in Saudi Arabia, the girl also underwent a ureteral stent for decompression of the right hydronephrosis [15].

If decompression was not done, it would possibly lead to damage to the right kidney as well as the renal function later. Therefore, the ureteral stent is indicated in this case for drainage of the obstructed right ureter and as pre-stenting before ureteroscopy lithotripsy to improve the stone-free rate and reduce complications. However, ureteral stents may also induce adverse events despite their obvious benefits. The stents can cause patient discomfort and subsequently affect the patient's quality of life. Besides, the presence of indwelling stents can lead to biofilm formation that may promote the development of urinary tract infection (UTI) or the formation of encrustations, complicating subsequent stent removal. A study has identified that 80% of patients with indwelling ureteral stents developed at least one urinary symptom ranging from bladder or flank pain to storage symptoms to hematuria [17]. UTIs associated with indwelling ureteral stents are most frequently caused by *E. coli*, *enterococcus* spp., *staphylococcus* spp., *pseudomonas* spp., and *candida* spp. [18]. Eradication of these infections may eventually require the exchange or removal of the stent later.

In conclusion, pediatric urolithiasis may not present as the classical symptoms of renal stone. Therefore, urolithiasis should be considered as a possible cause of children presenting with non-specific abdominal pain even though without urinary symptoms. Moreover, the treatments of pediatric urolithiasis are not much different than in adults, which involve multifactorial consideration especially complications of the treatment in this population.

Author contributions: All authors have sufficiently contributed to the study and agreed with the results and conclusions.

Funding: No funding source is reported for this study.

Acknowledgments: The authors would like to thank to the patient and his family member, who agreed for the case report to be written and published.

Ethical statement: Authors stated that the manuscript is a case report and therefore does not require ethical approval from an ethics committee. However, consent was taken from the parents of the child.

Declaration of interest: No conflict of interest is declared by authors.

Data sharing statement: Data supporting the findings and conclusions are available upon request from the corresponding author.

REFERENCES

1. Ward JB, Feinstein L, Pierce C, et al. Pediatric urinary stone disease in the United States: The urologic disease in America project. Urology. 2019;129:180-7. https://doi.org/10.1016/j.urology.2019.04.012 PMid:31005657 PMCid:PMC6988134
2. Smith J, Stapleton FB. Kidney stones in children: Clinical features and diagnosis. UpToDate Topic 6123; 2022. Available at: https://www.medilib.ir/uptodate/show/6123 (Accessed: 4 December 2022).
3. Copelovitch L. Urolithiasis in children: Medical approach. Pediatr Clin North Am. 2012;59(4):881-96. https://doi.org/10.1016/j.pcl.2012.05.009 PMid:22857835 PMCid:PMC3426770
4. Coward RJM, Peter CJ, Duffy PG, et al. Epidemiology of paediatric renal stone disease in UK. Arch Dis Child. 2003;88(11):962-5. https://doi.org/10.1136/adc.88.11.962 PMid:14612355 PMCid:PMC1719348
5. Gearhart JP, Herzberg GZ, Jeffs RD. Childhood urolithiasis: experiences and advances. Pediatrics. 1991;87(4):445-50. https://doi.org/10.1542/peds.87.4.445 PMid:2011420
6. VanDervoort K, Wiesen J, Frank R, et al. Urolithiasis in paediatric patient: A single centre study of incidence, clinical presentation, and outcome. J Urol. 2007;177(6):2300-5. https://doi.org/10.1016/j.juro.2007.02.002 PMid:17509344
7. Smith RC, Rosenfield AT, Choe KA, et al. Acute flank pain: Comparison of non-contrast-enhanced CT and intravenous urography. Radiology. 1995;194(3):789-94. https://doi.org/10.1148/radiology.194.3.7862980 PMid:7862980
8. Shavor C, Pagenhardt J, Sun Y, Kraft C, End B, Minardi J. Ureteral stone mimics appendicitis: A point-of-care ultrasound case report. Clin Pract Cases Emerg Med. 2020;4(4):555-8. https://doi.org/10.5811/cpcem.2020.7.48155 PMid:33217271 PMCid:PMC7676809
9. Yalcin Comert HS, Salci G, Sarihan H, Bozoglu ST, Ozdogan EB, Eyuboglu I. Giant ureteral stone in a pediatric patient: Case report. J Case Rep Stud. 2021;9(1):103. https://doi.org/10.15744/2348-9820.9.103
10. Smith J, Stapleton FB, Ellison J, Baskin L, Kim M. Acute management of nephrolithiasis in children. UpToDate Topic 6114; 2020. Available at: https://www.uptodate.com/contents/6114/print (Accessed: 4 December 2022).
11. Mishra SK, Ganpule A, Manohar T, Desai MR. Surgical management of pediatric urolithiasis. Indian J Urol. 2007;23(4):428-34. https://doi.org/10.4103/0970-1591.36718 PMid:19718300 PMCid:PMC2721576
12. Demir M, Kecik ES, Unal A, et al. Minimally invasive treatment of renal pelvis stones in children: A case report. Int J Innov Surg. 2021;4(1):1018.
13. Samad L, Aquil S, Zaidi Z. Paediatric percutaneous nephrolithotomy: Setting new frontiers. BJU Int. 2006;97(2):359-63. https://doi.org/10.1111/j.1464-410X.2006.05932.x PMid:16430647
14. Soltani MH, Simforoosh N, Nouralizadeh A, Sotoudeh M, Mollakoochakian MJ, Shemshaki HR. Laparoscopic pyelolithotomy in children less than two years old with large renal stones: Initial series. Urol J. 2016;13(5):2837-40. https://doi.org/10.22037/uj.v13i5.3553
15. Alshahrani AD, Alghamdi SM, Alshahrani SA, Abouelyazid AY. The effectiveness of extracorporeal shock wave in pediatric renal stones. Clin Case Rep Int. 2019;3:1093.
16. ElSheemy MS, Shouman AM, Shoukry AI, et al. Ureteric stents vs percutaneous nephrostomy for initial urinary drainage in children with obstructive anuria and acute renal failure due to ureteric calculi: A prospective, randomised study. BJU Int. 2015;115(3):473-9. https://doi.org/10.1111/bju.12768 PMid:24698195
17. Joshi HB, Okeke A, Newns N, Keeley Jr FX, Timoney AG. Characterization of urinary symptoms in patients with ureteral stents. Urology. 2002;59(4):511-6. https://doi.org/10.1016/S0090-4295(01)01644-2 PMid:11927301
18. Kehinde EO, Rotimi VO, Al-Hunayan A, Abdul-Halim H, Boland F, Al-Awadi KA. Bacteriology of urinary tract infection associated with indwelling J ureteral stents. J Endourol. 2004;18(9):891-6. https://doi.org/10.1089/end.2004.18.891 PMid:15659928