J Pediatr Adolesc Surg. 2020; 1: ahead
DOI: https://doi.org/10.46831/jpas.v1i2.34

Case Report

Percutaneous cystolithotripsy in the reconstructed bladder of cloacal exstrophy: A case report

Eiji Hisamatsu, Kanae Koyama, Kaoru Yoshino

Department of Urology, Aichi Children's Health and Medical Center, JAPAN

Cite as: Hisamatsu E, Koyama K, Yoshino K. Percutaneous cystolithotripsy in the reconstructed bladder of cloacal exstrophy: A case report. J Pediatr Adolesc Surg. 2020; 1: ahead

ABSTRACT

Background: Bladder stones are common after bladder augmentation. The management of bladder stones is challenging, especially in patients who underwent complex urinary tract reconstruction.

Case Presentation: We report our experience of percutaneous cystolithotripsy after bladder neck closure, creation of a catheterizable channel, and ileal bladder augmentation in a girl with cloacal exstrophy.

Conclusion: Percutaneous cystolithotripsy is a safe, effective, and minimally invasive treatment option for bladder stones after bladder neck closure and the creation of a continent catheterizable channel

Keywords: Cystolithotomy, Urinary reconstruction, Percutaneous

INTRODUCTION

The bladder stone is one of the late complications of bladder augmentation with a reported incidence of 10% to 52%.[1] The management of bladder stones is challenging, especially in patients who have undergone complex urinary tract reconstruction. Different surgical options have been reported for stones in the reconstructed bladder: open cystolithotomy, endoscopic cystolitholapaxy, and percutaneous cystolithotomy.[2-4] We report our experience of percutaneous cystolithotripsy after complex urinary tract reconstruction in a girl with cloacal exstrophy. The objective of this report is to share our experience of managing stones in a reconstructed bladder that are difficult for endoscopic cystolitholapaxy through a continent catheterizable channel.

CASE REPORT

A female infant weighing 2574 g was delivered at 36 weeks gestation by Cesarean section because prenatal ultrasonography at 35 weeks gestation revealed an omphalocele with polyhydramnios. She was diagnosed with cloacal exstrophy at birth. At 2 days of age, she underwent omphalocele closure, bladder closure, end colostomy using the hindgut, right end ureterostomy, pull-through vaginoplasty, and pubic approximation at another hospital. Postoperative cystography showed a vesicovaginal fistula. Subsequently, she developed bladder dehiscence. At 2 years of age, she was referred to our center for further management of urinary incontinence. Although we had planned to perform urinary tract reconstruction before the elementary school age, it had been impossible because of her private family matters. At 14 years of age, she underwent ileal bladder augmentation, creation of a continent catheterizable channel (Monti), bladder neck closure, bilateral ureteroneocystostomy, and closure of the vesicovaginal fistula (Fig.1). Postoperative cystography showed persistence of the vesicovaginal fistula (Fig.2a). At 15 years of age, she underwent re-closure of the vesicovaginal fistula. Although minor leakage was found on postoperative cystography, the fistula resolved with continuous bladder drainage for 3 months. She developed bladder stones 6 months post-procedure as evidenced by Ultrasound

Correspondence*: Eiji Hisamatsu MD, Department of Urology, Aichi Children's Health and Medical Center, 7-426 Moriokacho, Obu Aichi 474-8710 JAPAN
Email: fpsfd412@yahoo.co.jp
Submitted on: 26-07-2020
Conflict of interest: None

Accepted on: 20-10-2020
Source of Support: Nil

and X-ray KUB despite adequate daily bladder irrigation. The stones increased in number and size (25×13 mm, 25×13 mm, 8×8 mm), and she developed gross hematuria and lower abdominal pain (Fig.2b).

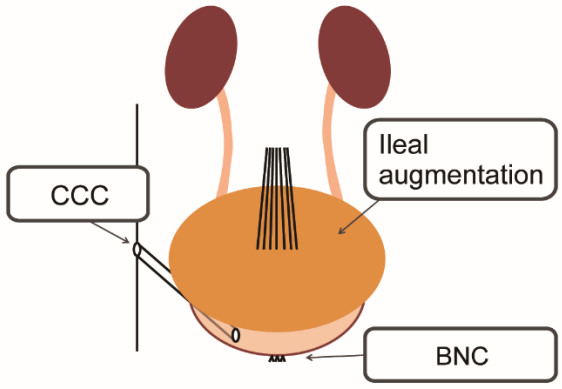

Figure 1: The schema after the urinary tract reconstruction: ileal bladder augmentation, creation of a continent catheterizable channel (CCC), bladder neck closure (BNC), bilateral ureteroneocystostomy, and closure of the vesicovaginal fistula.

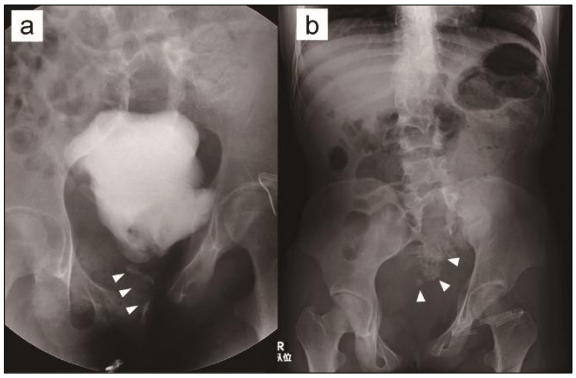

Figure 2: (a) Persistence of the vesicovaginal fistula on cystography 18 days after urinary tract reconstruction (△). (b) The bladder stones on KUB before percutaneous cystolithotripsy (△).

At 17 years of age, surgical intervention was performed for the bladder stones. A guidewire was fluoroscopically inserted through the catheterizable channel, and a ureteral access sheath (9.5/11.5 Fr) was placed. Cystolitholapaxy through the channel was considered to be impossible because it was quite difficult to secure a field of view even by a flexible endoscope due to the position of the stones and channel. Subsequently, we moved on to percutaneous cystolithotripsy (Fig.3). Under direct vision with the flexible endoscope, an 18-gauge angio-catheter was placed through the previous suprapubic tube tract in the left lower quadrant used at the time of urinary tract reconstruction. Through the angio-catheter, a guidewire was placed as a safety wire. The skin adjacent to the safety wire was incised, and a 10-mm laparoscopic trocar was placed under direct observation. A 9.5 Fr offset operating cystoscope was introduced into the bladder through the trocar. The flexible endoscope and ureteral sheath were removed, and a 12 Fr Nelaton catheter was placed through the channel to prevent overdistention of the bladder. The stones were fragmented using a Swiss LithoClast® Master-J (Boston Scientific Corp., Natick, MA, USA). The stone fragments were evacuated using a 26 Fr Nelaton catheter through the trocar. A 12 Fr balloon catheter was placed over the safety wire, and another balloon catheter was placed through the channel. The catheter through the trocar site was removed on postoperative day 7, and the catheter through the channel was removed on postoperative day 9. The postoperative course was uneventful. No stone was found on KUB 1 year after the surgery.

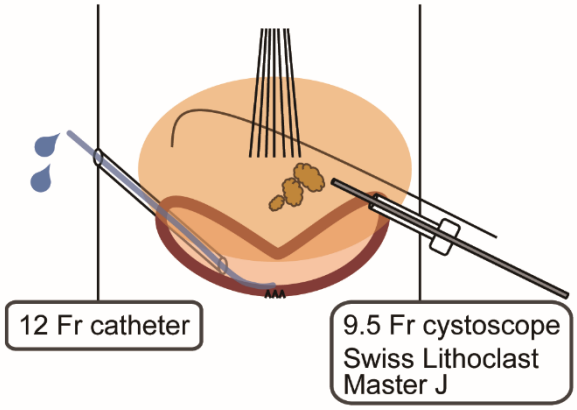

Figure 3: The schema of percutaneous cystolithotripsy. Fragmentation and extraction were performed through the trocar placed at the previous suprapubic tube site. A 12 Fr Nelaton catheter was placed through the catheterizable channel to prevent overdistention of the bladder.

DISCUSSION

Bladder stones are common after bladder augmentation. Risk factors include urinary stasis, mucus, bacteriuria, and/or metabolic abnormalities. Urinary stasis can be attributed to incomplete emptying due to continent catheterizable channel and bladder neck closure.[1] The management of bladder stones in children who underwent such complex urinary tract reconstruction remains controversial. Different surgical options have been reported for stones in the reconstructed bladder: open cystolithotomy, endoscopic cystolitholapaxy, and percutaneous cystolithotomy.[2-4]

Open cystolithotomy remains the preferred option to treat large or multiple stones in the reconstructed bladder. However, there is a concern about injury of the pedicles of the bowel used for augmentation. With the advent of endoscopy, minimally invasive surgeries have been performed. Al-Marhoon et al. reported favorable results of endoscopic management of bladder stones in children with low complications and short

hospital stays.[5] Thomas et al. reported good results in children treated by cystolitholapaxy through the catheterizable channel.[4] They needed to dilate the channel to place a sheath, the size of which ranged from 18 to 28 Fr (median 18 Fr). Although neither leakage nor difficulty was found in their series, there still remain concerns about late problems caused by dilation of the channel.

Percutaneous cystolithotomy has been reported to be a useful option because it can avoid injury of the pedicles as well as problems with catheterizable channels, as stated above. [2-3] On the other hand, percutaneous cystolithotomy often requires stone fragmentation. Residual fragments after stone fragmentation can become a nidus for bladder stone recurrence. Szymanski et al. compared stone recurrence after bladder augmentation between percutaneous cystolithotomy, endoscopic cystolitholapaxy through the catheterizable channel or urethra, and open cystolithotomy.[6] They showed the recurrence risk did not change significantly with any of those surgical approaches or with fragmentation. Therefore, open cystolithotomy is not superior to percutaneous cystolithotomy in terms of the prevention of stone recurrence.

We preferred endoscopic surgery over open cystolithotomy because we considered the possibility of stone recurrence requiring further surgeries. Szymanski et al. reported bladder stones recurred in 47.7% of patients (median recurrence time 9.5 years, range 3 months to 14.7 years).[6] Although the bladder stones in our patient might have been caused by the 3-month catheterization after the closure of the vesicovaginal fistula, we selected a less-invasive approach taking recurrence into consideration.

In conclusion, percutaneous cystolithotripsy is a safe, effective, and minimally invasive treatment option for bladder stones after bladder neck closure and the creation of a continent catheterizable channel. This approach would be less traumatic if repeated surgeries for recurrent stones are needed in the future.

Conflict of Interest: None.

Consent to Publication: Author(s) declared taking informed written consent for the publication of clinical photographs / material (if any used), from the legal guardian of the patient with an understanding that every effort will be made to conceal the identity of the patient, however it cannot be guaranteed.

Authors Contribution: Author(s) declared to fulfill authorship criteria as devised by ICMJE and approved the final version. Authorship declaration form, submitted by the author(s), is available with the editorial office.

Acknowledgements: None.

REFERENCES

1. Thomas JC, Clayton DB, Adams AC. Lower urinary tract reconstruction in children. In Partin AW, Dmochowski RR, Kavoussi LR, Peters CA (eds). Campbell-Walsh-Wein Urology. 12th ed. Philadelphia: Elsevier: 2020. p 696-701.
2. Rhee AC, Cain MP. Percutaneous cystolithotomy in the pediatric neuropathic bladder with laparoscopic trocar access: a modified approach useful for the augmented and native bladder, and continent urinary reservoir. J Pediatr Urol. 2013; 9:289-92.
3. Breda A, Mossanen M, Leppert J, Harper J, Schulam PG, Churchill B. Percutaneous cystolithotomy for calculi in reconstructed bladders: initial UCLA experience. J Urol. 2010; 183:1989-93.
4. Thomas JS, Smeulders N, Yankovic F, Undre S, Mushtaq I, López PJ, et al. Paediatric cystolitholapaxy through the Mitrofanoff/Monti channel. J Pediatr Urol. 2018; 14:433.e1-4.
5. Al-Marhoon MS, Sarhan OM, Awad BA, Helmy T, Ghali A, Dawaba MS. Comparison of endourological and open cystolithotomy in the management of bladder stones in children. J Urol. 2009; 181:2684-7.
6. Szymanski KM, Misseri R, Whittam B, Amstutz S, Kaefer M, Rink RC, et al. Cutting for stone in augmented bladders- what is the risk of recurrence and is it impacted by treatment modality? J Urol. 2014; 191:1375-80.