Open cystolithotomy for very large calculi in a Studer ileal neobladder

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Orthotopic ileal neobladder has been frequently performed as urinary diversion after cystectomy over the last decades. We report an unusual complication of very large calculi in a Studer ileal neobladder. Due to its size, open cystolithotomy was performed.

Key Words: neobladder stone, open cystolithotomy, Studer ileal neobladder

Introduction

Over the last decades continent urinary diversion with orthotopic ileal neobladder has been frequently performed after radical cystectomy. Numerous complications have been reported with this type of reconstruction; among them calculi, with reported rate of 3% to 43%.[1] Herein, we report a rare case of very large calculi in a Studer ileal neobladder that needed open surgery.

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Case report

A 56-year-old Caucasian male was referred to our institution for a 2 month history of gross hematuria and dysuria, 4 years after radical cystectomy with ileal neobladder replacement for bladder cancer. Pathology report revealed urothelial carcinoma of the bladder with microscopic invasion of perivesical fat and with three positive lymph nodes out of 18 (pT3aN2Mx). Adjuvant chemotherapy was initiated but not completed since the patient was lost to follow up.

Clinical and laboratory assessment were unremarkable at initial visit. Imaging and cystoscopic evaluation was ordered. Cystoscopic examination revealed at least three very large calculi in the neobladder. Plain abdominal x-ray showed three neobladder calculi of 8.1 cm x 8.1 cm, 5.1 cm x 4.9 cm

Figure 1. Plain kidney, ureter and bladder x-ray showing large radio opaque calcifications in the neobladder area and a right renal stone.

and 3.0 cm x 1.2 cm, respectively that were initially mistaken for a surgical implant by the radiologist. Moreover the patient had a 3.9 cm x 2.0 cm right renal calculus, Figure 1. Abdominal CT scan showed no cancer relapse however it revealed multiple small bowel adhesions to the neobladder, Figure 2.

Both renal and neobladder calculi were managed simultaneously with a percutaneous nephrolithotomy (PCNL) and an open cystolithotomy approach, respectively. PCNL was performed first, achieving

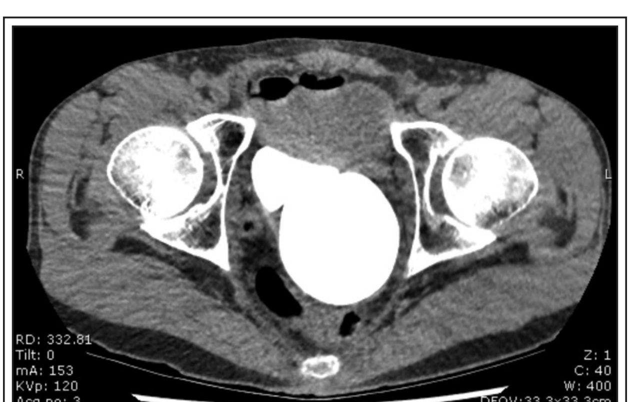

Figure 2. Un-enhanced computed tomography scan showing very large neobladder stones and small bowel adhesions to the neobladder.

Figure 3. Picture of the two largest stones. Ruler graduated in centimeter.

stone-free status with no complications. A nephrostomy tube was left in place. The Studer neobladder was accessed through a 10 cm midline incision and needed an extensive adhesiolysis. The three stones were removed under direct vision with the use of forceps, Figure 3. Watertight closure of the neobladder was then achieved with a running, two-layer 3-0 polyglycolic acid suture. A Penrose drain was left in place. Blood loss was minimal. The patient recovered quickly after the surgery. Nephrostomy tube and Penrose drain were removed on postoperative day 2 and patient left home with a urethral catheter. The first appointment, 3 weeks later, included a cystography that showed no leakage, therefore the urethral catheter was removed. Also, a metabolic stone work up was done and showed no abnormalities. All urine cultures revealed polymicrobial growth.

Biochemical analysis of the renal calculus revealed that it was 100% made of carbonate apatite whereas neobladder calculi were composed of 60% carbonate apatite and 40% magnesium ammonium phosphate (struvite). No staples or foreign body were found.

Discussion

Neobladder calculi is an uncommon complication and rates are different among diversion subtypes.[1,2] Studer reported no cases of neobladder calculi in his personal series of 482 patients after 32 months of follow up.[3] This could be partly explained by the close follow up and regular assessment. Other series reported rate ranging from 1.9% to 12.3% in patients with Studer neobladder.[4,5]

Several factors have been implicated in stone formation in intestinal urinary diversion. Mild chronic metabolic acidosis is common and can result in hypercalciuria and hypocitraturia.[1] Functional factors such as poor bladder emptying and urinary stasis have also been implicated.[2] Moreover, foreign bodies, such as non-absorbable staples or sutures and intestinal mucus are well known to become nidus for stone formation.[5-8] The high rate of pouch calculi reported by Steven and Poulsen (32.5%) was attributed by the authors to the use of metallic staples.[6] A prospective randomized trial confirmed this finding reporting a six-fold higher risk of stone formation in hemi-Kock pouches using metallic staples compared to absorbable staples (5% versus 30%).[7] Chronic bacterial colonization or recurrent urinary tract infections with urea-splitting bacteria may also lead to stone formation, especially infection stones. Bacteria such as Proteus mirabilis, Pseudomonas aeruginosa and Klebsiella species are commonly involved. Non-compliance to the follow up is a factor delaying diagnosis and increasing stone burden.[8] In our case, several factors may be involved including poor neobladder emptying, chronic bacterial colonization and non-compliance to follow up. This last issue is usually the most important factor related to very large neobladder stone.

Patient with neobladder calculi can be asymptomatic or present with various symptoms such as hematuria, dysuria, frequency, urgency, urinary incontinence or retention, abdominal pain and recurrent urinary tract infection. Initial investigation should include urinalysis, urine culture, complete blood count, electrolytes and serum creatinine. Metabolic work up for stone former should also be performed at least a month after the treatment.[2] Cystoscopic examination and plain KUB should confirm the diagnosis, and provide information regarding size, number and location of the stones. Abdominal computed tomography and intravenous urography may also be used for complete urinary tract anatomy assessment.

Treatment of reservoir stone can be challenging. Extracorporeal shock wave lithotripsy (ESWL) have been described in Kock and Indiana pouches for low stone burden and may requires endoscopic removal of fragments.[1] Most cases of neobladder stones are treated endoscopically, either through percutaneous or transurethral access. Some authors raised concerns of potential bladder neck contracture with the use of transurethral route.[1] In Tanaka's series, six out of seven patients with Studer pouch calculi were successfully treated with endoscopic lithotripsy.[5] Percutaneous cystolithotomy following bladder augmentation and cutaneous continent pouches have been reported with stone-free rate ranging from 56% to 95%.[1,9] However, literature on percutaneous treatment of orthotopic neobladder pouch is sparse and its location deep in the pelvis with bowel, omentum and mesenteric interpositions can make this approach hazardous.[8] In our case, stone burden precluded ESWL and cystolithotripsy. Percutaneous approach was not considered based on the large stone burden, small bowel adhesions and issues with patient compliance which mandated high success rate at first attempt. Madbouly reported a 100% stone-free rate with open surgery in a cohort of 12 patients with urethral hemi-Kock pouch and W-shaped neobladder with very large stone burden.[8] Open approach may also help to preserve the sphincteric mechanism and correction of concomitant reservoirs abnormalities such as revision of dessuscepted nipple valve. This is the first case of open cystolithotomy for neobladder calculi in a Studer neobladder that also needed a PCNL. This case highlights the need for compliance with follow up in patient with neobladder. □

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