

# Endoscopic Neo Cystolithotripsy for Multiple Calculi in Studer Ileal Neo Bladder

## A Case Report

Venkata Ramana Murthy Kusuma, Jayaram Reddy, Rama Krishna Prasad Divella

Keywords: urinary bladder calculi, lithotripsy, continent urinary reservoirs, treatment outcome

Urol J. 2011;8:159-62.  
www.uj.unrc.ir

### INTRODUCTION

Radical cystectomy with urinary diversion is the standard treatment for muscle invasive bladder cancer.<sup>(1)</sup> The ileal conduit has long been considered as the gold standard for urinary diversion. Continent urinary diversion with orthotopic neo bladder offers distinct advantages over ileal conduit. Orthotopic ileal neo bladder provides large capacity and low pressure reservoir, and is anastomosed to native urethra. It provides the patient with a superior cosmetic appearance, a simple effective alternative for urine storage, upper tract preservation, and efficient voiding.<sup>(2)</sup> However, various early and late complications have been described.<sup>(3)</sup> Herein, we report an unusual case of multiple calculi occurring in Studer orthotopic ileal neo bladder.

and orthotopic neo bladder reconstruction with Studer ileal neo bladder one year earlier. He was lost to follow-up 3 months after the surgery. After 8 months, he again presented to us with 1-month history of fever, dysuria, and urinary frequency.

On physical examination, except mild tenderness in his suprapubic region, nothing abnormal was



**Figure 1.** Plain kidney, ureter, and bladder x-ray showing multiple radio opaque shadows in the neo bladder area.

### CASE REPORT

A 45-year-old man had undergone radical cystectomy

Department of Urology, Osmania  
General Hospital, India

Corresponding Author:  
Venkata Ramana Kusuma Murthy,  
MS, MRCS, MCh  
Department of Urology, Osmania  
General Hospital, Afzal gunj,  
Hyderabad, 500012,  
Andhra Pradesh, India  
Tel: +91 991 274 7789  
Fax: + 91 402 460 0260  
E-mail: murthy.kusuma@rediffmail.com

Received September 2009  
Accepted February 2010



**Figure 2.** Postoperative plain x-ray showing complete clearance of the stones

detected; he was afebrile. His renal function tests and urine analysis were normal, and urine culture was sterile.

Plain kidney, ureter, and bladder x-ray showed multiple radio opaque shadows in the neo bladder area (Figure 1). Ultrasonography revealed multiple neo bladder calculi; the largest measuring  $3 \times 2$  cm in diameter. Cystoscopy revealed multiple calculi with extensive mucus flakes. All the calculi were fragmented by endoscopic neocystolithotripsy via transurethral approach. Complete stone clearance was achieved (Figures 2 and 3). After 1-year follow-up, he is stone free and voiding by abdominal straining with minimal post-void residual urine.

## DISCUSSION

The incidence of calculi in urinary diversion depends on the type of diversion used.<sup>(4)</sup> Neo bladder calculi in orthotopic ileal bladder are very rare. Deliveliotis and colleagues reported



**Figure 3.** Fragmented stones

a stone rate of 5.7% in patients with modified S-shaped ileal neo bladder<sup>(5)</sup> while Abol-Enein and Ghoneim reported a stone rate of 2.9% in patients with orthotopic W-shaped ileal neo bladder.<sup>(6)</sup> Studer and associates did not report a single case of neo bladder calculi in their twenty-year experience on 482 patients, because all the patients were kept under stringent lifelong follow-up protocol and monitored by computer (personal communication with Studer, UE).<sup>(3)</sup> Similarly, other centers using Studer pouch reported very low rates of neo bladder calculi.<sup>(7)</sup>

The etiology of neo bladder calculi is multifactorial, including idiopathic, metabolic, infectious, and structural causes. Patients with urinary diversion with ileal neo bladder have chronic metabolic acidosis which results in hypercalciuria and hypocitraturia. Furthermore, they may have hyperoxaluria, hyperphosphaturia, hypermagnesiumuria, and supersaturation of urine due to chronic dehydration. All these metabolic derangements will predispose them to stone formation.<sup>(4)</sup>

There is increased colonization of urea-splitting bacteria in orthotopic neo bladder, with prevalence of 12% to 79%.<sup>(8)</sup> *Proteus*, *Pseudomonas*, and *Klebsiella* species are most commonly involved pathogens. These bacteria produce the

urease enzyme that promotes the generation of ammonia and hydroxide from urea. The resultant alkaline urinary environment and high ammonia concentration along with abundant phosphate and magnesium in urine promote crystallization of magnesium ammonium phosphate, leading to formation of struvite calculi.<sup>(9)</sup> Since the degree of colonization depends on the amount of residual urine in the bladder, inefficient voiding and non compliance with clean intermittent catheterization are the main reasons for stone formation in patients with neo bladder. Increased mucus production, foreign bodies, and use of nonabsorbable staples are other causative factors implicated in the formation of stones. In our patient, multiple neo bladder calculi were due to increased mucus production, increased residual volume due to inefficient voiding, and non compliance of the patient to strict follow-up program.

The presentation of neo bladder calculi can be asymptomatic; hence, they are incidentally diagnosed on follow-up or the patient may present with dysuria, frequency, urgency incontinence, suprapubic pain, hematuria, and recurrent urinary tract infection.

Initial investigation should include complete biochemical profile, serum level of electrolytes as well as urine analysis and urine culture. Diagnosis is confirmed by cystoscopy. The number, size, and location of the calculi can be determined by plain kidney, ureter, and bladder x-ray. Alternatively, abdominal computed tomography scan provides necessary information. Intravenous urography is performed to look for any upper tract dilatation and function of the kidneys. Cystoscopic examination confirms the presence of stones and provides information regarding the etiology of stones. Furthermore, the cause of calculi, such as staples, sutures, foreign bodies, and mucus flakes can be determined.

Various treatment modalities have been described, including percutaneous cystolithotripsy, transurethral endoscopic neo cystolithotripsy, and open cystolithotomy. Patel and Bellman recommended percutaneous approach for management of calculi in continent urinary pouches. Although they had no personal

experience with orthotopic bladder calculi, they suggested percutaneous approach. Because they postulated that aggressive instrumentation per the urethra would lead to the bladder neck contracture.<sup>(10)</sup> In our patient, we used transurethral approach for treatment of the stones because the patient had good caliber urethra. We could achieve complete clearance of the stones without any complications. As the majority are infected stones, it is imperative to achieve a complete stone clearance, and special care must be taken in removing any foreign bodies.

Prevention is one of the most effective measures to deal with this complication. Maintaining adequate intake of fluids, daily irrigation of the pouch with normal saline, voiding by clock or double voiding, performance of regular clean intermittent catheterization in those who void ineffectively, and antibiotic prophylaxis in those who develop recurrent urinary tract infections are the recommended preventive measures.<sup>(4)</sup>

Strict adherence to the above-mentioned measures and lifelong follow-up with biochemical investigations, ultrasonography at least every 6 months for the first four years and annually thereafter as well as annual pouchoscopy after 5 years will definitely eradicate the problem.<sup>(11)</sup>

---

## CONFLICT OF INTEREST

None declared

---

## REFERENCES

1. Stein JP, Lieskovsky G, Cote R, et al. Radical cystectomy in the treatment of invasive bladder cancer: long-term results in 1,054 patients. *J Clin Oncol.* 2001;19:666-75.
2. Hobisch A, Tosun K, Kinzl J, et al. Life after cystectomy and orthotopic neobladder versus ileal conduit urinary diversion. *Semin Urol Oncol.* 2001;19:18-23.
3. Studer UE, Burkhard FC, Schumacher M, et al. Twenty years experience with an ileal orthotopic low pressure bladder substitute--lessons to be learned. *J Urol.* 2006;176:161-6.
4. Beiko DT, Razvi H. Stones in urinary diversions: update on medical and surgical issues. *Curr Opin Urol.* 2002;12:297-303.
5. Deliveliotis C, Alargoff E, Skolarikos A, Varkarakis I, Argyropoulos V, Dimopoulos C. Modified ileal neobladder for continent urinary diversion: experience and results. *Urology.* 2001;58:712-6.

6. Abol-Enein H, Ghoneim MA. Functional results of orthotopic ileal neobladder with serous-lined extramural ureteral reimplantation: experience with 450 patients. *J Urol*. 2001;165:1427-32.
7. Tanaka T, Kitamura H, Takahashi A, Masumori N, Itoh N, Tsukamoto T. Long-term functional outcome and late complications of Studer's ileal neobladder. *Jpn J Clin Oncol*. 2005;35:391-4.
8. Razvi HA, Martin TV, Sosa RE, Vaughan Jr ED. Endourologic management of complications of urinary intestinal diversions. *AUA Update Series*. 1996;15:174-9.
9. Menon M, Resnick MI. Urinary lithiasis: Etiology, diagnosis and medical management In: Walsh PC, A.B. R, Vaughan ED, et al., eds. *Campbell's urology*. Vol 4. 8 ed. Philadelphia: WB Saunders 2002:3260-1.
10. Patel H, Bellman GC. Special considerations in the endourologic management of stones in continent urinary reservoirs. *J Endourol*. 1995;9:249-54.
11. Venn SN, Mundy AR. Continent urinary diversion using the Mainz-type ureterosigmoidostomy--a valuable salvage procedure. *Eur Urol*. 1999;36:247-51.