Urology Case Reports 3 (2015) 74–76

Contents lists available at ScienceDirect

Urology Case Reports

journal homepage: www.elsevier.com/locate/eucr

Endourology

Endoscopic Treatment of Studer's Orthotopic Neobladder Lithiasis

Diogo Gil-Sousa*, Daniel Oliveira-Reis, Vitor Cavadas, Manuel Oliveira, José Soares, Avelino Fraga

Urology Department, Oporto Hospital Center, Portugal

ARTICLE INFO

Article history:
Received 18 January 2015
Received in revised form
28 January 2015
Accepted 29 January 2015
Available online 11 March 2015

Keywords:
Neobladder
Orthotopic
Lithiasis
Endoscopy

ABSTRACT

Studer's neobladder lithiasis is a rare but important long term complication of this orthotopic bladder substitute technique. We report a case of a 45 year-old male patient, submitted to a radical cystoprostatectomy with a Studer's orthotopic neobladder 4 years before, presenting bad compliance to recommended urinary habits, increased production of mucus and high post voiding residue. CT scan and urethrocystography showed a distended pouch with 2 major sacculations with narrow communication and a stone in each sacculation. A minimally invasive endoscopic technique was successfully used in the treatment of the 2 small calculus.

Introduction

Radical cystectomy with urinary diversion is the standard treatment for muscle invasive bladder cancer.[1]

The neobladder as an orthotopic bladder substitute approaches the ideal urinary diversion by providing a low-pressure, easily emptied continent reservoir. Continent urinary diversions may be of great psychological benefit to select patients.[2]

Several types of orthotopic bladder substitutions have been developed, of which Studer's ileal neobladder is one of the most common procedures.[2] Studer's ileal neobladder is easily constructed and provides unchanged voiding habits with good continence and upper urinary tract preservation, with relatively low rates of complication, even compared with the intermediate-term results of an ileal conduit.[2]

However, it is not free of early and late complications. A pouch-related late complication rate between 11.6% and 23.5% has been reported in different series.[3] Reservoir calculus formation is a well-known late complication. Factors contributing to stone formation in patients with intestinal urinary diversion are complex and incompletely understood.[3]

Herein, we report a rare case of calculi occurring in Studer's orthotopic ileal neobladder.

Case presentation

45 year-old male patient, submitted to a radical cystoprostatectomy with a Studer's orthotopic neobladder 4 years before due to invasive urothelial carcinoma. He presented bad compliance to recommended urinary habits and increased production of mucus, beginning to refer voiding complaints with high post voiding residue (PVR) evaluated through ultrasound. CT scan and urethrocystography showed a distended pouch with 2 major sacculations with narrow communication that led to difficult emptying of the proximal one and 1 small stone in each sacculation (7 mm in the proximal one and 5 mm in the distal one) – Fig. 1; No urethral alterations were noticed.

The importance of maintaining the correct urinary habits recommended was reinforced, with significant decrease of PVR. The patient was proposed to endoscopic treatment of neobladder lithiasis. Endoscopic procedure was performed with a 16Fr flexible cystoscope inserted through the urethra into the orthotopic neobladder, without urethral resistance or lesion. It was possible to visualize a relevant mucus production by the intestinal wall, that was involving both calculi – Fig. 2.

The procedure presented some challenges in the passage of the flexible cystoscope to the proximal sacculation of the neobladder, due to narrow communication and difficult angulation, as it is shown in fluoroscopy – Fig. 3.

Vigorous flushing of the mucus involving the stones enabled the correct visualization, mobilization and downsizing of the stones. Both stones were safely basketed with no sphincter or urethral

* Corresponding author. Rua 5 de Outubro, 182, 4100-172 Porto, Portugal. Tel.: +351 938545043.
E-mail address: diogogil85@gmail.com (D. Gil-Sousa).

http://dx.doi.org/10.1016/j.eucr.2015.01.013

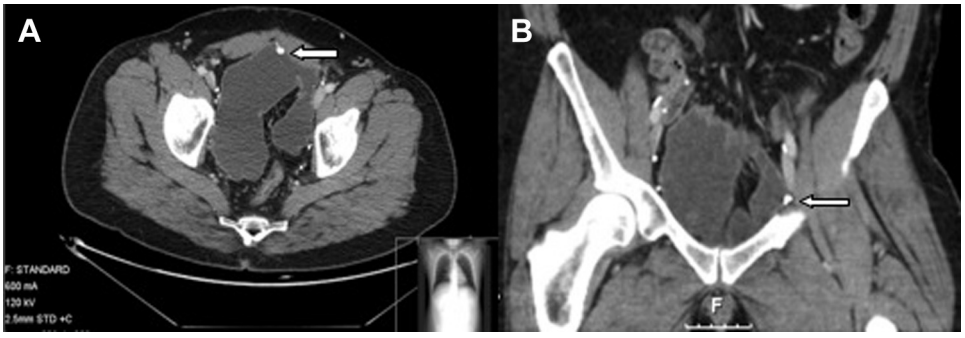

Figure 1. CT scan showing neobladder stone (A – axial view; B – coronal view) – arrows.

damage. The careful removal of both calculi was atraumatic to the urethra, with no postoperative complications and hospitalization stay of less than 24 h.

Patient adopted the correct urinary habits recommended and showed a clear improvement of the voiding complaints with residual PVR 1 month after surgery. Stone composition was 100% Apatite.

Discussion

Formation of calculi within orthotopic urinary reservoirs is a well-known late complication.

Factors contributing to stone formation in these patients include urinary stasis caused by impaired voiding with subsequent residual urine, chronic metabolic acidosis, urinary infection (especially with urea splitting organisms), excessive mucus production, encrustation and stone formation on foreign bodies as exposed staples.[3]

Diversion patients commonly present with mild metabolic acidosis (due to bicarbonate loss and reabsorption of urinary solutes like ammonium chloride and hydrogen ions), which promotes bony demineralization via a buffering process with increased calcium liberation and excretion. Furthermore, excess ammonium absorption enhances intestinal sulfate uptake and renal sulfate excretion in this patient group which increases the filtered load of sulfate to the nephron and inhibits calcium reabsorption. Acidosis also induces hypocitraturia which is a known risk factor for calcium stone formation.[3]

Mucus overproduction by the intestine may also be involved in calculi formation in Studer's neobladder, with the adhesion of small crystals and bacterial biofilm formation.[3]

Figure 2. Removal of mucus involving the stone.

Inefficient voiding and non compliance with clean intermittent catheterization are reported as the main reasons for stone formation in patients with neobladder.[4]

The incidence of calculi in urinary diversion depends on the type of diversion used. Neobladder calculi in orthotopic ileal bladder are very rare, with no reported cases of neobladder calculi by Studer and associates in their 20-year experience on 482 patients.[5]

This incidence varies widely according to different series, like Tanaka et al that reports 7% of neobladder lithiasis in 57 patients who underwent radical cystectomy and bladder reconstruction with Studer's ileal neobladder.[2]

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.[4]

The case presented underlines the importance of correct voiding habits as one of the main measures to prevent calculi formation in Studer's ileal neobladdder. The patient did not respect the recommendations of voiding by clock and presented an enlarged pouch with 2 major sacculations that did not allow complete emptying, which lead to high PVR.

Mucus overproduction, as referred by Mabbouly et al, also plays a major role in this case as we can observe a large quantity of mucus inside the neobladder and encrusted in the outer layer of the calculi. Indeed, mobilization and removal of the calculi with the basket was

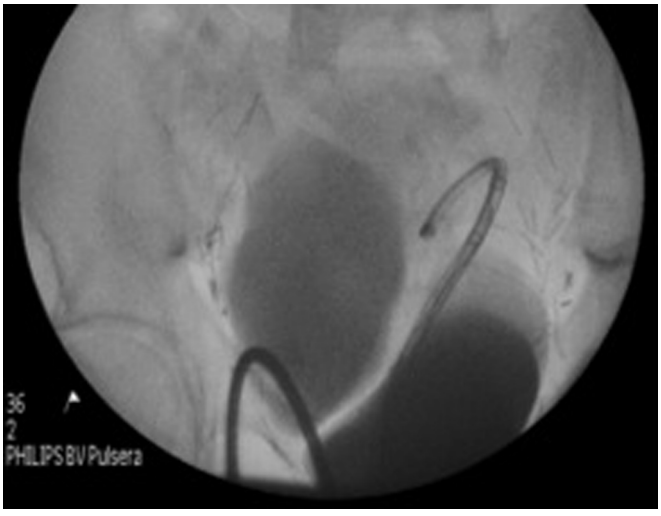

Figure 3. Intraoperative fluoroscopy, showing the flexible cystoscope passing through the distal sacculation into the proximal one.

only possible after flushing and cleaning the thick mucus outer layer of each calculus.

Conclusion

Studer's neobladder lithiasis is a rare but important long term complication of this orthotopic bladder substitute technique, often related with metabolic disturbs, mucus overproduction and inefficient voiding.

The endoscopic technique described enabled avoidance of a more invasive surgical treatment and allowed for rapid return of the patient to complete health. In our opinion proved to be the best method of treatment as the patient presented good caliber urethra and we managed to achieve complete clearance of the stones with a minimal invasive procedure and no complications.

Conflict of interest

The authors do not report any conflict of interest.

References

1. Mayr R, Fritsche HM, Pycha A, et al. Radical cystectomy and the implications of comorbidity. *Expert Rev Anticancer Ther*. 2014;14:289–295.
2. Tanaka T, Kitamura H, Takahashi A, et al. Long-term functional outcome and late complications of Studer's ileal neobladder. *Jpn J Clin Oncol*. 2005;35:391–394.
3. Madbouly K. Large orthotopic reservoir stone burden: role of open surgery. *Urol Ann*. 2010;2:96–99.
4. Kusuma VR, Reddy J, Divella RK. Endoscopic neocystolithotripsy for multiple calculi in studer ileal neo bladder a case report. *Urol J*. 2011;8:159–162.
5. 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;176:161–166.