CASE REPORT

TRAUMA AND RECONSTRUCTIVE UROLOGY

Ureterocolic fistula secondary to a self–expanding retrievable ureteral stent

George Ransford, David Pan, Ahmed Eldefrawy, Govindarajan Narayanan, and Murugesan Manoharan

University of Miami Miller School of Medicine, Miami, FL, USA

Article history
Submitted: July 6, 2012
Accepted: Aug. 30, 2012

Correspondence
Murugesan Manoharan
University of Miami
Department of Urology
PO Box 016960 (M814) Miami, FL 33101, USA
phone: +1 305 243 6596
mmanoharan@med.miami.edu

Self–expanding stents are relatively new in the field of urology and have primarily been used for permanent remodeling of benign or malignant stricture. We are presenting a rare and interesting case of a ureterocolic fistula that formed secondary to placement of an expandable, retrievable metal stent in the ureter. After multiple retrieval efforts, the self–expanding metal stent was finally retrieved and a ureterocolic fistula was appreciated on antegrade pyelography. The patient chose to manage it non–surgically, with routine nephroureteral catheter exchanges, and her creatinine continues to remain stable.

Key Words: ureterocolic fistula ‹› stent ‹› ureter

INTRODUCTION

Ureterocolic fistulas are a relatively rare phenomenon. While they are most often secondary to obstructing ureteral calculi, other predisposing factors include diverticular disease, radiation, cancer, tuberculosis (pre–1940) and trauma [1, 2, 3]. We present a rare case of ureterocolic fistula that developed secondary to a WallFlex® self–expanding retrievable stent (Boston Scientific, Natick, MA) that was placed to remodel a ureteral stricture.

The application of self–expanding stents in urology was borrowed from their use in vascular and biliary stenoses. The initial urologic use of permanent self–expanding stents was to relieve malignant stricture secondary to an extrinsic pressure from a pelvic tumor or lymph node metastasis [4]. Recently, they have been used for ureteroileal anastomotic strictures following radical cystectomy with urinary diversion [5]. However, there is only one other published report of the use of a temporary, retrievable self–expanding stent for ureteral remodeling [6]; the authors experienced failure of the retrieval loop but had no tissue ingrowth after being in place for one month.

CASE REPORT

A 74–year–old female with a history of cervical cancer underwent multiple pelvic surgeries and radiotherapy. Subsequently, the patient developed symptomatic right–sided hydronephrosis secondary to a 6 cm long mid to distal right–sided ureteral stricture. The patient was initially managed by a community physician who had placed a nephroureteral catheter approximately six months before referring the patient to us. Despite the presence of this catheter, the obstruction persisted, and she continued to have significant symptoms and discomfort. Her creatinine remained stable at 0.7 mg/dl and the nuclear renogram demonstrated adequate function at 42% in the right kidney.

In view of the persistence of the stricture, a decision was made to insert a 10 mm x 8 cm WallFlex® self–expanding retrievable stent in the mid to distal right ureter (Figure 1). Based on anecdotal evidence and

DOI: 10.5173/ceju.2013.02.art33

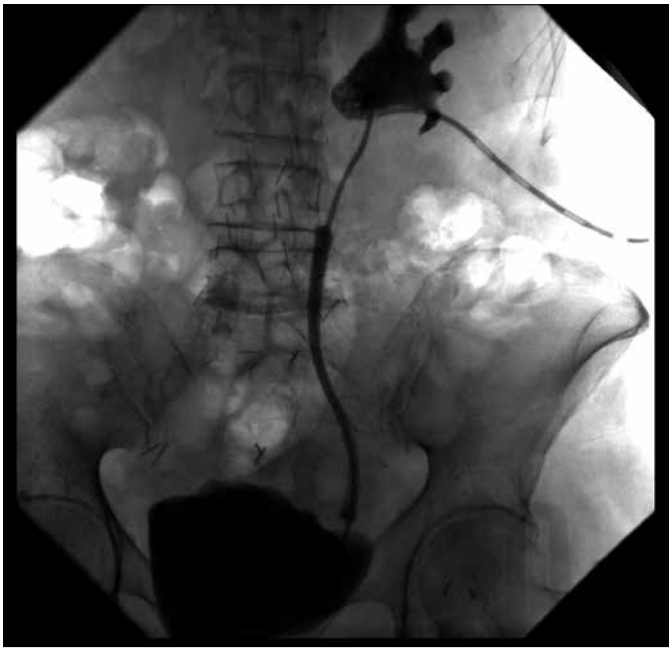

Figure 1. *Retrievable stent at insertion.*

Figure 2. *Retrievable stent removed, enterocolic fistula visualized.*

in collaboration with the interventional radiology team at our institution, we thought it may be possible to use this retrievable stent temporarily in order to remodel the strictured segment of ureter. We also believed that the presence of the nephroureteral catheter inside the self–expanding stent would prevent or reduce the chance of luminal stenosis secondary to intimal hyperplasia.

She presented 8–weeks later for stent removal. During the procedure, the interventional radiology team encountered difficulty removing the WallFlex® stent, a complication that has been described in the past [6]. When the stent was finally retrieved on the third attempt – nearly one year after placement – extensive "debris" was seen within the stent, which was likely a combination of tissue in–growth and encrustation. The patient subsequently had a new nephroureteral catheter put into place, to be exchanged on a routine basis.

In a post–operative follow–up appointment, the patient complained of right flank pain and discomfort, as well as malodorous urine – very common symptoms of a ureterocolic fistula [7]. An antegrade pyelogram demonstrated a fistulous connection between the ureter and the sigmoid colon (Figure 2). In consultation with the colorectal team, we recommended an exploratory laparotomy, lysis of adhesions, and repair of the fistulous connection. However, the patient declined active treatment and elected to continue having routine nephroureteral catheter exchanges. Over the next eight months, she continued to have urinary tract infections, but no fecaluria or pneumaturia. Her most recent creatinine, six months ago, was 0.67 mg/dl, and she continues to have an *E. coli* positive urine culture. On her most recent visit two months ago, the nephroureteral catheter was exchanged for a double–J stent. During that exchange, a retrograde pyelogram was performed but no fistula could be appreciated.

DISCUSSION

The WallFlex® stent used in this case is a retrievable and more flexible version of the original WallSTENT®, which seems to be the most widely tested of the self–expandable metal stents for urologic applications [8]. Composed of a platinum core and nitinol encasement, the WallFlex® has a Permalume® covering to resist tissue ingrowth and an integrated retrieval loop to facilitate removal.

The use of self–expanding stents does not come without complications [9]. The most frequent complications reported include tissue ingrowth, migration, infection, encrustation, retrieval difficulty, and scarring of the ureter longer than the original stricture. Liatskios et al. believe that the Achilles heel of ureteral metal stents is urothelial hyperplasia, as it leads to progressive luminal loss and relapse of obstruction – usually occurring early in the post–interventional period [5]. Yet, studies have shown that it usually regresses four to six weeks after insertion of the stent [10, 11]. A prior study in animals found that

the degree of force exerted on the ureteral wall affects the degree of urothelial hyperplasia [12]. Accordingly, they describe that a nominal diameter of 8 mm is the maximum that should be implanted in order to achieve a balance between sufficient luminal restoration and the induction of hyperplastic narrowing [5]. We believe that the stent used in this case, 8 cm x 10 mm, might have been too large in diameter, which contributed to a more aggressive urothelial hyperplasia. In addition, a greater outward force by the stent on the ureteral wall could have caused an inflammatory reaction, leading to fistula formation. There are case reports in the literature where metal stents used in the biliary tree have caused such fistulas [13, 14].

While the research to date supports the off–label use of permanent metal stents for malignant and benign obstructions, there are no studies examining the temporary or retrievable self–expanding stents. The aforementioned complications, especially retrieval complications, require further study. In our case, the retrieval difficulty certainly could have been due to a combination of device failure and tissue in–growth or encrustation, as the stent had been in place several months longer than anticipated. Future research will need to address this and other complications, while at the same time increasing the number of patients in a given study.

References

1. Maeda Y, Nakashima S, and Misaki T. Ureterocolic fistula secondary to colonic diverticulitis. Int J Urol. 1998; 5: 610–612.
2. Lee WK, Chang SD, Roche CJ, Duddalawar VA, Rowley VA, McLouglin MG. Spontaneous ureterocolic fistula secondary to calculous pyohydroureteronephrosis. Br J Radiol. 2005; 78: 954–955.
3. Cirocco WC, Priolo SR, and Golub RW. Spontaneous ureterocolic fistula: a rare complication of colonic diverticular disease. Am Surg. 1994; 60: 832–835.
4. Lugmayr HF and Pauer W. Wallstents for the treatment of extrinsic malignant ureteral obstruction: midterm results. Radiology. 1996; 198: 105–108.
5. Liatsikos EN, Kagadis GC, Karnabatidis D, Katsanos K, Papathanassiou Z, Constantinides C, et al. Application of self–expandable metal stents for ureteroileal anastomotic strictures: long–term results. J Urol. 2007; 178: 169–173.
6. Gorin MA, Antebi E, Manoharan M, Bird VC. Endoscopic retrieval of a retained self–expanding metal stent placed for a ureteroileal anastomotic stricture. J Endourol. 2011; 25: 911–912.
7. Winter CC, Linderholm BE, and Shiraki IW. Ureterocolic fistula. Am J Surg. 1973; 125: 338–342.
8. Al Aown A, Iason K, Panagiotis K, and Liatsikos EN: Clinical experience with ureteral metal stents. Indian J Urol. 2010; 26: 474–479.
9. Liatsikos EN, Barbalias GA, Siablis D. Ureteral metal stents: a tale or a tool? J Endourol. 2005; 19: 934–939.
10. Wakui M, Takeuchi S, Isioka J, Iwabuchi K, Morimoto S. Metallic stents for malignant and benign ureteric obstruction. BJU Int. 2000; 85: 227–232.
11. Pauer W and Lugmayr H. Metallic Wallstents: a new therapy for extrinsic ureteral obstruction. J Urol. 1992; 148: 281–284.
12. Thijssen AM, Millward SF, and Mai KT: Ureteral response to the placement of metallic stents: an animal model. J Urol 1994; 151: 268–270.
13. Hyun CB and Bemiller T. Biliary–duodenal fistula caused by metal stent. Gastrointest Endosc 2001; 54: 361.
14. Lee TH, Park S–H, Kim SP, Lee SH, Lee Ch–K, Chung Il–K, et al. Spontaneous choledochoduodenal fistula after metallic biliary stent placement in a patient with ampulla of vater carcinoma. Gut Liver. 2009; 3: 360–363.