CASE REPORT

Antegrade opening of the ureteral orifice via dilation balloon and placement of a ureteral double - J stent

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Abstract

Ureteral orifice destruction (complete or partial) during extensive transurethral resection of tumors of the urinary bladder is a relatively uncommon complication that may result in the dilation of the overlying part of the urinary tract. The present case report describes the orthodromic opening of the ureteral orifice via balloon dilation and placement of a ureteral double-J stent in a patient with complete ureteral orifice destruction, dilation of the overlying part of the urinary tract and hydronephrosis complicated by multiple lithiasis.

Keywords:
Ureteral orifice, ureteral stent, balloon dilation, lithiasis

Introduction

Transurethral Resection of Bladder Tumor (TUR-BT) is one of the most common urologic procedures. It consist the preferable and accepted treatment option for non-invasive tumors and it is also part of the diagnostic approach for all bladder tumors. It is considered as a safe surgical procedure, however complications may rarely occur1. One of them is the traumatic injury of the ureteral orifice. It is relatively rare and may occur during extensive TUR’s of large tumors especially when is located proximal to the ureteral orifice. The injury may cause orifice stricture or failure of the antireflux mechanism. The first results in dilation of the overlying part of the urinary tract and hydronephrosis, while the latter may predispose to
urinary tract infections, dilation of the overlying part of the urinary tract or implantation of cancer cells in the upper urinary tract system. In such a case, in order to avoid potential implantation of cancer cells in the upper urinary tract system or outside the urinary tract, the repair is deemed necessary to be endoscopically performed. The most common stricture management is scar tissue resection and it depends on the identification of the exact location site of ureteral orifice via several techniques. In certain cases, the access to the orifice is particularly difficult due to deformity or edema and therefore a blind opening at the orifice site is not indicated. The present case report describes the orthodromic opening of a destructed ureteral orifice via balloon dilation and ureteral double-J stent placement in a patient with complete orifice failure, dilation of the overlying part of the urinary tract and hydronephrosis complicated by multiple lithiasis.

Case report

A 62-year-old male patient, who, ten months prior to his visit, was subjected to TUR of a superficial tumor of the urinary bladder, was presented with macroscopic hematuria and back pain, occasionally recurring with paroxysms. The patient is under follow up and receives intravesicular instillations of epirubicin. In cystoscopy (3 months prior to the diagnosis of hematuria) neither tumor recurrence nor cancer development in situ were
found however; the left orifice was undetectable. Apart from confirming hematuria, urianalysis and urine culture showed no infection or crystalluria. The ultrasound examination of the abdomen revealed dilation of both the pelvicalyceal system of the left kidney and the ipsilateral ureter. The CT-scan diagnosed multiple lithiasis in the lower part of the affected left ureter. Blood urea nitrogen and creatinine levels were within normal range. The patient consecutively underwent an unsuccessful endoscopic repair attempt and extracorporeal lithotripsy. Due to the progressive hydronephrosis and patient’s unfavourable condition, a percutaneous nephrostomy placement for drainage purposes was decided.

For the drainage of the pelvicalyceal system via percutaneous access, a percutaneous drainage kit (Introducer Drainage Catheter Kit, Bioteque Corporation, Taiwan) was used. Under ultrasound guidance, a dilated left upper pole calyx was punctured via a 21g Chiba needle and the pelvicalyceal system was opacified with iodinated contrast agent (diluted with normal saline 50/50) (Fig. 1). Next, a 0.018” Mandril guidewire and a Cobra angiographic stent were introduced into the pelvicalyceal system and, properly maneuvered; were advanced to the distal part of the ureter in order to facilitate the demonstration of the dilation of the lower part of the ureter. A filling defect distanced 4 cm from the conceivable orifice location, suggested a calculi-induced obstruction and in fact, the bladder lumen was not opacified (Fig. 2).
A 0.018” Mandril guide wire assisted the catheterization of the pelvicalyceal system with coaxial implantation system and, for maneuverability reasons; it was replaced by a 0.035” Heavy Duty guidewire. The last was advanced into the bladder. The insertion site, the bladder’s lumen outline as well as any potential leak, were inspected via contrast medium injection (Fig. 3). A 9-Fr peel-away sheath (Cook Medical Europe Ltd. Limerick, Ireland) was introduced into the pelvicalyceal system. Via the sheath and guided by the Heavy Duty wire, a 4.8-Fr double-J ureteral stent and its pusher (Standard Loop Stent, Bioteque Corporation, Taiwan) were placed into the ureter. When the double-J stent was well-advanced in the bladder and its final place in the pelvis was confirmed, the guidewire was retrieved followed by the pusher (Fig. 4). Through the sheath, an extra 8-Fr nephrostomy catheter was placed in order to ensure the kidney drainage in case of stent malfunction. A few days later, subsequent to the confirmation of the ureteral double-J stent’s proper functioning, the nephrostomy catheter was removed.

Having confirmed the restoration of the pelvicalyceal system, an attempt to expand the ureteral orifice via balloon dilation was decided.

Similar to the above described technique, a 9-Fr peel-away sheath was introduced into the pelvicalyceal system, through which, a compatible semi-rigid foreign body retrieval forceps (“Alligator” foreign body retriever / Karl Storz) was inserted and removal of the ureteral double-J stent was followed. Assisted by the guidewire, an angiographic stent with a dilation balloon (compliant balloon 14 atm-4.3mm) was advanced to the strictured part of the ureter. A progressive dilation of 1-2 min duration was performed followed by instillation of normal saline solution under pressure and placement of an 8-Fr ureteral double-J stent (Figs 5-8). The imaging study confirmed the calculi expulsion.

**Comment**

The use of catheters with incorporated dilation balloon (Fogarty type) does not actually represent a widely used practice in urology. In the majority of the cases, they have been used in managing congenital strictures of the ureteropelvic junction (UPJ). Relatively uncommonly, they have been used as an auxiliary medium for the removal of foreign bodies from the ureter or the prevention of calculi reflux during nephrolithotripsy. Recently, they were used in the diagnosis of ureteral strictures during laparoscopic pyeloplasty, as well as in the dilatation of a strictured anastomosis of ureter and neobladder. The limited experience in the use of Fogarty type catheters for the treatment of ureteral strictures is mainly explained by the availability of most effective techniques that are not available in our hospital. Of note, the modern trend for the final management of such strictures is primarily the laser-assisted endoscopic incision. Long-term success rates of endoscopic incision range between 60 to 70 % and, in general terms, they rank higher than those managed with a balloon dilator. In the present case, the patient background -that ruled out the open surgical management- and the lack of laser equipment in our hospital, rendered the above
described method as the only available treatment approach. Notably, it delivered satisfying results given that no recurrence was manifested during the 8-month follow up. Regarding the placement of a respectively large diameter ureteral double-J stent for the preservation of the treatment outcome, it should be mentioned that it consists an established practice in reconstructive procedures. Usually, the introduction of ureteral stents for ureteral orifice dilatation maintenance is antegrade, (cystoscopically assisted through the vesicoureteral orifice) however, in our case, no such possibility was present given that our hospital is not equipped with a C-Arm.

In conclusion, percutaneous, placement of ureteral stents, as described above, is an alternative image-guided technique allowing for the successful placement of the ureteral double-J stent in order to avoid ureteral perforation. By using the refined interventional radiology material (coaxial insertion systems, peel-away sheaths etc), the maneuvers are safer and better tolerated ensuring thus the precise placement into the drainage system of the kidney. Of particular importance is the initial access site to the pelvicalyceal system which should be performed through the middle or upper calyces. Lower calyx access is not preferred since it is accompanied by increased angulation of the introducers, wires, and catheters, which consequently impede easy advancement inside the ureter. Finally, balloon dilation next to the calculi (Fig. 2, 5 & 7) should be avoided, for it may induce a potential ureteral perforation.

References


