Treatment of urinoma due to ureteral perforation by percutaneous nephrostomy (PCN) and antegrade placement of ureteral stent.

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Abstract

Percutaneous antegrade placement of ureteral stent is performed under fluoroscopic guidance and represents a treatment option when retrograde, cystoscopically assisted ureteral stent placement is not feasible. This is a report of a complicated urinary infection in a 41-year-old woman, in whom the initial attempt of retrograde ureteral stent placement was unsuccessful and caused perforation of the ureter. Percutaneous antegrade, fluoroscopically guided approach to the pelvicalyceal system and ureter and the subsequent placement of a new ureteral stent were successful and associated with quick clinical and laboratory improvement.

Key words:
ureteral stent, double “J”, percutaneous antegrade placement

Introduction

Double-J ureteral stents (also known as “pigtails”) are widely used in everyday urological practice mainly for the ureteric patency preservation. Surgically inserted under fluoroscopic guidance, via a C-arm mobile radiography or fluoroscopy system, the stents are reversely placed in the ureter via the ureteral orifices following cystoscopy. In private
practice, or where no radiography equipment is available, the placement is empirically performed solely assisted by the stent’s graduation markings. The result is then approximately studied on a kidney-ureter-bladder (KUB) radiography. Alternatively, and especially when retrograde access is not feasible, the stents are inserted in antegrade fashion after percutaneous puncture in the renal pelvicalyceal system. Stent placement via or next to a pre-existing stent is relatively rarely encountered in everyday practice and cited in literature [1,2]. The aim of the present report is the description of a case of complicated urinary infection with ectopic ureteral stent retrograde placement, ureteral perforation-induced urinoma and its management.

**Case report**

A 41-year-old female patient was hospitalized with persistent febrile infection. She reported an attempt of cystoscopic retrograde ureteral stent placement elsewhere. Pain during ureteral stent placement, resistance to stent advancement and pus excretion from the ureteral orifice and the stent’s free-end -reported by the patient- suggested complicated urinary tract infection. Despite the antibiotic treatment’s adjustment to the blood culture antibiogram data, the clinical and laboratory signs did not improve (temperature: 40° C, WBC 23840/ml, CRP: 22). The transabdominal ultrasound study revealed left-kidney hydronephrosis and dilation of the imaged part of the ureter, of unspecified aetiology. The plain KUB radiography showed that the cystoscopically placed stent was within the conceivable course of the ureter though at a level lower than anticipated for the renal pelvis.

![Image 1. Initial percutaneous access to the pelvicalyceal system](image1)

![Image 2. Antegrade ureteral stent placement - fluoroscopy](image2)

Given the non-improvement of the patient’s condition and the questionable effectiveness of the previous procedure, the drainage procedure was decided for the pelvicalyceal system via percutaneous access; a percutaneous drainage kit was initially used (Introducer Drainage Catheter Kit, Bioteque Corporation, Taiwan). 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). The imaging study of the ureter exhibited the part of the initial double-J ureteral stent emerging the ureter at the height of the 5th lumbar vertebra (where the obstructing calculus was detected as opacification deficit) (Fig. 1) Via the Chiba needle, a 0.018” Mandril guidewire was introduced into the pelvicalyceal system and, properly maneuvered, it was then advanced up to the initial part of the ureter. Wire guidance assisted in the catheterization of the pelvicalyceal system with coaxial implantation system and the Mandril wire was replaced by a 0.035” Heavy Duty one. This wire was relatively easily advanced into the ureter and up the bladder (Fig. 2). Also assisted by the guidewire, a 9-F 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, we placed a new 4.8-F double-J ureteral stent and its pusher to the ureter (Standard Loop Stent, Bioteque Corporation, Taiwan). When the double-J stent was well-advanced in the bladder and its final place in the pelvis was confirmed, the wire was then retrieved followed by its pusher. Through this sheath, an extra 8-F nephrostomy catheter -component of the initial drainage kit- was placed, to ensure the kidney drainage in case of stent malfunction (Fig. 3).

The patient manifested clinical and laboratory improvement soon after the successful drainage (temperature: 38.5° C, WBC 12840/ml, CRP:12, approximately on the 18th post-procedural hour). The initial ectopic ureteral catheter was removed the next day via cystoscopy. The day thereafter, the nephrostomy catheter was also removed having previously verified, via contrast medium, the patency of the percutaneously placed ureteral stent. The patient was scheduled for lithotripsy.

**Comment**

Double-J ureteral stents are widely used in the management of ureteral stricture or obstruction induced by internal or external causes (calculus, neoplasia, postoperatively, radiation etc) [3, 4]. Usually, the placement of such stents is retrograde, cystoscopically assisted through the cystoureteral orifice, although it is not always feasible. The hardest part in placing the ureteral stents is the acquired stricture site as well as the natural strictures at the pelvi-ureteric junction (PUJ), the bladder and the iliac vessels confluence. The perforation of the ureter is a common complication in all kinds of catheterization and placement techniques and is more likely to occur in blind introduction [4].

Percutaneous antegrade ureteral stent insertion, as described above, constitutes an alternative fluoroscopically assisted technique that allows for the successful double-J
placement and the treatment of the perforated ureter. By using the refined interventional radiology material (coaxial insertion systems, peel-away sheaths), the maneuvers are safer and better tolerated ensuring the precision in advancing the materials into the drainage system of the kidney. Of particular importance and for the technical success of the procedure, is the initial access site to the pelvicalyceal system which should be performed through one of the middle or upper calyces. Lower calyx access is not preferred since it is accompanied by increased angulation of the introducers, the wires, the catheters etc, which consequently cannot be easily advanced inside the ureter [5].

Περίληψη
Η διαδερμική, κατιούσα τοποθέτηση ουρητηρικών καθετήρων (stents) γίνεται με ακτινοσκοπική καθοδήγηση και αποτελεί μια θεραπευτική επιλογή, όταν η ανιούσα, μέσω κυστεοσκόπησης τοποθέτηση ουρητηρικού καθετήρα είναι αδύνατη. Στην παρούσα αναφορά περιγράφεται περιστατικό επιπλεγμένης ουρολοίμωξης σε γυναίκα 41 ετών, στην οποία η αρχική προσπάθεια για τοποθέτηση ουρητηρικού καθετήρα μέσω της ανιούσας οδού απέτυχε και προκάλεσε διάτρηση του ουρητήρα. Η διαδερμική κατιούσα, υπό ακτινοσκοπικό έλεγχο προσπέλαση του πυελοκαλυκικού συστήματος και του ουρητήρα και η επακόλουθη τοποθέτηση νέου ουρητηρικού καθετήρα υπήρξε επιτυχής και συνοδεύτηκε από άμεση κλινική και εργαστηριακή βελτίωση.

Λέξεις ευρετηρίου:
ουρητηρικός καθετήρας, διπλό J, διαδερμική κατιούσα τοποθέτηση

References