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After urgent drainage of an obstructed kidney by internal ureteric stenting; is ureteroscopic stone extraction always needed?

Diaa-Eldin Taha *, **Ahmed M. Elshal, Mohamed H. Zahran, Ahmed M. Harraz, Ahmed R. El-Nahas, Ahmed A. Shokeir**

Urology and Nephrology Centre, Mansoura University, Egypt

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Emergency;
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ABBREVIATIONS

BMI, body mass index;
MSUC, midstream urine culture;
NCCT, non-contrast spiral CT;
OR, odds ratio;
PCN, percutaneous

Abstract ***Objectives:*** To assess the probability of spontaneous stone passage and its predictors after drainage of obstructed kidney by JJ stent, as insertion of an internal ureteric stent is often used for renal drainage in cases of calcular ureteric obstruction.

Patients and methods: Between January 2011 and June 2013, patients for whom emergent drainage by ureteric stents were identified. The patients' demographics, presentation, and stone characteristics were reviewed. The primary endpoint for this study was stone-free status at the time of stent removal, where all patients underwent non-contrast spiral computed tomography (NCCT) before stent removal. Ureteroscopic stone extraction was performed for CT detectable ureteric stones at the time of stent removal. Potential factors affecting the need for ureteroscopic stone extraction at the time of stent removal were assessed using univariate and multivariate statistical analyses.

Results: Emergent ureteric stents were undertaken in 196 patients (112 males, 84 females) with a mean (SD) age of 53.7 (16.2) years, for renal obstruction drainage. At the time of stent removal, 83 patients (42.3%) were stone free; with the remaining

* Corresponding author at: Mansoura Urology and Nephrology Center, 35516 Elgomhoria St, Mansoura University, Mansoura, Egypt. Tel.: +20 050 2202222; fax: +20 050 2202717.
E-mail address: drdiaaeldin@gmail.com (D.-E. Taha).

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nephrostomy;
ROC, Receiver operating characteristic;
SIRS, systemic inflammatory response syndrome;
URS, ureteroscopy

113 patients (57.7%) undergoing ureteroscopic stone extraction. On multivariate analysis, stone width [odds ratio (OR) 15.849, 95% confidence interval (CI) 2.83; $P = 0.002$) and radio-opaque stones (OR 12.035, 95% CI 4.65; $P < 0.001$) were independent predictors of the need for ureteroscopic stone extraction at the time of stent removal.

Conclusion: Spontaneous ureteric stone passage is possible after emergent drainage of an obstructed kidney by ureteric stenting. Stone opacity, larger stone width, and positive preoperative urine culture are associated with a greater probability of requiring ureteroscopic stone extraction after emergent drainage by ureteric stenting.

Introduction

Emergent drainage of obstructed kidneys is needed in cases of ureteric calculi causing uraemia or sepsis. This obstruction can be relieved by placement of a nephrostomy tube (percutaneous nephrostomy, PCN) or a ureteric stent. Insertion of a JJ stent is often used for urgent decompression of obstructed kidneys secondary to calcular ureteric obstruction. The impact of stent insertion on ureteric peristalsis is not clear. The effect of ureteric stent insertion on ureteric peristalsis was experimentally studied in a porcine model and stent insertion was associated with an initial increase in peristaltic activity, which was followed by a decrease or arrest of peristalsis [1].

Other clinical and experimental studies have shown that ureteric stents are associated with ureteric dilatation, diminished ureteric peristalsis, and impaired stone passage [2-5]; however, spontaneous stone passage is not an infrequent event after ureteric stent insertion.

After urgent decompression by ureteric stenting for an acutely obstructed kidney, an additional procedure is often necessary for the ureteric stone. However, it is not clear which stones in which patients will require further treatment, i.e. those stones that will pass or disappear after ureteric stenting. In the present study, we assessed the probability of spontaneous stone passage and its predictors after urgent drainage of acutely obstructed kidney by ureteric stenting.

Patients and methods

Data were retrospectively collected for patients who underwent emergent ureteric stent placement for drainage of calcular ureteric obstruction between January 2011 and June 2013. Patients were classified into two groups: patients in the first group were stone-free on non-contrast spiral CT (NCCT) and in the second group ureteric stones were still present. Ureteroscopic stone extraction was performed for ureteric stones detected by CT at the time of stent removal.

Study population

Patients that presented at the Emergency Room with an acutely obstructed kidney and were eligible for emergent drainage were assessed. A ureteric stent was inserted for uraemic patients with obstructed solitary (functional or anatomical) or bilateral obstructed kidneys. A ureteric stent was inserted for sepsis whenever an obstructed kidney was associated with two or more of the systemic inflammatory response syndrome (SIRS) criteria [6]. In patients with PCN tube drainage, an active primary ureteroscopic stone treatment was attempted and patients who were managed by ESWL or percutaneous nephrolithotomy were excluded from the study.

Intervention

On presentation, patients were assessed by history, physical examination, urine analysis, midstream urine culture (MSUC), serum creatinine, blood electrolytes, and leucocytic count. NCCT of the urinary tract was performed for all patients at presentation. The stone size was measured in two dimensions, i.e. the stone length and width. The stone surface area was calculated using the formula, surface area = length × width × π × 0.25 [7].

A single preoperative i.v. dose of third generation cephalosporin was given. Cystoscopic insertion of the JJ stent (Percuflex, Boston Scientific) was performed under regional anaesthesia with fluoroscopic control. The ureteric stent was inserted over a hydrophilic guidewire to allow safe bypassing of the obstructed ureteric segment and a 16 F urethral catheter was fixed for 24 h to allow free drainage of the obstructed kidney.

Post-intervention evaluation

Serum creatinine, blood electrolytes and blood count were repeated the next morning. Once the serum