Endourology and Stones

Early Hospital Admission and Treatment Onset May Positively Affect Spontaneous Passage of Ureteral Stones in Patients With Renal Colic

Stavros Sfoungaristos, Adamantios Kavouras, Panagiotis Kanatas, Mordechai Duvdevani, and Petros Perimenis

OBJECTIVE	To evaluate the impact of early hospital admission and onset of medical expulsive therapy (MET) in spontaneous passage of ureteral stones causing renal colic.
METHODS	We recruited 392 patients referred to the emergency room with symptoms of renal colic. All patients received standard MET of oral tamsulosin 0.4 mg at the time of diagnosis. In group A, patients who received MET in <2 hours from the symptom onset were included, whereas group B consisted of patients treated in >2 hours. The association of MET onset and stone-free rates after 6 weeks of follow-up was evaluated. Early MET onset predictive impact on spontaneous stone passage was evaluated as well.
RESULTS	The stone-free rate in group A and B patients was 71.2% and 59.7% ($P = .018$), respectively. A significant association was observed between spontaneous calculus elimination and stone size ($P \leq .001$), location within the ureter ($P = .007$), and the interval between pain onset and pharmaceutical management ($P = .018$). Patients who received a late-onset MET had an increased risk to develop febrile upper urinary tract infection during the follow-up period ($P = .040$). In the multivariate analysis, size ($P \leq .001$) and early therapy onset ($P = .019$) were statistically important predictors for stone-free status after the surveillance period.
CONCLUSION	Patients with renal colic who admitted to the emergency department earlier since symptom onset may have increased potential to be stone free during the surveillance period. UROLOGY 84: 16–21, 2014. © 2014 Elsevier Inc.

The reported lifetime risk of urolithiasis ranges between 5% and 12%, and worldwide prevalence of renal stone disease is estimated to be 5%-12%.[1,2] The incidence has increased recently as a result of environmental, social, and professional life changes.[2]

Urolithiasis management is a very common issue in daily urology practice, and renal colic represents the most prominent clinical manifestation of the disease.[3] This acute condition has a significant impact on the quality of life, producing distress and discomfort. It also constitutes a major economical burden, with annual expenditure to reach $2.1 billion.[4]

Currently, there are several treatment options for patients with renal colic. These include extracorporeal shock wave lithotripsy, uretoroscopic lithotripsy, and other conservative protocols such as "medical expulsive therapy" (MET) protocol. The latter aims to relieve symptoms (pain, discomfort, and urinary symptoms) and facilitate stone passage, as well, in an interval of 4-6 weeks. Calcium channel blockers and alpha-blockers are the most commonly used agents for MET. Results from several trials have shown that MET may facilitate spontaneous stone passage and decrease morbidity.[5,6]

The management of patients with renal colic includes pain control during the acute phase and MET as a systematic treatment. However, there are no published data in the literature that examined the potential association between treatment success and the time intervened between renal colic symptoms and treatment onset. Do patients admitted to the emergency department earlier after the onset of symptoms have a greater likelihood to be stone free after an active surveillance protocol?

The aim of the present study was to investigate the impact of early hospital admission and onset of MET on spontaneous passage of ureteral stones.

MATERIALS AND METHODS

After we obtained an approval waiver of the ethics Committee of our institution, we conducted a retrospective analysis of

prospectively collected data of 392 patients admitted to the emergency department with symptoms of renal colic from March 2011 until April 2013.

All patients included in the study had a solitary ureteral stone. Exclusion criteria were the presence of fever (axillary temperature >37.8°C), history of recently diagnosed urinary tract infection, or antibiotic therapy intake during the last 2 weeks. Patients with renal colic symptoms caused by extra-renal causes were not recorded.

A noncontrast spiral computed tomographic scan of the abdomen and pelvis was performed in all patients to confirm the diagnosis. Maximal stone length, side, and location were recorded. Location was divided into ureteropelvic junction, proximal ureter (above sacroiliac joints), midureter (overlying sacroiliac joints), distal ureter (below sacroiliac joints), and vesicoureteral junction.

A standard analgesic treatment protocol was followed in all patients at the acute phase of renal colic consisting of an intramuscular injection of diclofenac 75 mg while a tablet of tamsulosin 0.4 mg was given per os to immediately initiate MET. Based on our primary concept, we recorded the time intervened between renal colic symptom onset and treatment onset. We considered 2 hours as a suitable cutoff value given the fact that it commonly takes that much time for a patient with renal colic to be diagnosed and to receive treatment in our hospital. Thus, if tamsulosin tablet was taken in <2 hours from symptom onset, the patient was included in group A. In contrast, patients were included in group B whenever treatment was started in >2 hours from symptom onset. In an effort to keep strict criteria for dividing patients into group A and B, patients who had even mild symptoms started in <2 hours from the time they received MET were included in group A. Patients who had any degree of pain for >2 hours were included in group B.

In all cases with symptom relief, patients were discharged with a prescription of diclofenac 75 mg twice a day orally for 7 days (the first pill to be taken 12 hours after the intramuscular injection), and the MET consisted of tamsulosin 0.4 mg once a day orally for 30 days (the first pill to be taken after 24 hours). If persistent pain and/or highly impaired renal function was observed during follow-up, a double-J ureteral stent or a percutaneous nephrostomy was inserted, and the patients were excluded from the study.

A follow-up visit was planned after 6 weeks. All patients underwent a second computed tomographic scan. Spontaneous stone passage was considered as the absence of any ureteral calculi. In the patients who were referred to the urology department complaining of new-onset fever or recurrent pain, a double-J stent or a percutaneous nephrostomy for urinary diversion was inserted. We have to underline that these patients, who had symptom relief and were readmitted to the hospital complaining of recurrent pain while they had been discharged from the emergency department, were not excluded and recurrent pain was recorded as a complication. Instead, in patients with pain persistence after primary treatment at the emergency department, a double-J stent was inserted and they were excluded from the analysis.

Statistical analysis was completed by SPSS software, version 17 (SPSS Inc, Chicago, IL). Descriptive statistics are presented as mean ± standard deviation and interquartile range for normally distributed variables and as the absolute number and percentage frequency for categorical variables.

The normality condition of the numerical variables was studied by Kolmogorov-Smirnov test. Mann-Whitney U test was used to compare means between numerical groups. Chi-square test was used for categorical variables.

A univariate analysis was performed to identify the significance of studied parameters in prediction of spontaneous stone passage. A multivariate analysis was then performed for the variables identified as statistically important in univariate analysis, using logistic regression.

All tests were 2 tailed, and P value <.05 was considered as statistically significant.

RESULTS

Median patient age was 39 years (41.5 ± 13.3 years, 20), and 216 patients (55.1%) were men and 176 of them (44.9%) were women. Calculus size ranged between 2.3 and 15.0 mm (6.88 ± 3.42 mm, 4.9). One hundred ninety-seven calculi (50.3%) were found on the right side and 195 (49.7%) on the left. Thirty-seven stones (9.4%) were identified at the ureteropelvic junction region, sized 2.6-15 mm (7.28 ± 1.17 mm, 4.8); 40 (10.2%) at the proximal ureter, sized 5.1-9.4 mm (7.28 ± 1.90 mm, 1.6); 61 (15.6%) at the midureter, sized 2.5-13.9 mm (6.55 ± 2.63 mm, 3.5); 83 (21.2%) at the distal ureter, sized 2.3-15 mm (6.58 ± 3.73 mm, 3.5); and 171 (43.6%) at the vesicoureteral junction, sized 2.3-14.9 mm (6.96 ± 3.83 mm, 6.4). No statistically significant difference was noticed regarding stone size in different ureteral locations (P = .581).

Most of studied patients (233, 59.4%) were managed in <2 hours from the onset of the renal colic, whereas 159 patients (40.6%) were treated in >2 hours after symptoms started. After 6 weeks of active surveillance, spontaneous stone passage was noticed in 261 cases (66.6%). The stone-free rate in group A and B patients was 71.2% and 59.7% (P = .018), respectively. Patients' characteristics, according to the presence of spontaneous passage, are listed in Table 1. A significant association was observed between spontaneous calculus elimination and stone size (P ≤.001), location within the ureter (P = .007), and interval between pain onset and pharmaceutical management (P = .018). Characteristics of patients in group A and B are presented in Table 2.

A double-J stent or a nephrostomy tube was inserted in 120 patients (30.6%), 29 cases (7.40%) returned with fever and ureteral obstruction during the surveillance period as a complication of the stone, and 51 patients (13.0%) hospitalized. Characteristics of patients, who referred back to the hospital because of adverse events secondary to ureteral lithiasis, are listed in Table 3. The association of early therapy onset and presence of complications, in terms of fever, need for double-J stent or nephrostomy insertion, or hospitalization, is seen in Table 3. Patients who received a late-onset MET had an increased risk to develop a febrile upper urinary tract infection during follow-up period.

A regression analysis was conducted, consisting of a univariate and a multivariate analysis focused on the identification of independent predictors for spontaneous stone passage. As revealed by the univariate analysis,