Factors Influencing Readmission after Elective Ureteroscopy

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Purpose: Ureteroscopy is increasingly used to manage nephrolithiasis, upper urinary tract urothelial carcinoma and other urological conditions. In this study we determine the rate of readmission and emergency department visits after ureteroscopy in an underserved population, as well as factors associated with these unplanned visits.

Materials and Methods: A retrospective chart review from 2010 to 2014 of all elective ureteroscopies was conducted at a single tertiary hospital serving an underserved population in a major metropolis. Demographic, operative and discharge characteristics were collected and analyzed.

Results: A total of 276 ureteroscopies were performed with 15.6% presenting to the emergency department within 30 days. Overall 5.8% were readmitted. Readmitted patients were more likely to have hypertension (OR 3.64, p=0.02), asthma or chronic obstructive pulmonary disease (OR 5.54, p=0.001), 2 or more comorbidities (OR 3.65, p=0.12), or a complication associated with ureteroscopy (OR 7.27, p=0.007). The patients who sought care in the emergency department after ureteroscopy were less likely to have had a ureteral stent in place before ureteroscopy (OR 0.35, p=0.017) or an endoscopic urological procedure within the last 30 days (OR 0.35, p=0.045). About two-thirds of patients who presented to the emergency department complained of pain alone, while the most common complaints for readmitted patients were fever and pain (43.8%).

Conclusions: The majority of emergency department visits after ureteroscopy were due to pain. These patients were less likely to have a preoperative ureteral stent placed or a history of recent urological procedures. Readmission rates were associated with overall comorbidities and complications.

Key Words: ureteroscopy; patient readmission; comorbidity; emergency service, hospital; stents

Abbreviations and Acronyms

COPD = chronic obstructive pulmonary disease

ED = emergency department

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AVOIDABLE rehospitalizations are costly to the health care system and may be a metric of the quality of care. Under the Affordable Care Act the Centers for Medicare and Medicaid Services have implemented plans to decrease hospital reimbursement when expected readmission rates exceed standards for certain medical conditions and plan to include surgical procedures in the future.[1] This approach is intended to increase the attention to clinical outcomes and quality improving measures. Rehospitalization rates are higher among patients with poor health and comorbid conditions.[2] An unintended consequence of the negative reimbursement approach may be penalizing those hospitals that treat underserved patients, a vulnerable population with increased health difficulties.[3,4]

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Rigid and flexible ureteroscopy have been increasingly used for stone disease and in other minimally invasive procedures.[5,6] Many urological and nonurological studies examining surgical readmissions have reported on outcomes after complex oncologic or open cases. Patients with multiple medical comorbidities or a higher ASA® (American Society of Anesthesiologists®) classification, as well as patients experiencing surgical complications, are more likely to be readmitted within 30 days after the procedure.[7–9] Fewer studies have examined causes and rates of readmission after common ambulatory procedures performed by urologists. Rambachan et al found a readmission rate of 3.47% in an analysis of outpatient urological procedures that did not include ureteroscopy, a rate similar to other nonurological ambulatory procedures.[4,7] Emergency department visits are also common among patients after ambulatory surgery, with a majority of patients who return to the ED presenting due to pain.[10] Contrary to this, postoperative infections represent the most common reason for rehospitalization after surgery.[2,11]

In this study we determine the rate of ED visits and readmissions after ureteroscopy, and if any factors inherent to the patient, surgery or discharge planning were associated with unplanned readmissions or ED visits. Defining such factors may result in determining patients at risk for rehospitalization after ureteroscopy and prospective strategies to prevent such return visits.

MATERIALS AND METHODS

After institutional review board approval a retrospective chart review was performed of all patients from 2010 to 2014 who underwent elective ureteroscopy at a single tertiary care facility serving mainly Medicare, Medicaid and uninsured patients, a catchment area deemed by the state department of health as underserved. Patients were excluded from the study if they were admitted urgently through the ED or were hospitalized for other reasons before the procedure. Select patient characteristics and procedural details were extracted from the electronic medical record. Information collected on each patient included age, gender, insurance status, body mass index and certain medical comorbidities, including hypertension, hyperlipidemia, coronary artery disease, diabetes, asthma or COPD, chronic kidney disease with or without hemodialysis, history of cancer, any coagulopathy or bleeding disorder, having a solitary kidney, cerebrovascular accident or neurological disorder, systemic steroid use or a psychiatric history.

We then collected data on ASA classification and whether the patient was treated within the last 30 days for a urinary tract infection or pyelonephritis. Operative characteristics collected included preoperative urine culture, indications for ureteroscopy, eg lithotripsy, diagnostic, endopyelotomy, ureteroscopic biopsy etc, preoperative ureteral stent placement, endoscopic urological procedures within 30 or 60 days before ureteroscopy, eg cystoscopy, stent placement, ureteroscopy for any reason, or percutaneous nephrolithotomy, operative time, stone burden and Clavien-Dindo complications. Hospital metrics included length of stay, prescriptions and drug type. Outcome data collected included presentation to the ED within 30 days, readmission within 30 days, presenting complaints when arriving in the ED or at the time of readmission, and length of time after the procedure that the patient presented to the ED or was readmitted.

In terms of statistical analysis categorical variables were analyzed using Pearson chi-square analysis and continuous variables were analyzed using Student's t-test. Variables that were significant on univariate analysis were then included in simple logistic regression analysis and those that were independent of each other were included in multivariate logistic regression. Statistical analysis was performed using Stata® version 12.

RESULTS

A total of 276 ureteroscopies were performed that met the study criteria. The majority of these patients, 186 (67.4%), had Medicaid, while 59 (21.4%) had private insurance, 23 (8.3%) had no insurance at the time of surgery and 8 (2.9%) had Medicare. Of these patients 43 (15.6%) presented to the ED within 30 days after ureteroscopy, of whom 27 (9.78%) did not require admission and 16 (5.8%) were ultimately readmitted. The average time to presentation for the ED only and readmission group was similar at 5.9 ± 6.9 and 5.7 ± 6.3 days, respectively ($p=0.546$). Baseline characteristics of each group are shown in the supplementary table (http://jurology.com/). Compared to those who did not return to the hospital the patients who were readmitted were more likely to have hypertension (68.8% vs 38.6%, $p=0.018$), asthma or COPD (43.8% vs 10.7%, $p<0.001$), 2 or more comorbidities (75.0% vs 40.3%, $p=0.007$), or have a medical or surgical complication during or after the procedure (18.8% vs 3.4%, $p=0.004$). The patients who visited the ED after ureteroscopy but did not require readmission, compared to those who did not present, were more likely to have asthma or COPD (25.9% vs 10.7%, $p=0.023$) and less likely to have had a ureteral stent in place before ureteroscopy (29.6% vs 55.8%, $p=0.010$). Patients who had undergone another endoscopic procedure (eg cystoscopy, stent placement, ureteroscopy for any reason or percutaneous nephrolithotomy) less than 30 days before ureteroscopy were less likely to present to the ED after the planned ureteroscopy (29.6% vs 49.8%, $p=0.047$).

Logistic regression was then performed on these factors found to be associated with ED visits or readmission (table 1). The presence of a

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