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Recent Antibiotic Treatment Increases the Risk of Urinary Tract Infection after Outpatient Cystoscopy

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Abstract

Introduction: Symptomatic urinary tract infection is a complication of office based cystoscopy. AUA guidelines recommend prophylactic antibiotics for patients with an increased risk of urinary tract infection. However, study results are mixed regarding the efficacy of prophylaxis for urinary tract infection prevention. We evaluate predictors of infection to identify groups at increased risk for urinary tract infection after cystoscopy.

Methods: We identified all office cystoscopies performed at a single institution from April 2012 through May 2014. Patients with a positive urine culture within 30 days of the procedure were reviewed for symptomatic urinary tract infection. Those with a urinary tract infection were matched to 4 controls. Patient characteristics were extracted and examined for association with urinary tract infection. A multivariable logistic regression model was fit to identify associations between composite clinical variables and urinary tract infection.

Results: During the study period 5,488 patients underwent cystoscopy, of whom 29 (0.53%) had a urinary tract infection. Cultures showed quinolone resistant organisms in 13 of 29 (45%) urinary tract infections. The use of an external catheter or intermittent catheterization (p=0.04), hospitalization within 4 weeks (p=0.04) and the use of antibiotics within 6 months of cystoscopy (p=0.01) were associated with urinary tract infection. Recent antibiotic exposure, recent nongenitourinary infection or recent hospitalization was associated with urinary tract infection on multivariable analysis (OR 5.26, 95% CI 1.87−14.8, p <0.01).

Conclusions: Recent antibiotic exposure, infection or hospitalization is associated with an increased risk of urinary tract infection after cystoscopy. Most symptomatic urinary tract infections are due to quinolone resistant organisms in this population. The optimal prophylactic regimen should be tailored to regional antibiotic susceptibility patterns and individual patient risk factors.

Abbreviations and Acronyms

AUA = American Urological Association

EMR = electronic medical record

UTI = urinary tract infection

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Flexible cystoscopy is a common procedure performed in the outpatient setting by urologists and other practitioners for a variety of indications. Symptomatic urinary tract infection is a known complication of cystoscopy. Rates of UTI after cystoscopy performed without antibiotic prophylaxis range from less than 1% to 10% using varying definitions of infection.[1−4]

The AUA recommends onetime pre-procedural antibiotic prophylaxis for patients considered at high risk for infection before cystoscopy (see Appendix).[5] Multi-specialty surgical prophylaxis guidelines also endorse single dose prophylaxis in patients with risk factors who undergo cystoscopy.[6]

Randomized controlled trials report mixed results regarding the efficacy of antibiotic prophylaxis before cystoscopy in preventing post-procedural bacteriuria and UTI.[1−4,7] Furthermore, it is unknown if clinical benefit is derived from the prevention of post-procedural bacteriuria,[8] the primary outcome investigated in most randomized trials.

Recent studies challenge the notion that even high risk individuals need prophylaxis before cystoscopy, considering the rarity and often mild nature of UTI.[9,10] This is especially relevant given the increasing importance of antibiotic stewardship during a time of increased antibiotic resistance rates.[11]

To better identify patients at increased risk for symptomatic UTI after cystoscopy we performed a matched case-control study of patients diagnosed with symptomatic UTI within 30 days of outpatient cystoscopy at our institution. This study design enabled us to evaluate risk factors and antimicrobial resistance patterns in patients with symptomatic, culture proven UTI, further elucidating patient groups that could potentially benefit from prophylaxis.

Methods

Clinic Protocol

Between April 2012 and May 2014, 5,488 outpatient cystoscopies were performed in the 2 outpatient urology clinics at our institution. Flexible cystoscopy was performed after the genitalia were prepped with povidone-iodine solution and 2% lidocaine jelly was instilled into the urethra. After each procedure the cystoscopes were cleaned using an enzymatic cleanser (V. Mueller®), sterile water wash and chemical sterilization with peracetic acid (Steris S40®). After the procedure the patients were given an informational handout and instructed to notify the clinic if they experienced a temperature of 101F or greater. Neither clinic had a formalized protocol regarding the use of pre-procedural prophylactic antibiotics and the administration of antibiotic prophylaxis was left to clinician preference (approximately 75% of patients received prophylactic fluoroquinolone pre-procedural antibiotic).

Study Design

After obtaining institutional review board approval, urine culture results within 30 days of cystoscopy were extracted from the EMR for all patients who underwent cystoscopy during the study period. Recognizing that this methodology would systematically miss infections treated outside of our health system and those treated empirically based on symptoms without obtaining a urine culture (thereby underestimating our infection rate), determining the incidence of infection was not a goal of this study. Positive cultures with pathogenic organisms were selected for review. Using prior literature and Centers for Disease Control and Prevention surveillance definitions as a guide,[6,12] and working with the hospital epidemiologist (TRT), we developed several criteria to define patients with symptomatic UTI.

The criteria included one of several signs or symptoms with no other recognized cause (fever, urgency, frequency, dysuria, prostate tenderness or suprapubic tenderness) AND a positive urine culture (10^5 colonies per ml or greater microorganisms) with no more than 2 species present, OR 2 of the previously mentioned signs and symptoms with no other recognized cause AND at least 1 of 7 signs including 1) positive dipstick for leukocyte esterase and/or nitrate, 2) pyuria (urine specimen with greater than 10 white blood cells per mm^3), 3) organisms seen on Gram stain of unspun urine, 4) at least 2 urine cultures with repeated isolation of the same uropathogen (gram-negative bacteria or Staphylococcus saprophyticus) with 10^2 or greater colonies per ml in nonvoided specimens, 5) less than 10^5 colonies per ml of a single uropathogen in a patient being treated with an effective antimicrobial agent for UTI, 6) physician diagnosis of UTI or prostatitis and 7) physician initiation of appropriate therapy for UTI or prostatitis.

Patients who met these criteria were defined as cases. Matching was then performed using STATA® (release 11) based on surgeon, clinic location, ICD-9 and CPT codes.