

SEXUAL MEDICINE REVIEWS

Are Urine Cultures Necessary Prior to Urologic Prosthetic Surgery?

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ABSTRACT

Introduction: A preoperative negative urine culture is generally advised before implantation of urologic prosthetics to prevent device infection. However, a review of the medical literature indicates sparse evidence to support this practice.

Aim: To describe outcomes for patients undergoing prosthetic implantation without preoperative urine cultures.

Methods: The cases of men undergoing artificial urinary sphincter (AUS) and/or inflatable penile prosthesis (IPP) placement at a tertiary care center from 2007 through 2015 were reviewed. Of 713 devices implanted in 681 patients (337 AUSs in 314 patients, 376 IPPs in 367), 259 cases without preoperative urine cultures were analyzed (41%). Patients received standard perioperative antibiotics.

Main Outcome Measures: Device infection was diagnosed clinically. Average follow-up was 15 months.

Results: Device infection occurred in 4 of 259 patients (1.5%) with no difference noted in infection rate between device groups (AUS = 3 of 174 [2%]; IPP = 1 of 85 [1%]; $P = .99$); this rate appears to be consistent with the infection rate of numerous other published prosthetic series. Common skin organisms were implicated as the infectious agents in half the infected devices. Only one patient (0.4%) developed an *Escherichia coli* infection.

Conclusion: This study suggests that prosthetic urologic surgery can be safely performed without preoperative urine cultures. **Kavoussi NL, Viers BR, Pagilara TL, et al. Are Urine Cultures Necessary Prior to Urologic Prosthetic Surgery? Sex Med Rev 2017;X:XXX–XXX.**

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INTRODUCTION

Although the artificial urinary sphincter (AUS) and inflatable penile prosthesis (IPP) lead to high satisfaction in men with incontinence and erectile dysfunction, respectively, the implantation of these devices comes with potential risks, especially infection. Reviews at high-volume surgical centers have estimated the risk of device infection to be approximately 1% to 2%^{1–6} for implanted AUSs and 2% to 8% for PPs.^{7,8} Multiple factors increase infectious risk, such as immunocompromised status, diabetes, history of spinal cord injuries, or history of multiple urologic procedures, but no evidence exists on the routine screening of preoperative urine cultures to prevent infectious complications.^{9–11} Although many prosthetic urologists require a negative preliminary urine culture, with treatment of positive cultures before implantation,¹² a recent survey of experienced

implanters showed that up to 50% do not routinely obtain preoperative urine cultures on their patients.¹³

Because many patients treated at our tertiary academic center are from remote locations, it is often unwieldy to obtain routine urine cultures during preoperative testing, which is normally performed the afternoon before surgery. Treatment of asymptomatic patients with positive urine cultures has been associated with adverse drug effects and antimicrobial resistance.¹⁴ In prosthetic urology, evidence supporting the routine performance of preoperative urine cultures is lacking. Further, last-minute surgical cancellations can ensue, and health care costs can be escalated by adding lost time from work and/or additional travel time and expenses. We report on the first outcome review of a large group of patients undergoing prosthetic urologic procedures without routine preoperative urine cultures.

METHODS

Practices

A total of 721 AUS and PP placements and replacements were performed in 689 patients with complete data available by a single surgeon at our tertiary university-based high-volume

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surgical center from 2007 to 2015. On the day of surgery, perioperative antibiotics were standardized to include a first-generation cephalosporin (ie, cefazolin) and an aminoglycoside (ie, gentamicin). All IPPs were placed through a penoscrotal incision and all AUSs were placed through a perineal incision with a separate high scrotal incision for pump placement. Gentamicin irrigation was used intraoperatively in all cases. All patients were discharged on 3 days of postoperative rifampin or cephalexin and ciprofloxacin. Patients were routinely followed up at 6 weeks for device activation and then followed at 3 months and annually thereafter.

Data Collection and Analysis

Charts were reviewed and examined for patients who had no preoperative urine culture results before prosthetic device implantation. The median follow-up time was 15 months. Outcomes of interest in our review included device infection, which was diagnosed clinically (ie, fever, increased white blood cell count, and/or purulence at explantation) or by obtaining a positive culture from the explanted device in a patient with suspected infection at physical examination. All explanted devices were cultured. The project was approved by the institutional review board committee. All men in this series had bladder outlet patent to at least to a 14-Fr catheter—those who did not were treated endoscopically for obstruction and their prosthetic surgery was postponed until the urethral caliber was known to be stable at least at 14 Fr.

The Mann-Whitney U-test and χ^2 test were used to compare continuous and categorical variables, respectively. Primary outcomes included device infection. A sub-analysis was performed to evaluate the rates of positive urine cultures by the type of procedure performed; in this analysis, odds ratios for the type of procedure performed are reported with respect to IPP. Statistical significance was defined as a *P* value less than .05. All analyses were conducted in JMP 12.0 (SAS Institute, Cary, NC, USA) by our group.

RESULTS

A total of 259 patients were identified who had prosthetic implantation without urine culture result before surgery (Table 1). Overall, we observed device infection in 4 of 259 patients (1.5%). We did not observe a statistically significant difference in infection rates between device groups (AUS = 3 of 174 [2%]; IPP = 1 of 85 [1%]; *P* = .99). Device groups differed by age, prior implant status, and radiation status. Of cases with device infections (*n* = 4), different pathogens were cultured at time of explantation. The AUS infection (25% of infections) was caused by *Pseudomonas aeruginosa*, and the three IPP infections were (75% of infections) were caused by *Streptococcus* species, *Escherichia coli*, and *Cryptococcus* species.

DISCUSSION

In the present study, we analyzed a large series of prosthetic urologic cases performed without preoperative urine culture and

Table 1. Demographic and preoperative data for patients by preoperative urine culture results*

	All patients	IPP	AUS	<i>P</i> value
Procedures	259	85	174	
Age (y)	66 (61–72)	70 (67–74)	64 (60–70)	<.001
BMI (kg/m ²)	29 (26–32)	30 (25–33)	28 (26–31)	.29
CAD	35 (14)	17 (20)	17 (10)	.06
Diabetes	63 (25)	13 (15)	50 (29)	.07
Smoking history	133 (52)	43 (51)	90 (52)	.99
Previous PP	35 (14)	18 (21)	17 (10)	.04
Previous radiation [†]	44 (17)	33 (39)	11 (6)	<.001
Revision [‡]	48 (19)	29 (34)	19 (11)	.005
Infected devices	4 (1.5)	1 (1)	3 (2)	.99

AUS = artificial urinary sphincter; BMI = body mass index; CAD = coronary artery disease; IPP = inflatable penile prosthesis; PP = penile prosthesis.

*Continuous variables are presented as median (interquartile range) and categorical variables are presented as number (percentage).

[†]Including brachytherapy and proton beam therapy.

[‡]Refers to whether the patient had an AUS or PP and was to undergo revision at our institution.

assessed them for infectious outcomes. With an infection rate of 1.5%, this cohort has a comparable infection rate to other recent prosthetic urologic surgical reviews, suggesting the limited utility of preoperative urine cultures in preventing infectious complications.^{7,8,15,16} We recently published our series evaluating the bacteriology of prosthetic device infection and found no correlation between infectious pathogens and preoperative urine cultures.¹⁷

In an era of increasing bacterial resistance and medical costs, the screening urine culture has undergone scrutiny. Screening and prophylactically treating patients for asymptomatic bacteriuria can lead to antimicrobial resistance, *Clostridium difficile* infection, and adverse drug reactions.^{18,19} Although the cost of a single urine culture is only \$40 (as estimated by data from the Centers for Medicare and Medicaid Services),²⁰ when extrapolated to approximate the total cost of routine urine culture screening before prosthetic device implantation nationally, the cost increases to higher than \$1,000,000 annually.^{5,6} In addition, in a high-volume referral-based tertiary academic medical center such as ours, obtaining accurate and appropriately collected urine cultures can be logistically difficult for patients, can delay surgery, and add further costs (e.g antibiotic treatment) and inconvenience to patient care.

Recent surveys have reported that 40% of members of the Sexual Medicine Society of North America and 50% of members of the International Society of Sexual Medicine do not perform routine urine cultures when placing PPs and there is no consensus for AUSs.¹³ No randomized controlled trials have been performed to evaluate the utility of preoperative cultures for preventing infectious complications when implanting urologic devices. Even

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