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Is Risk of Artificial Urethral Sphincter Cuff Erosion Higher in Patients with Penile Prosthesis?

Varun Sundaram, Billy H. Cordon, Matthias D. Hofer, and Allen F. Morey

ABSTRACT

Introduction: Frequently encountered morbidities after prostatectomy include stress urinary incontinence and erectile dysfunction. Patients with severe disease may undergo placement of both a penile prosthesis (PP) and an artificial urethral sphincter (AUS).

Aim: We hypothesized that concomitant PP may promote AUS cuff erosion by impaired corporal blood flow and/or direct pressure on the cuff. The aim of this study was to compare the rate of AUS cuff erosion in patients with and without a PP.

Methods: We reviewed 366 AUS operations at our tertiary center between 2007 and 2015 with a mean follow-up of 41 months (range 6–104). Included in the analysis were first-time AUS cuff erosions. Patients with recurrent erosions, AUS revisions, and iatrogenic erosions were excluded. In a separate analysis, we analyzed AUS explantations for all causes. Cohorts were compared by demographic information, preoperative characteristics, and rates of erosion and explantation.

Main Outcome Measures: Erosion confirmed by cystourethroscopy and explantation of the AUS for all causes.

Results: Among 366 AUS surgeries at a mean follow-up of 41 months, there were 248 (67.8%) AUS alone cases compared to 118 (32.2%) AUS and PP cases (AUS/PP). Sixty-two patients met exclusion criteria for first-time cuff erosion. Among 304 evaluable AUS patients, we found a significantly higher rate of erosion in the AUS/PP group (11/95, 11.6%) compared to the AUS alone group (9/209, 4.3%, $P = .037$). When examining explantations for all causes in the entire cohort (n = 366), we observed a significantly higher rate of device removal, (20/118, 17%) in the AUS/PP group compared to the AUS group (23/248, 9.2%, $P = .044$).

Conclusion: AUS/PP patients appear to have a higher risk of AUS cuff erosion and explantation compared to men with AUS alone.

Key Words: Artificial Urethral Sphincter; Penile Prosthesis; Erosion; Stress Urinary Incontinence

INTRODUCTION

In an attempt to maximize quality of life after prostate cancer treatment a subset of patients will undergo artificial urinary sphincter (AUS) and penile prosthetic (PP) placement.[1–4] Dual AUS and PP implantation has been found to be safe, efficient, and cost effective.[5–7] However, we hypothesized that concomitant AUS and PP may be associated with a higher risk of cuff erosion for 2 reasons: The collateral blood supply to the urethra may be compromised by placement of the cavernosal cylinders, and direct compression of the periurethral tissues is likely due to the proximity of the 2 devices in the perineum.

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Department of Urology, University of Texas Southwestern, Dallas, TX, USA

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AIMS

The aim of the current study is to review our large prosthetic database of patients to determine whether the presence of a concomitant PP is a risk factor for AUS cuff erosion.

MATERIALS AND METHODS

We performed a retrospective review of an institutional review board-approved database of all patients undergoing AUS placement at our tertiary referral center from 2007 to 2015. Patients with less than 6 months of follow-up were excluded. Erosions were confirmed with cystourethroscopy prior to AUS removal. Patients were separated into 2 cohorts based on whether or not these patients had also received a PP (AUS vs AUS/PP). All patients with a PP, regardless of whether it was placed at the time of AUS or in a separate surgery, were grouped together. The populations were compared by mean age, BMI, comorbidities,

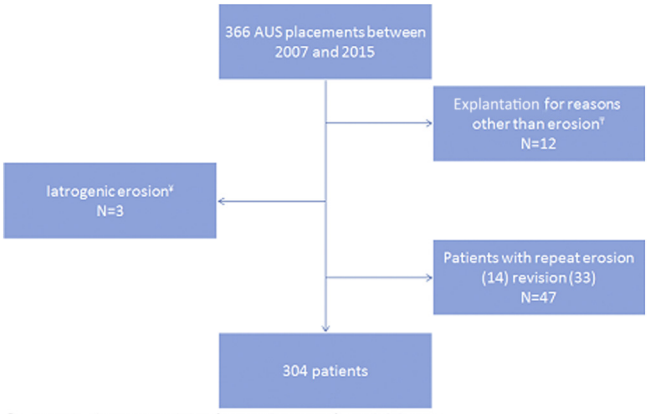

Figure 1. First time erosion exclusion criteria. Figure 1 is available in color online at www.jsx.jsexmed.org.

smoking history, prior surgery for stress urinary incontinence (SUI), prior radiation, location of the pressure regulating balloon (PRB), use of transcorporal placement, cuff size, serum testosterone levels, and follow-up time to erosion or explantation.

Two separate analyses were performed. The first analysis compared the rate of AUS cuff erosion; only patients with first-time AUS cuff erosions were included. A total of 62 events were excluded (Figure 1) due to AUS revisions (n = 33), multiple erosions in the same patient (n = 14), iatrogenic erosions clearly linked to and immediately following urethral instrumentation (n = 3), explantations for infection (n = 10), and urothelial cancer treatment (n = 2). In the second analysis, we examined the rate of cuff explantation for all causes between the 2 groups (AUS alone vs AUS/PP).

All operations were performed by a single senior surgeon using a uniform technique. AUS placement was performed through a perineal incision with a separate high scrotal incision for placement of the pressure-regulating balloon (PRB) and the pump. The PRB was placed either in the space of Retzius (early in the series) or in a high submuscular (HSM) location (second half of the series). While measuring urethral circumference we left the Foley catheter (14F) in place and used the provided measuring tape. In simultaneous AUS and PP placements, a perineal incision was made for cuff placement and a separate penoscrotal incision was made for placement of the PP and remaining components of the AUS. A Foley catheter was left in place overnight. If prolonged catheterization was required for urinary retention exceeding 1 week, the urethral catheter was exchanged for a suprapubic tube.

Antibiotic prophylaxis postoperatively included 3 days of a fluoroquinolone and a first-generation cephalosporin. Patients were followed up 6 weeks after the operation for activation of the AUS with teaching; additional routine follow-up was scheduled at 3 and 12 months. After 1 year, patients were followed annually if desired. Additional visits were scheduled as needed for concerns regarding pain and/or device malfunction.

Demographic and preoperative variables within the 2 groups were compared using the Student t test for continuous variables and χ^2 or Fisher exact test analysis for categorical variables. Erosion rates, explantation, and time to revision were compared. All statistical analyses were 2-tailed and a P value of $<.05$ was considered significant. Kaplan Meier analysis (log rank) was performed to examine the survival curves. Analyses were performed using SPSS version 22.0 (IBM, Armonk, NY, USA).

RESULTS

A total of 366 AUS cases were entered prospectively into our database between 2007 and 2015 (248 AUS and 118 AUS/PP). Patient characteristics are summarized in Table 1. Those in the

Table 1. Patient demographics

	Total	AUS only	AUS & PP	
No. Case	366	248	118	*P* value
Mean follow up, mo (range)	41 (6–104)	40 (6–102)	43 (6–104)	.303
Mean age, y (range)	70.4 (24–0)	70.7 (24–90)	69.6 (39–87)	.303
Mean BMI (kg/m^2)	28.8	28.6	29.4	.117
Diabetes mellitus, no. (%)	66 (18)	44 (18)	22 (18)	.885
Hypertension, no. (%)	201 (55)	135 (54)	66 (56)	.823
Coronary artery disease, no. (%)	67 (18)	45 (18)	22 (18)	.886
ED, no. (%)	266 (73)	148 (60)	118 (100)	<.001*
History of tobacco use, no. (%)	212 (58)	149 (60)	63 (53)	0.258
Prior SUI surgery, no. (%)	193 (53)	125 (50)	68 (58)	.218
Prior radiation, no. (%)	155 (42)	110 (44)	45 (38)	.308
Mean cuff size (cm)	3.8	3.81	3.84	.506
3.5 cuff, no. (%)	168 (46)	112 (45)	56 (47)	.737
HSM PRB, no. (%)	225 (61)	162 (65)	63 (53)	.030*
Transcorporal cuff, no. (%)	58 (16)	44 (18)	14 (12)	.170

*$P < .05$.