Same Day Discharge Versus Overnight Observation Protocols — Similar Outcomes Following Artificial Urinary Sphincter Surgery

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OBJECTIVES To analyze our institutional experience transitioning from overnight observation (OBS) to same day surgery (SDS) for artificial urinary sphincter (AUS) procedures. Prior research has questioned the need for OBS following AUS surgery.

METHODS We retrospectively reviewed AUS surgeries performed by a single surgeon at our tertiary academic medical center between 08/2013 and 01/2020. Patients were grouped based on discharge status: OBS vs SDS. Cost savings associated with SDS were estimated using room and bed charges from a contemporary group of AUS patients.

RESULTS We identified 525 AUS cases that met inclusion criteria. Men in the SDS group (n = 318) were more likely to have undergone a virgin AUS insertion and were slightly younger and healthier. Men in the OBS group (n = 207) were more likely to suffer an immediate postoperative complication (1% vs 0%, $P < .01$) and to be readmitted within 90 days of surgery (15% vs 5%, $P < .01$). The groups did not vary with respect to multiple other perioperative outcomes measures. Among patients who underwent AUS surgery between 09/2017 and 08/2020, those with OBS status (n = 39) had mean additional room and bed charges of $ 745 ± 302 vs none for SDS patients (n = 183).

CONCLUSION SDS for AUS insertion is safe, effective, and associated with significant cost savings. Routine overnight observation after AUS insertion appears to be unnecessary. UROLOGY 157: 206–210, 2021. © 2021 Elsevier Inc.

Artificial urinary sphincter (AUS) insertion continues to be the most common and most effective surgical intervention for men with moderate to severe stress urinary incontinence, a condition most frequently originating after prostate cancer treatment.[1] Over 3500 AUS insertions are performed per year in the United States alone.[2] Overnight in-hospital observation (OBS) has historically been standard practice for most implanters with various objectives including the assurance of adequate immediate post-surgical recovery, pain control, administration of parenteral antibiotics, and/or urethral catheter removal for voiding trial.

Contemporary research has questioned the need for OBS following AUS surgery based on low immediate postoperative complication rates and minimal narcotic requirements during the overnight stay.[3] Same day surgery (SDS) is common practice for many surgical procedures, including inflatable penile prosthesis insertion, and has generally been associated with higher patient satisfaction and lower overall costs.[4-7] One recent French study reported a low rate of readmission within 3 days of AUS insertion among 81 men. We hypothesized that short and medium-term outcomes would not differ significantly between OBS and SDS protocols for AUS insertion. Herein we present an analysis of our institutional experience transitioning from OBS to SDS for AUS surgery - the largest and longest followed series of its kind.

MATERIALS AND METHODS

We retrospectively reviewed all AUS surgeries (insertions and revisions) performed by a single surgeon at our tertiary academic

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medical center between August 2013 and January 2020 (IRB: STU-2020-1187). Patients who were admitted for device explant in the context of device infection were excluded. Medical records were reviewed for patient demographics, immediate postoperative complications, timing of postoperative discharge, outpatient phone call and/or non-routine clinic visit within 7 days of discharge, and need for emergency department (ED) visit and/or readmission and/or device explant or revision within 90 days of discharge. Cases were grouped based on patient discharge status: OBS vs SDS.

All patients received single-dose perioperative parenteral antibiotic prophylaxis and three days of postoperative oral antibiotics (cephalexin and ciprofloxacin unless contraindicated). OBS patients received continued parenteral antibiotics until discharge, typically in the form of two additional doses of IV cefazolin. Urethral catheters (14 Fr silicone) were removed prior to discharge (OBS group) or self-removed at home (SDS group). All catheters were removed on the morning of Postoperative Day 1. Starting in March 2016, oxidized cellulose pledgets were inserted immediately prior to closure to augment hemostasis.[8] Percutaneous drains were placed when indicated by evidence of ongoing bleeding.

SDS patients received detailed instructions from their recovery nurse that included a demonstration of catheter balloon functionality and method of balloon deflation. Patients were discharged with standardized, surgery-specific instructions regarding postoperative precautions and reasons to contact our office, most importantly an inability to void within four hours of catheter removal. Catheter removal in the clinic was offered to all SDS patients. Postoperative urinary retention was managed with 12 Fr catheter reinsertion and repeat voiding 72 hours later. If retention persisted despite a total of three voiding trials then a suprapubic tube was placed or the AUS cuff was upsized depending on surgeon and patient preferences.

Charge savings associated with SDS were estimated using institutional data on room and bed charges from a contemporary group of AUS patients (09/2017 through 08/2020). Statistical analysis was performed with STATA (StataCorp. 2017. Stata Statistical Software: Release 15. College Station, TX: StataCorp LLC). Groups were compared using Student's *t* tests with unequal variance for continuous variables and with Pearson Chi-squared tests for categorical variables.

RESULTS

We identified 525 AUS cases that met inclusion criteria. Compared with men in the OBS group (n = 207), those in the SDS group (n = 318) had slightly lower American Society of Anesthesia physical classifications scores (2.5 ± 0.6 vs 2.3 ± 0.5, $P < .01$), were more likely to have a history of hypertension (54% vs 64 %, $P = .03$), and were less likely to have a history of male sling insertion (17% vs 9 %, $P = .01$) or bladder neck contracture (26% vs 16 %, $P = .01$) (Table 1). The groups were similar in terms of age, BMI, smoking status, and stress urinary incontinence etiology.

Men in the OBS group were more likely to have undergone non-virgin AUS insertion (48% vs 41%, $P = .04$), more likely to have undergone transcorporal cuff placement (14% vs 7 %, $P = .01$), and more likely to have suffered an immediate postoperative complication (1% vs 0%, $P < 0.01$) and to have required an unplanned readmission within 90 days of AUS surgery (15% vs 5 %, $P < .01$) (Table 2, Fig. 1A). Rates of outpatient phone calls (44% vs 47%, $P = .45$) and unplanned clinic visits (7% vs 10 %, $P = .31$) within 7 days of surgery and of ED visits (11% vs 9 %, $P = .54$) and explant or revision surgery within 90 days of surgery (5% vs 3 %, $P = .14$) were similar between groups (Table 2).

Etiologies for postoperative events are summarized in Table 3. Outpatient phone calls and non-routine clinic visits within 7 days of AUS surgery were most frequently related to catheter removal and voiding trial or urinary retention following catheter removal at home. ED visits and readmissions within 90 days were most frequently related to urinary retention and concern for infection. Additional genitourinary surgery within 90 days of the initial AUS surgery was most frequently complete AUS

Table 1. Patient demographics.

Group	OBS n = 207	SDS n = 318	*P*-value
Age (years), mean ± SD	71.8 ± 9.5	70.2 ± 9.4	.06
BMI (kg/m^2), mean ± SD	29.7 ± 5.6	29.0 ± 4.6	.11
ASA, mean ± SD	2.5 ± 0.6	2.3 ± 0.5	**<.01**
Anticoagulation other than ASA 81 mg, count (%)	17 (8%)	17 (5%)	.19
Preoperative Narcotic use, count (%)	47 (22%)	51 (16%)	.06
History of Diabetes, count (%)	47 (22%)	75 (23%)	.82
A1c of those with Diabetes (mmol/mol), mean ± SD	7.0 ± 1.1	6.6 ± 0.8	.14
History of HTN, count (%)	113 (54%)	205 (64%)	**.03**
Current or Former Smoker, count (%)	123 (59%)	164 (51%)	.08
History of Prostatectomy, count (%)	178 (85%)	280 (88%)	.38
Time from Prostatectomy to AUS (years), mean ± SD	9.8 ± 8.0	8.1 ± 9.4	.06
History of TURP/HoLEP, count (%)	31 (14%)	46 (14%)	.85
Time from TURP/HoLEP to AUS (years), mean ± SD	8.7 ± 9.1	4.9 ± 5.4	.08
History of Radiation to Prostate, count (%)	97 (46%)	158 (49%)	.63
Time from Radiation to AUS (months), mean ± SD	10.3 ± 8.2	9.2 ± 6.7	.35
Preoperative Pads Per Day (number), mean ± SD	5.1 ± 4.8	4.8 ± 3.2	.45
History of Male Sling, count (%)	36 (17%)	30 (9%)	**.01**
History of Urethral Stricture, count (%)	49 (23%)	59 (18%)	.16
History of Bladder Neck Contracture, count (%)	54 (26%)	53 (16%)	**.01**

ASA 81 mg, aspirin 81mg; AUS, artificial urinary sphincter; HoLEP, holmium laser enucleation of the prostate; HTN, hypertension; OBS, overnight observation; SD, standard deviation; SDS, same day surgery; TURP, transurethral resection of the prostate.
p-values < 0.05 have been made bold to draw attention to statistical signifigance of cut-off p < 0.05.

Table 2. Intraoperative and postoperative results.

Group	OBS n = 207	SDS n = 318	*P*-value
Virgin AUS Insertion, no (%)	109 (52%)	188 (59%)	**.04**
Cuff Size (cm), mean ± SD	4.0 ± 0.5	4.1 ± 0.4	.05
Transcorporal Approach Used, count (%)	30 (14%)	24 (7%)	**.01**
Percutaneous Drain Left at End of Case, count (%)	37 (17%)	27 (8%)	**<.01**
Postoperative Complication Prior to Discharge, no (%)	4 (1%)	0 (0)	**.01**
Urinary Retention after Catheter Removal on POD1, no (%)	5 (2%)	11 (3%)	.50
Postoperative Suprapubic Catheter Placement, no (%)	9 (4%)	2 (0.6%)	**<.01**
Non-routine Clinic Visit within 7 d of Discharge, no (%)	16 (7%)	33 (10%)	.31
Outpatient Phone Call within 7 d of Discharge, no (%)	92 (44%)	152 (47%)	.45
ED Visit within 90 d of Discharge, no (%)	24 (11%)	30 (9%)	.54
Time from AUS surgery to ED visit (days), mean ± SD	23.4 ± 28.0	24.7 ± 26.5	.88
Readmission within 90 d of Discharge, no (%)	32 (15%)	19 (5%)	**<.01**
Time from AUS surgery to Readmission (days), mean ± SD	33.9 ± 27.4	46.4 ± 25.4	.09
Need for Device Explant or Revision within 90 d of Discharge, no (%)	12 (5%)	10 (3%)	.14
Device Explant for Infection or Erosion within 90 d of Discharge, no (%)	5 (2%)	7 (2%)	.87
Device Revision for Persistent Incontinence within 90 d of Discharge, no (%)	4 (1%)	3 (0.9%)	.33

AUS, artificial urinary sphincter; ED, emergency department; OBS, overnight observation; POD1, postoperative day 1; SD, standard deviation; SDS, same day surgery.
p-values < 0.05 have been made bold to draw attention to statistical signifigance of cut-off p < 0.05.

explanation due to infection or cuff erosion. Eleven (11/525, 2%) men required suprapubic catheter replacement following two failed voiding trials.

A strong trend towards SDS was noted over the years captured in this study (Fig. 1B). In the most recent two years of data analyzed, 78% of AUS patients were categorized as SDS. Among patients who underwent AUS surgery between 09/2017 and 08/2020, those with OBS status (n = 39) had mean additional room and bed charges of $ 745 ± 302 vs none for SDS patients (n = 183).

COMMENT

Over the past decade, we have successfully transitioned toward SDS as our preferred care pathway for AUS patients at our tertiary academic medical center. This is the largest and most robust study to report on a cohort of men discharged on the day of AUS surgery and it demonstrates that outcomes are similar to those achieved with an OBS protocol. Rates of immediate postoperative complications, urinary retention, outpatient phone calls, unplanned clinic visits, ED visits, and need for short-term revision or explant surgery were all comparable with those of men observed overnight prior to discharge. The 90-day readmission rate was lower in the SDS group. While certainly dependent on adequate patient education and understanding, these findings confirm our clinical intuition that SDS is a safe option for men undergoing AUS surgery.

Our findings of a 1% overall immediate complication rate and a complete lack of need for admission or readmission based on surgical pain are consistent with a recent study that examined complication rates and narcotic requirements among 163 men who underwent AUS surgery with an OBS protocol.[3] The only published study to report on men actually discharged on the day of AUS insertion found a 6% readmission rate within 3 days of outpatient surgery among 81 French men. SDS safety has additionally been demonstrated in the settings of penile prosthesis insertion (where SDS rates have already risen substantially), anterior urethroplasty, and donor nephrectomy.[9-12] Taken together, the findings of these papers suggest that men undergoing AUS surgery who recover appropriately in the PACU can be safely discharged and that the potential need for overnight pain control or catheter management do not routinely justify hospital admission.

Importantly, SDS patients in this study had a similar low rate of device explant or revision within 90 days (3%) despite the additional IV antibiotic received by OBS patients. While our routine practice remains a short course of postoperative oral antibiotics we recognize that the limited data available suggests this is probably unnecessary for uncomplicated virgin AUS insertions.[13]

In addition to safety, it is important that SDS does not detract from overall patient satisfaction. While not directly assessed in this study, patient acceptance and satisfaction with SDS in general has been established for a variety of surgical procedures including cholecystectomy, total joint replacement, and cataract surgery.[5-7] This literature demonstrates that patient satisfaction is maintained or improved with SDS.

We observed a considerable shift in the relative use of SDS and OBS over the study period (Fig. 1B). We attribute the increasing use of SDS over this time period to increasing surgeon comfort with SDS as result of experience and successful outcomes. Our institution also opened an Outpatient Surgery Center with an overnight observation unit during the study period. This facility is intentionally well equipped for efficient SDS. Nonetheless, we frequently use the SDS protocol at our University Hospital without issue.

While difficult to assess in the context of the United States healthcare system, SDS intuitively results in cost

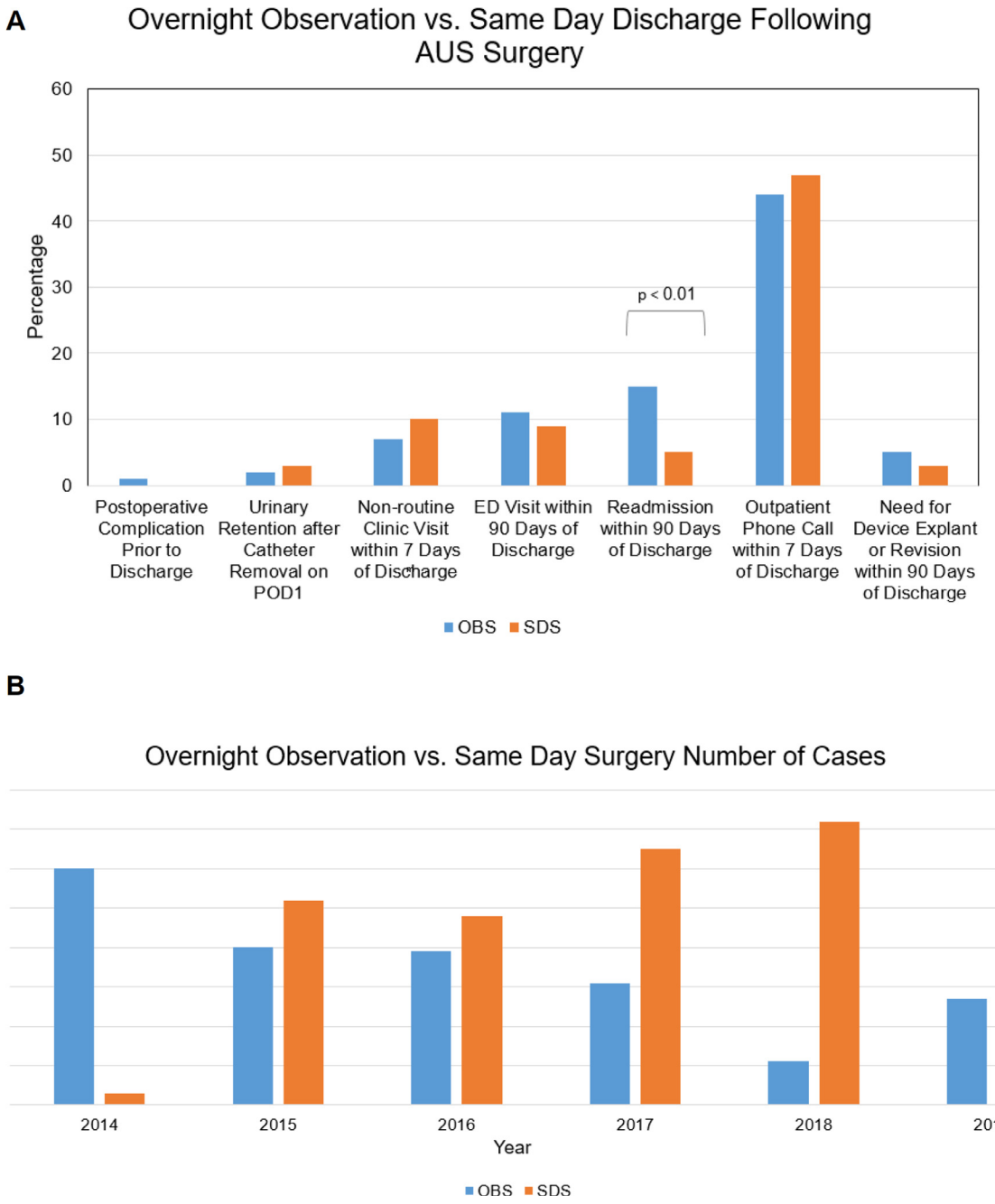

Figure 1. (A) Postoperative outcome comparison (B) case number comparison. (Color version available online.)

savings as long as patients are not being readmitted or requiring additional interventions at higher rates than OBS patients. In this study we utilized contemporary institutional cost data and found a savings of around $750 per AUS surgical case. This cost-savings analysis is limited by a lack of data regarding charges associated with postoperative ED visits and readmission. The few other studies to estimate cost savings with SDS have reported savings per case of 17% for IPP insertion, 20% for cataract surgery, and around $5000 for total joint replacement.[5,14,15]

This study is limited by its retrospective design, lack of randomization, an inability to determine the exact rationale for overnight observation in each case, and lack of patient reported outcome measure data including satisfaction with OBS or SDS. Certainly, any patient who suffered an immediate postoperative complication would be admitted regardless of whether or not we had planned for SDS preoperatively. Attempts to elucidate the true financial impact of foregoing overnight observation are limited by the complex cost and reimbursement environment of modern medical practice. However, given the broad shift toward SDS for a plethora of invasive surgical procedures nationally, and our favorable AUS experience, the case for outpatient AUS surgery seems to be well justified.

Table 3. Postoperative events.

Event (total n)	Primary etiology	OBS n = 207	SDS n = 318
Immediate Postoperative Complication (n = 4)	Acute cerebral infarction	1 (0.4%)	0
	Chest pain with ICU transfer and negative workup	1 (0.4%)	0
	Myocardial infarction requiring cardiac catheterization	1 (0.4%)	0
	Ileus	1 (0.4%)	0
Outpatient Phone Call within 7 d of AUS Surgery (n = 244)	Urinary retention after catheter removal	19 (9%)	18 (5%)
	Postoperative questions not requiring intervention	20 (9%)	42 (13%)
	Concerns regarding the wound or genitalia	12 (5%)	21 (6%)
	Postoperative pain	12 (5%)	12 (3%)
	Scheduling	14 (6%)	16 (5%)
	Medication related	10 (4%)	18 (5%)
	GI disturbances	6 (2%)	8 (2%)
	Other	5 (2%)	11 (3%)
Non-routine Clinic Visits within 7 d of AUS Surgery (n = 49)	Urinary retention after catheter removal	6 (2%)	4 (1%)
	Catheter removal and voiding trial	8 (3%)	22 (6%)
	Postoperative pain	1 (0.4%)	1 (0.3%)
	Concerns regarding the wound or genitalia	2 (0.9%)	5 (1%)
Emergency Department Visits within 90 d of AUS Surgery (n = 54)	Urinary retention	12 (5%)	6 (1%)
	Pain	5 (2%)	7 (2%)
	Concerns regarding the wound or genitalia	3 (1%)	8 (2%)
	GI disturbances	1 (0.4%)	1 (0.3%)
	Non-GU concerns	4 (1%)	7 (2%)
Readmission within 90 d of AUS Surgery (n = 51)	Urinary Retention	11 (5%)	5 (1%)
	Concern for infection or erosion	9 (4%)	10 (3%)
	Suprapubic Catheter Placement Required	9 (4%)	2 (0.6%)
	Recurrent incontinence requiring device revision	4 (1%)	1 (0.3%)
	Concerns regarding the perineal incision	2 (0.9%)	0
	Pain control	0	2 (0.6%)
	Non-GU concerns	6 (2%)	1 (0.3%)
Additional Genitourinary Surgery within 90 d of AUS Surgery (n = 22)	Device explanation due to infection or erosion	5 (2%)	7 (2%)
	Pump revision	1 (0.4%)	3 (0.9%)
	Cuff up-sizing due to retention	2 (0.9%)	0
	Cuff down-sizing due to persistent incontinence	1 (0.4%)	0
	Revision of the pressure regulating balloon	2 (0.9%)	0
	Perineal wound exploration	1 (0.4%)	0
	Simple cystectomy with ileal conduit urinary diversion	0	1 (0.3%)

CONCLUSIONS

SDS for AUS insertion is safe, effective, and associated with cost savings. Routine overnight observation after AUS insertion appears to be unnecessary.

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