Case Series on Surgical Management of Stress Urinary Incontinence in Men

Delayed management of artificial urinary sphincter cuff erosion: a case series

Luke A. Shumaker[1]^, Tyler R. Compher[1], John P. Selph[2]

[1]Department of Urology, University of Alabama at Birmingham, Birmingham, Alabama, USA; [2]Urology Associates of Nashville, Nashville, Tennessee, USA

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Correspondence to: John P. Selph, MD. Department of Urology, University of Alabama at Birmingham, 1720 2nd Ave S, FOT 1120, Birmingham, AL 35294, USA. Email: jpselph@ua-pc.com.

Background: The artificial urinary sphincter (AUS) has been used to treat post-prostatectomy incontinence in men for decades with excellent outcomes and low complication rates. A successful AUS placement can dramatically improve the quality of life in men with stress urinary incontinence. Consequently, complications in this population can be devastating for the patient. One of the most troublesome complications is cuff erosion, which necessitates explantation of the device and dooms a man to recurrent incontinence. While the device can be replaced, device replacements are fraught with high erosion rates. Furthermore, it is not uncommon for men undergoing AUS placement to have multiple medical comorbidities that make urgent surgery for explantation unideal. Nonetheless, men with cellulitis and significant symptoms must undergo removal of an eroded AUS. There is little to no literature published on the timing or need for device removal in the man who has an asymptomatic erosion.

Case Description: We report a case series of five men undergoing delayed or no explantation of an asymptomatic cuff erosion. All five men were asymptomatic at the time of presentation and underwent a delayed explant or no explant. No man required urgent device explant while the erosion was present.

Conclusions: Urgent device explantation may not be necessary in the asymptomatic AUS cuff erosion, and further study may be able to elucidate men who can avoid removal of cuff erosion when no symptoms are present.

Keywords: Artificial urinary sphincter (AUS); erosion; male incontinence; case series

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Introduction

Artificial urinary sphincter (AUS) implantation in male patients is indicated for sphincter incompetence associated with bothersome involuntary leakage of urine. The most common location for an AUS cuff is the posterior bulbar urethra. Although alternative cuff placement options exist (bladder neck, transcorporal), these locations are less commonly used. When one of these alternative locations are employed, it may be in cases of neurogenic bladder associated incontinence, or, in the case of post-prostatectomy incontinence, it is often in the setting of prior cuff erosion or concern for future erosion. Exposure of an AUS cuff due to complete erosion of the spongiosum and urethral mucosa is a dreaded but intuitive risk of AUS placement and has been reported to happen in about 8.5% of patients (1). Technical factors such as uneven extrinsic

^ ORCID: 0000-0002-9255-9121.

cuff pressure due to a poorly oriented cuff or cuff under sizing can increase the risk of erosion. Patient factors such as reduced spongiosum volume resulting from radiation, trauma, or other fibrosis-inducing processes can also increase risk of erosion (2). An alternative mechanism for cuff erosion is urethral instrumentation forcing the spongiosum against the cuff as would occur with Foley catheter placement or the passing of endoscopic instruments during transurethral procedures. Patients must be counseled regarding the need to avoid a standard French Foley catheter placement. Additionally, a relative contraindication to AUS placement is the need for routine transurethral procedures, as may be required in recurrent stone formers, men with recalcitrant bladder neck stenosis, or patients with a history of bladder cancer.

As is the case with all implanted prosthetics, infection is a known risk and typically considered to require urgent intervention with explantation and washout. Historically, a diagnosis of AUS erosion by cystoscopy has been considered an imminent tissue infection risk. Thus, patients with confirmed erosion are recommended to undergo urgent explantation and washout urgently upon diagnosis, regardless of whether there are subjective or objective signs of current infection (3).

Urgent eroded AUS explantation is unquestionably necessary when a patient demonstrates systemic or local signs of infection. Nonetheless, there are contexts where immediate explantation may be associated with increased operative risk or lead to unnecessary patient burden. Factors we have encountered that tip the balance between risks and benefits of explantation are typically related to anesthesia risk or history suggesting subacute erosion.

AUS patients with cardiopulmonary conditions may not be optimized at the time of presentation. These patients may require an alternative anesthetic plan or medical optimization and consultation with non-urologic specialists to assess anesthetic risks. Any provider that has worked to move complex patients through a hospital course understands that facilitating multidisciplinary planning in these contexts can require a significant amount of time. If hospital observation and short interval explantation are pursued in these cases, a multiday hospital stay may accrue prior to completion of planning and operating room scheduling, especially in times of staffing shortages in hospitals (4). The subset of patients with chronic cardiopulmonary conditions that will remain at increased risk of general anesthesia complications despite optimization require careful consideration, multidisciplinary insight, and patient counseling.

Patients presenting with a history suggesting subacute erosion also raise the question of whether urgent explantation is absolutely necessary. We have encountered men where signs consistent with an eroded AUS have been present for months or years prior to referral to our tertiary center. In these cases, it is impossible to know the exact timeline for transmural erosion. However, in patients with months or years of symptoms it seems reasonable to assume that in a subset of these cases the cuff has been exposed for weeks or months. In select cases where it is likely that erosion is sub-acute and the patient is relatively asymptomatic, making unequivocal recommendations for hospitalization and AUS explantation regardless of patient context seems incongruent. Our experience has been that in these cases a nuanced discussion of risks and benefits accounting for a patient's individual social factors and geography is warranted.

Encountering one or both factors in multiple AUS erosion cases has made us consider whether urgent explantation is truly warranted. Furthermore, could the eroded AUS in the frail patient, the asymptomatic patient, or the patient with socioeconomic concerns be left alone if the man is asymptomatic? There is little published data regarding the clinical timeline for explantation and no reported data on the safety of an interval of observation prior to a planned operation. We seek to report the experience of high-volume AUS implanters with several cases of delayed (or no) explantation. We present this case series in accordance with the AME Case Series reporting checklist (available at https://tau.amegroups.com/article/view/10.21037/tau-22-809/rc).

Highlight box

Key findings

- Asymptomatic AUS erosion is uncommon but is usually managed with urgent device removal, though this may not be necessary.

What is known and what is new?

- Very little it is known about the natural history of asymptomatic AUS erosion. We present a case series that adds information about the natural history of asymptomatic AUS erosion in the short term.

What is the implication, and what should change now?

- Further study of this topic is warranted in that urgent explant of an AUS in an asymptomatic man may not be necessary.

Case presentation

A case series of patients with asymptomatic AUS erosion was queried from academic surgeons who are high-volume implanters of the AUS for post-prostatectomy urinary incontinence where device explant was performed in a delayed setting. This is a retrospective, multicenter study of non-consecutive cases. Clinical characteristics of the cases were extracted and highlighted below. All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee(s) and with the Helsinki Declaration (as revised in 2013). Publication of this case report was waived from patient consent according to the Institutional Review Board.

Case 1

A 74-year-old male with a history of robotic prostatectomy for prostate cancer seen for evaluation of dysuria. He had an AUS present and placed at an outside hospital several years prior, though the exact date of placement was not known. He underwent a cystoscopy showing a small, dorsal area of device erosion. A urinalysis showed no hematuria, and a urine culture was negative. The patient was asymptomatic other than dysuria. He chose to delay surgery for 3 months as he wanted to go on a vacation, and his device was left activated. Ultimately, the device was explanted and he is awaiting another device after recovering from coronavirus disease 2019 (COVID-19) infection.

Case 2

A 77-year-old male with a history of pelvic fracture urethral injury in a car wreck 35 years prior. He had undergone a penile implant and AUS soon after the original injury. These worked for 30 years until both ultimately need removal and replacement. He did well after the revision surgery. One and a half years after the AUS removal and replacement, he was admitted for a stroke at an outside facility and had a foley in place for nearly a month. His rehab facility called noting hematuria. He came to our clinic where a 50% erosion was noted, but the patient was completely asymptomatic. He was admitted for explantation, but ultimately given the recent stroke, cardiac comorbidities, and lack of symptoms, the surgery was cancelled. His device was left deactivated. He remains with an eroded device 9 months later.

Case 3

A 69-year-old male admitted with a liver abscess. He had a history of robotic prostatectomy for prostate cancer and was almost 1 year post AUS placement. A catheter was in place for about 1 month during hospitalization. The patient came to the office for worsening incontinence. He had a negative urinalysis and urine culture, and he was noted to have a circumferential device erosion with a capsule around the eroded implant. The device was left deactivated. He had transportation difficulty returning to the hospital for explant, and ultimately, he did not have his explant for 6 months. He currently lives with a suprapubic catheter with no desire for another AUS.

Case 4

A 79-year-old male with a history of combined brachytherapy and external beam radiation for prostate cancer with an AUS placed in 2017 that eroded. A second device was placed in 2019 and survived for three years until he presented to the office with recurrent incontinence. A 270-degree erosion was noted on cystoscopy, and he had a positive urine culture and blood on urinalysis. His device was deactivated. He unfortunately had a hip fracture that was repaired, and he was sent to rehab on Eliquis. He was managed nonoperatively for 2 months before his device was explanted.

Case 5

A 65-year-old male with a history of prostatectomy for prostate cancer who had an AUS 3 years prior. He came for evaluation due to a malfunctioning device and complaints of worsening leakage. A cystoscopy revealed erosion of the device, though the patient was completely asymptomatic and had had worsening incontinence for over 6 months. His cuff was deactivated after the cystoscopy. Despite his concerns about being completely incontinent again, he ultimately underwent device explant after cardiac clearance due to significant medical comorbidities. 3 months later he underwent implant of another cuff which ultimately eroded 2 months after implantation. He currently lives with a

suprapubic tube.

Discussion

Traditional teaching has been that the eroded AUS must be explanted, albeit the timing of explantation is varied. For the asymptomatic patient, we have traditionally deactivated the device, given men antibiotics, and had them return on an outpatient basis for expedited but not immediate explantation. For the symptomatic man with cellulitis, severe symptoms, or transportation concerns, we have admitted, started antibiotics, and explanted as soon as feasible. In this case, all of the men but one had the AUS deactivated once the erosion was identified.

Our initial experience with the potential for nonoperative management of AUS erosion was largely patient driven—the elderly, frail man with medical comorbidities and an asymptomatic erosion. Medendorp *et al.* showed that patients undergoing AUS removal procedures were more frail than patients undergoing AUS placement procedures, and frailty was associated with increased odds of major complications from an AUS procedure (5). Furthermore, Hampson and colleagues showed that nearly 80% of men with stress urinary incontinence have significant medical comorbidity, and more than half have a life expectancy less than 10 years (6). We have also seen other men with a similar profile come to our clinic for malfunction of an AUS that are ultimately diagnosed with an erosion. As in case 5 above, these men are often not symptomatic other than worsening leakage, yet we have taken these men for explantation and the morbidity that comes with explant, healing with a catheter and/or suprapubic tube, then a recovery period before considering another AUS, which itself is at high risk for another erosion (7). Often times these men are more incontinent than with a non-eroded AUS, but they are still relatively dry compared to what they are once the implant is removed. This anecdotal experience begs the question: do all eroded AUS cuffs need to be removed?

Singla reported on their experience in an AUS series with two patients with congenital anomalies who underwent bladder neck AUS placement and ultimately developed erosion—one was managed nonoperatively for 15 years and another for 5 years without explantation (8). It is important to recognize that the cuff was at the bladder neck in these two patients, while in the case series reported here, all cuffs were bulbar. Notably, as in this case report, all the patients reported here except for one had a negative urine culture. One might consider then that in some scenarios, perhaps in a subacute erosion, a capsule form around the urethral defect that prevents bacteria from causing local tissue infection. It is interesting to counter that thought by recognizing that in the typical AUS revision, the cuff and its pseudocapsule are not normally adherent to the corpus spongiosum around which it wraps—a simple uncoupling of the tab allows the device to be removed—and thus a pathway should exist through which urine and/or bacteria could travel. Nonetheless, there are this subset of men who do not develop cellulitis and the subsequent scrotal edema and pain.

Certainly, this case series is severely limited in that this is a small retrospective series amongst a handful of surgeons. Though not included here, we are aware, however, of several other surgeons who have cases of erosion managed non urgently or even without explant. But it is hypothesis generating—how many men actually develop an asymptomatic erosion post AUS placement that never come for follow-up? Cystoscopy on every case would be required for this rate to be determined, and likely this number is low. And is it inevitable that all asymptomatic men with erosion become symptomatic? This series would suggest that that is not the case, and in selected cases of men who are perhaps frail or who can live with their current level of incontinence understanding explant and replacement has a high risk for repeat erosion, observation can be considered. While nearly everyone in this series underwent explantation, they were all asymptomatic at the time of removal months after diagnosis.

Conclusions

AUS is an uncommon but dreaded complication of AUS placement that almost always necessitates device removal. The subsequent morbidity of recovering from surgery, waiting for possible reimplant of a device, and the high risk of erosion in reimplant cases are costly, time-consuming, and morbid for men. While further study is needed to change recommendations, this small series suggests asymptomatic men with AUS cuff erosion may not need urgent (or ever need) device explantation.

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Footnote

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