

Non-erosive urethral perforation between tandem artificial urinary sphincter cuffs

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Tandem cuff artificial urinary sphincter (AUS) is a well-accepted treatment modality for refractory urinary incontinence following prostatectomy. We present a unique case of a 60-year-old male who experienced

spontaneous urethral perforation between tandem AUS cuffs following a strong valsalva maneuver. The patient was treated with immediate AUS explant and transcorporal single cuff placement several months later.

Key Words: artificial urinary sphincter, urethral perforation

Introduction

For more than 40 years, artificial urinary sphincter (AUS) has remained the gold standard surgical treatment for male stress urinary incontinence. Since its first reported use in 1972, the AUS design has undergone a multitude of changes and improvements resulting in a high rate of stress urinary incontinence (SUI) reduction and patient satisfaction following implantation.^{1,2} Despite the success of the AUS, approximately 15% of men continue to experience bothersome leakage following AUS placement. Options for persistent or recurrent SUI after AUS placement include cuff downsizing, proximal relocation, transcorporal cuff placement, urethral wrapping, and tandem cuff AUS placement.³⁻⁷ Tandem cuff AUS theoretically provides a longer column of

cuff mediated urethral compression and thus less SUI. However, little is known about the potential for vascular compromise when the urethral-spongiosal complex is compressed in two locations. Herein, we present a unique case of urethral perforation between tandem AUS cuffs which may have been precipitated by vascular compromise of the urethra due to the compressive effect of the cuffs.

Case report

A 60-year-old male originally underwent bulbar placement of a 4 cm AUS cuff via a perineal incision for severe SUI following laparoscopic radical prostatectomy. The patient had satisfactory results with the initial AUS for 2 years, after which bothersome SUI gradually recurred. A tandem 4 cm cuff was subsequently placed 2.5 cm distal to the existing cuff and the patient's SUI resolved upon device reactivation 6 weeks postoperatively. Approximately 2.5 years later, the patient experienced a severe coughing episode which was immediately followed by severe perineal pain and gross hematuria. Five days later, he presented to the urology clinic, where physical examination demonstrated an inflamed, erythematous, tender perineum overlying the AUS cuffs and flexible cystoscopy revealed a large perforation of the ventral urethral mucosa between the two AUS cuffs with no evidence of cuff erosion, Figure 1. The patient was immediately taken to the

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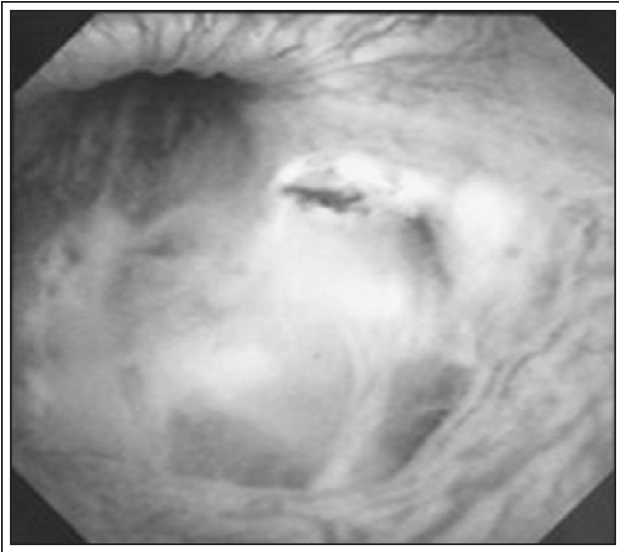


Figure 1. Urethral perforation.

operating room for explant of his entire AUS system. Intraoperative findings included a large phlegmon between and involving both cuffs, but no evidence of cuff erosion. A urethral catheter was left in place for 3 weeks postoperatively and subsequent voiding cystourethrogram demonstrated no extravasation or stricture, Figure 2.

Approximately 6 months later, cystoscopy demonstrated a well-healed urethra. Therefore, a 6 cm transcorporal AUS cuff was placed via a perineal approach which was downsized to 5 cm 10 months later due to recurrent incontinence. Approximately 1 year later, the patient is doing well with 1 pad/day residual SUI.

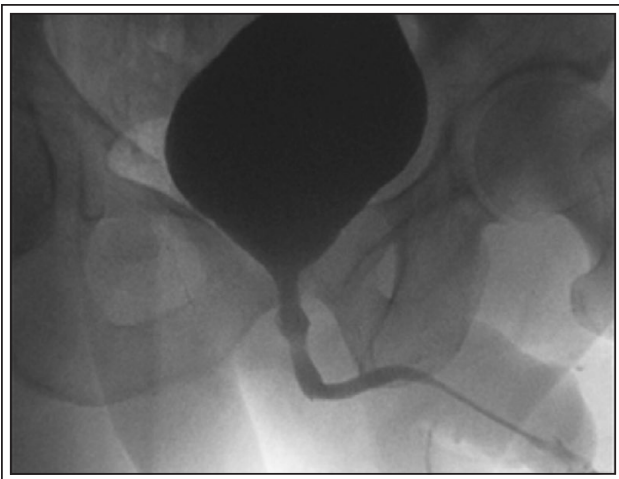


Figure 2. Retrograde urethrogram 3 weeks after perforation.

Discussion

Tandem cuff AUS placement was introduced in the early 1990s as a means to increase urethral resistance in the setting of recurrent or persistent incontinence following initial AUS placement. Theoretically, increased urethral resistance would result from lengthening the column of urethral compression with the addition of a second AUS cuff.⁸ Unfortunately, there is no evidence supporting this theory. Rather, recent literature suggests that the second, more distal cuff has no effect on the urethral resistance (as measured by retrograde leak point pressure) and that the primary source of resistance to urinary flow through the urethra is a single AUS cuff appropriately positioned in the proximal bulbar urethra.⁹

Complications following AUS placement include infection, erosion, urethral atrophy, and mechanical failure; all of which require AUS removal and/or revision to restore continence. Such complications may be more common following tandem cuff AUS placement. O'Connor et al reported a nearly two-fold increase in the rate of surgically managed complications after tandem cuff AUS compared to patients with a single cuff AUS. Actuarial device survival was decreased among tandem cuff AUS devices and no difference in continence outcomes were observed when comparing patients with tandem versus single cuff systems.¹⁰

In addition to his tandem cuff device, our patient had multiple factors which placed him at an increased risk for AUS complications. Medical comorbidities included hypertension, hyperlipidemia, coronary artery disease, and peripheral vascular disease, all of which suggest microvascular disease and thus the potential for vascular mediated atrophy to the corpus spongiosum. Additionally, compression of the proximal AUS cuff may have limited antegrade vascular perfusion while the distal cuff limited retrograde perfusion, thus compromising the vascular integrity of the short urethral segment between the AUS cuffs. In combination, these factors likely resulted in an attenuated urethral segment between the AUS cuffs which was unable to withstand the pressure generated by his violent coughing episode. Thus, the ventral urethra succumbed to the pressure and ruptured, manifesting clinically as a sudden, sharp perineal pain followed by gross hematuria. Subsequent urinary extravasation into the periurethral tissues led to the inflammatory phlegmon observed at time of AUS explantation.

To our knowledge, this is the first reported case of a non-erosive urethral perforation between tandem AUS

cuffs. Tandem cuff AUS patients are at a unique risk of urethral perforation due to the compromised urethral segment between the cuffs. Excellent continence outcomes are achievable following AUS explant and staged transcorporal single cuff AUS placement. □

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