Immediate Urethral Repair during Explantation Prevents Stricture Formation after Artificial Urinary Sphincter Cuff Erosion

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Abbreviations and Acronyms

AUS = artificial urinary sphincter

DVIU = direct vision internal urethrotomy

HRQL = health related quality of life

ISU = in situ urethroplasty

RRP = radical retropubic prostatectomy

VCUG = voiding cystourethrogram

XRT = external beam radiation therapy

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Study received institutional review board approval.

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Purpose: We compare stricture outcomes in patients with artificial urinary sphincter cuff erosion managed with and without synchronous urethral repair.

Materials and Methods: Records of patients who underwent artificial urinary sphincter removal for cuff erosion from 2007 to 2013 were retrospectively reviewed. Two cohorts of patients were evaluated, with those in group 1 treated with in situ urethroplasty and those in group 2 treated with a Foley catheter only. We compared demographic, clinical and radiological data to assess resultant stricture disease, and compared operative times between the cohorts.

Results: Of the 26 artificial urinary sphincter cuff erosion cases identified 13 underwent in situ urethroplasty while 13 did not. Mean patient age was 73 years (range 61 to 83) with a mean followup of 24 months (range 8 to 69). The rate of urethral stricture formation after artificial urinary sphincter explantation was significantly reduced among patients treated with in situ urethroplasty (5 of 13, 38%) compared to those treated with Foley catheter only (11 of 13, 85%; $p = 0.047$). Mean operative times were similar at 78 minutes (50 to 133) for the in situ urethroplasty group vs 70 minutes (51 to 92) for the Foley catheter only group ($p = 0.39$). Those treated with in situ urethroplasty underwent significantly fewer procedures per patient before artificial urinary sphincter replacement (0.4 vs 1.1, $p = 0.004$) and had a much higher rate of eventually undergoing secondary artificial urinary sphincter implantation (7 of 13, 54% vs 2 of 13, 15%, $p = 0.04$) compared to those with cuff erosion treated with Foley catheter only.

Conclusions: Urethral repair at the time of artificial urinary sphincter explantation for cuff erosion appears to prevent stricture development, thus facilitating successful artificial urinary sphincter replacement.

Key Words: urinary incontinence; urinary sphincter, artificial

ALTHOUGH the artificial urinary sphincter provides significant relief for men with stress urinary incontinence in the majority of cases,[1] urethral cuff erosion remains a troublesome complication, occurring in 2% to 15% of patients, necessitating device removal.[2–5] Traditional management consists of urinary diversion with Foley catheter placement or suprapubic cystostomy for several weeks followed by AUS reimplantation after 4 to 6 months of additional tissue healing.[2,6]

During AUS cuff explantation we have observed that the resulting urethral defect may be substantial and prone to urethral stricture formation

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during secondary healing. Although not well reported, the development of urethral stricture in the patient with AUS is a vexing problem requiring further manipulation such as dilation or incision/excision of the stricture before AUS replacement, if and when that ever becomes possible.

To prevent stricture development and its attendant problems after AUS cuff erosion we developed an abbreviated technique of urethral repair called in situ urethroplasty. Our hypothesis was that immediate reconstruction of the urethra at cuff removal may decrease the rate of stricture formation at the site of erosion. We compared the rates of urethral stricture formation and the clinical course in patients with AUS cuff erosion undergoing ISU to those receiving Foley catheter urethral stenting alone.

MATERIALS AND METHODS

An institutional review board approved, retrospective review of our AUS database was performed between June 2005 and October 2013. We identified 26 consecutive men with AUS cuff erosion who underwent device explantation during this period. Patient characteristics reviewed included etiologies of incontinence, age, smoking history, hypertension, coronary artery disease, renal disease, diabetic status and prior radiation.

At the time of AUS explantation the patients with urethral erosion were treated with immediate urethral repair via ISU with 3 weeks of Foley catheter drainage (group 1) or simply had a Foley catheter placed for 3 weeks after explantation and no urethral repair (group 2). Foley catheter insertion facilitated reconstruction and, when necessary, urethroscopy with wire placement ensured accurate placement of a 14Fr Council tip catheter. ISU was then performed by reapproximating the ventral urethral edges with full thickness, interrupted 2-zero absorbable monofilament suture over the catheter, while the dorsal area of the defect was not manipulated (fig. 1). This abbreviated approach was performed without further mobilization of inflamed tissues within the already hostile operative field.

The primary end point of our study was assessment of urethral stricture formation after AUS cuff removal. Patients who underwent ISU obtained a voiding cystourethrogram 3 weeks postoperatively. An office cystoscopy was also performed 2 months after VCUG to ensure urethral patency. Urethral strictures were defined by the inability to pass a 16Fr flexible cystoscope.[7] We also evaluated the presence and number of interim procedures required for stricture management when necessary. When possible, AUS reinsertion was performed via a transcorporal technique after 6 months.

Demographic and subgroup analyses were compared using chi-square tests. Student t-tests were used to identify differences in rates of stricture formation. All analyses were performed using SPSS® statistical software (version 19) with $p < 0.05$ considered statistically significant.

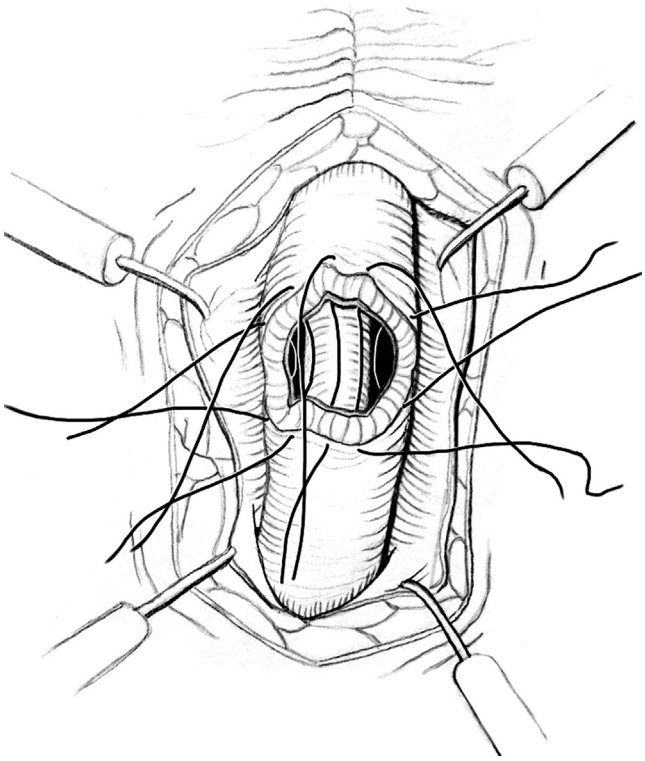

Figure 1. ISU is performed by reapproximating ventral edges of urethra at site of AUS cuff erosion using 2-zero absorbable monofilament sutures over 14 or 16Fr Foley catheter while dorsal aspect is left intact.

RESULTS

Demographics

During the study period 26 men underwent AUS explantation with a mean followup of 24 months (range 8 to 69). Half of the patients underwent primary ISU at AUS cuff explantation (group 1) while the other half received a stenting Foley catheter only (group 2). Mean patient age was 73 years (range 61 to 83), and the groups were well matched for age, comorbidities, stress urinary incontinence etiology and radiation history (table 1).

Table 1. *Demographics and comorbidities among patients with AUS cuff erosion*

	Group 1		Group 2		p Value
Mean pt age (range)	73.5	(60–89)	72.2	(61–81)	0.64
No. hypertension (%)	12	(92)	11	(85)	0.65
No. coronary artery disease (%)	8	(62)	6	(46)	0.73
No. renal disease (%)	4	(31)	3	(23)	0.84
No. diabetes (%)	5	(38)	5	(38)	0.76
No. radiation therapy (%)	6	(46)	8	(62)	0.24
No. tobacco use (%)	4	(31)	4	(31)	0.80
Av (cm) cuff size (range)	3.7	(3.5–4.0)	3.9	(3.5–4.5)	0.15
No. etiology of incontinence (%):					
RRP	10	(77)	7	(54)	
XRT	—		1	(8)	
Microwave therapy	1	(8)	—		
RRP/XRT	3	(23)	3	(23)	
RRP/Cryoablation	—		1	(8)	