

Independent risk factors for urethroplasty failure



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Introduction

Specific factors contributing to the risk of urethroplasty failure remain controversial:

- Inconsistent data
- Retrospective research

The aim of this study is to identify independent risk factors for urethroplasty failure in a prospective patient cohort.

Methods

- All native male patients undergoing urethroplasty at our center between 2008 and 2018 → prospective database
- Exclusion criteria for this study:
 - Age < 18y
 - Follow-up < 1y
 - Posterior strictures
 - Strictures at perineal urethrostomy
- Postoperative follow-up:
 - 14d: urethrography + catheter removal
 - 3m: follow-up visit with anamnesis, physical examination, uroflowmetry
 - 12m: follow-up visit with anamnesis, physical examination, uroflowmetry
 - Annually: follow-up visit with anamnesis, physical examination, uroflowmetry
 - If Qmax < 15 ml/s → additional urethrography/urethroscopy
- Definition of failure: need for additional urethral intervention (incl. simple dilation)
- Statistical analyses:
 - Descriptive statistics
 - Uni- and multivariate Cox regression analyses (entire patient cohort + location-specific analyses)
 - Kaplan-Meier statistics & Log-Rank test: comparison of failures with and without contrast extravasation at first urethrography
 - SPSS® 25.0 – Two-tailed testing – Alpha set at 0.05
- Local Ethics Committee approval: UZG2008/234

Results

	Total (n = 474)	Penile (n = 145)	Bulbar (n = 247)	Penobulbar (n = 82)
Median follow-up (months) (IQR)	62 (35-91)	65 (41-93)	58 (31-86)	71 (41-98)
Median age (years) (IQR)	5 (37-63)	48 (37-58)	51 (33-63)	60 (49-68)
Median stricture length (cm) (IQR)	3.0 (1.5-6.0)	3.0 (1.5-5.0)	2.0 (1.0-4.0)	10.5 (6.5-15.0)
Stricture etiology n (%)				
Idiopathic	196 (41)	44 (30)	132 (53)	20 (24)
Iatrogenic	152 (32)	27 (19)	82 (33)	43 (52)
Catheter	61 (13)	12 (8.3)	36 (15)	13 (16)
Transurethral resection of the prostate	64 (14)	13 (8.3)	30 (12)	22 (27)
Radical prostatectomy	14 (3.0)	2 (1.4)	11 (4.5)	1 (1.2)
Irradiation of the prostate	11 (2.3)	1 (0.69)	5 (2.0)	5 (6.1)
Other	3 (0.63)	0	1 (0.40)	2 (2.4)
Failed hypospadias repair	49 (10)	38 (26)	5 (2.0)	6 (7.3)
External trauma	30 (6.3)	3 (2.1)	24 (9.7)	3 (3.7)
Lichen Sclerosus	40 (8.4)	30 (21)	0	10 (12)
Inflammatory	8 (1.7)	4 (2.8)	4 (1.6)	0
Prior interventions n (%)				
None	91 (19)	39 (27)	36 (15)	16 (20)
≥ 1 DVIU/dilation	226 (48)	42 (29)	145 (59)	39 (48)
≥ 1 Urethroplasty	157 (33)	64 (44)	66 (27)	27 (33)
Comorbidities n (%)				
Smoking (or cessation < 1 year)	69 (15)	25 (17)	28 (12)	16 (20)
Diabetes	32 (6.9)	7 (4.9)	16 (6.6)	9 (11)
Cardiovascular comorbidity	105 (23)	23 (16)	57 (24)	25 (31)
Suprapubic catheter n (%)	88 (19)	19 (13)	55 (22)	14 (17)

Table 1. Patient and stricture characteristics

Legend: IQR = interquartile range; DVIU = direct vision internal urethrotomy; cm = centimeters

	Total (n = 474)	Penile (n = 145)	Bulbar (n = 247)	Penobulbar (n = 82)
Preoperative UTI n (%)	108 (23)	33 (23)	57 (23)	18 (22)
Surgical technique n (%)				
Transecting anastomotic repair	71 (15)	0	70 (28)	1 (1.2)
Non-transecting anastomotic repair	86 (18)	6 (4.1)	78 (32)	2 (2.4)
Free graft urethroplasty	189 (40)	53 (37)	90 (36)	46 (56)
Pedicled flap urethroplasty	5 (1.1)	4 (2.8)	0	1 (1.2)
Meatoplasty	55 (12)	55 (38)	0	0
Combined procedure	16 (3.4)	4 (2.8)	0	12 (15)
Multi-stage urethroplasty	26 (5.5)	15 (10)	4 (1.6)	7 (8.5)
Definitive perineostomy	26 (5.5)	8 (5.5)	5 (2.0)	13 (16)
Median operation time (min) (IQR)	100 (80-130)	82 (62-110)	100 (84-125)	151 (109-186)
Median hospital stay (days) (IQR)	2 (2-3)	2 (1-2)	2 (2-3)	3 (2-4)
Median catheter stay (days) (IQR)	14 (9-14)	12 (8-15)	13 (9-15)	15 (13-16)
Extravasation at first VCUG n (%)	25 (6.9)	5 (6.3)	13 (5.8)	7 (12)
Complications (Clavien-Dindo) n (%)				
None	346 (73)	102 (70)	182 (74)	62 (76)
Grade 1	73 (15)	24 (17)	37 (15)	12 (15)
Grade 2	41 (8.6)	15 (10)	22 (8.9)	4 (4.9)
Grade 3	14 (2.9)	4 (2.8)	6 (2.4)	4 (4.9)
Failures n (%)	81 (17)	33 (23)	28 (11)	20 (24)

Table 2. Surgical characteristics and outcome

Legend: UTI = urinary tract infection; min = minutes; IQR = interquartile range; VCUG = voiding cysto-urethrography

	Univariate		Multivariate	
	HR (95% CI)	p-value	HR (95% CI)	p-value
ENTIRE PATIENT COHORT				
Age	1.00 (0.98-1.01)	0.6		
Stricture length	1.05 (1.01-1.09)	0.03	1.01 (0.95-1.07)	0.7
Stricture location				
Penile	1.59 (1.02-2.48)	0.04	0.78 (0.36-1.72)	0.5
Bulbar	0.49 (0.31-0.78)	0.003	0.44 (0.20-0.99)	0.046
Penobulbar	1.48 (0.89-2.45)	0.1		
Stricture etiology				
Idiopathic	0.57 (0.35-0.91)	0.02	0.74 (0.41-1.32)	0.3
Iatrogenic	1.51 (0.97-2.35)	0.1		
Failed hypospadias repair	1.83 (0.99-3.38)	0.052		
External trauma	0.54 (0.17-1.72)	0.3		
Lichen Sclerosus	0.84 (0.36-1.92)	0.7		
Inflammatory	1.93 (0.61-6.12)	0.3		
Prior interventions				
≥ 1 DVIU/dilation	0.97 (0.63-1.50)	0.9		
≥ 1 Urethroplasty	1.55 (0.99-2.42)	0.052		
Comorbidities				
Smoking (or cessation < 1 year)	1.50 (0.86-2.63)	0.2		
Diabetes	1.63 (0.78-3.39)	0.2		
Cardiovascular comorbidity	0.96 (0.56-1.64)	0.9		
Preoperative UTI	0.79 (0.45-1.36)	0.4		
Extravasation at first VCUG	3.17 (1.55-6.46)	0.002	2.86 (1.38-5.91)	0.005

Table 3. Uni- and multivariate Cox regression analyses for entire patient cohort

Legend: HR = hazard ratio; DVIU = direct vision internal urethrotomy; UTI = urinary tract infection; VCUG = voiding cysto-urethrography

P-values < 0.05 are highlighted in bold

Location-specific Cox regression analyses could not identify other risk factors for failure

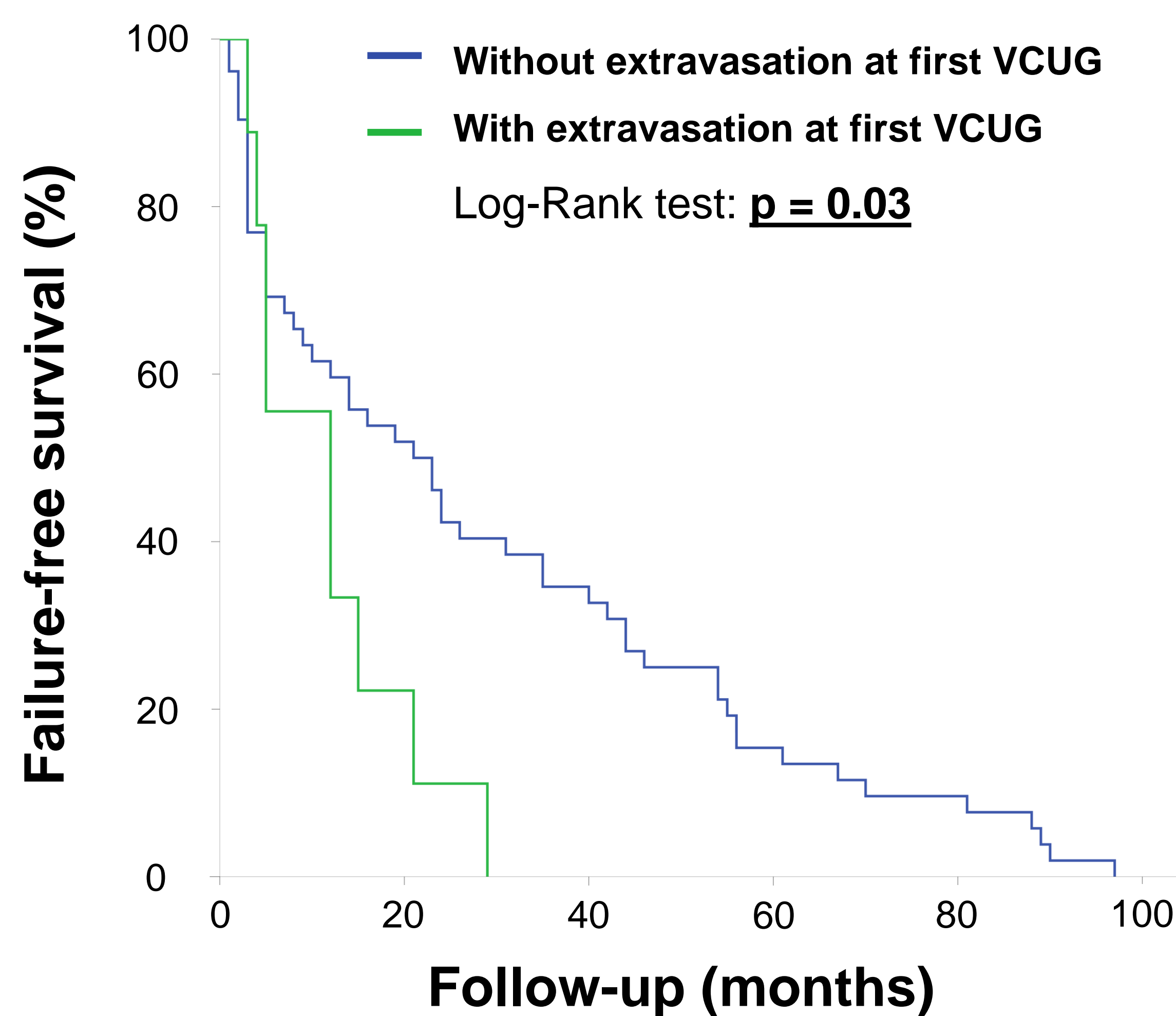


Fig. 1. Kaplan-Meier curve of failures with and without extravasation at first VCUG

Legend: VCUG = voiding cysto-urethrography

Conclusions

Extravasation at first urethrography: independent risk factor for urethroplasty failure & associated with earlier stricture recurrence than other failed cases