

Aims

- Radiotherapy, XRT and/or BT, is a standard of care for the treatment of localized prostate cancer.
- Radiotherapy may be accompanied by a host of local complications.
- Herein we report our experience with prostate stones, a relatively uncommon complication.

*XRT, external beam radiation therapy; BT, brachytherapy

Methods

- Retrospective observational case series of men who developed prostate stones after radiotherapy.
- EMR from two practice settings were searched for men who developed prostatic stones after undergoing XRT and/or BT.
- Age, duration of follow-up, Gleason score, time from radiotherapy to diagnosis of prostate stones, symptoms, validated symptom scores (IPSS, LUTSS), associated conditions (urethral stricture, bladder neck contracture, urethral obstruction, overactive bladder), Q, PVR, 24-hour voiding diary, cystoscopy and VUDS, methods of treatment, type and number of surgeries and outcomes.

*EMR, electronic medical records; IPSS, International Prostate Symptom Score; LUTSS, Lower Urinary Tract Symptom Score; Q, uroflow; PVR, post-void residual; VUDS, video urodynamic study

Results

- One hundred ninety-two records of patients with radiation complications reviewed
- Prostatic urethral stones identified in 12/192 men (6.3%).
- Median age was 78 years (interquartile range was 12, lower quartile 71, upper quartile 83).
- All 12 patients underwent BT, and 4 underwent EBRT as well.
- Follow-up ranged from 2 months to 15 years with a mean and median of 3.3 years and 2.2 years, respectively. Three patients are still actively being followed.
- The mean interval time from radiotherapy to diagnosis of prostate stones was 8 years (range 7 months to 18 years).
- Seven patients underwent VUDS after stone removal: urethral obstruction was found in these 7 patients and detrusor overactivity in 3/7.
- All 12 patients from this case series underwent transurethral stone extraction +/- laser lithotripsy.
- Concomitant surgery included TURP in 5/12 (42%), TUIP in 3/12 (25%), and urethrotomy for urethral strictures in 3/12 (25%).
- Four out of 12 patients (33%) underwent suprapubic catheter placement at some point.
- Over time, patients, in sum, underwent 85 subsequent surgeries to address bladder outlet obstruction, urinary incontinence, etc., including sphincter prosthesis implantation in 4/12 (33%) and explantation in 2/12 (17%), urinary diversion in 2/12 (17%), transurethral procedures (e.g. TUIP, TURP), cystoplasty, open cystolitholapaxy, and additional lithotripsy of prostatic urethral stones.

Discussion

- Prostate stones are uncommon complications of radiation for prostate cancer, accounting for 6.3% of men referred to us because of complications of EBRT or BT. Most had signs of radionecrosis of the prostatic urethra and of bulbomembranous stricture. Surgical outcomes were bleak; every patient required multiple interventions and none can be considered a true success.
- Initial treatment of prostatic urethral stones in our cohort included lithotripsy, sometimes with concomitant TURP and/or urethrotomy. One patient had such high stone burden that he initially required open cystostomy followed by TURP and urethrotomy.
- These patients developed many significant complications and then subsequently underwent a multitude of procedures with minimal success. Our 12 patients underwent a combined total of 85 procedures.
- Figure 1. depicts one patient's particularly long saga; this patient, for most of the post-radiotherapy period, had a bad quality of life and still does.
- At last follow-up, only 3/12 (25%) men are continent—two of whom have a urinary sphincter prosthesis, and one is only 6 months post-op (we have yet to see how this patient will fare long-term in the years to come).
- In our cohort, only two patients had meaningfully successful long-term outcomes, and both required a number of procedures to achieve that limited success.

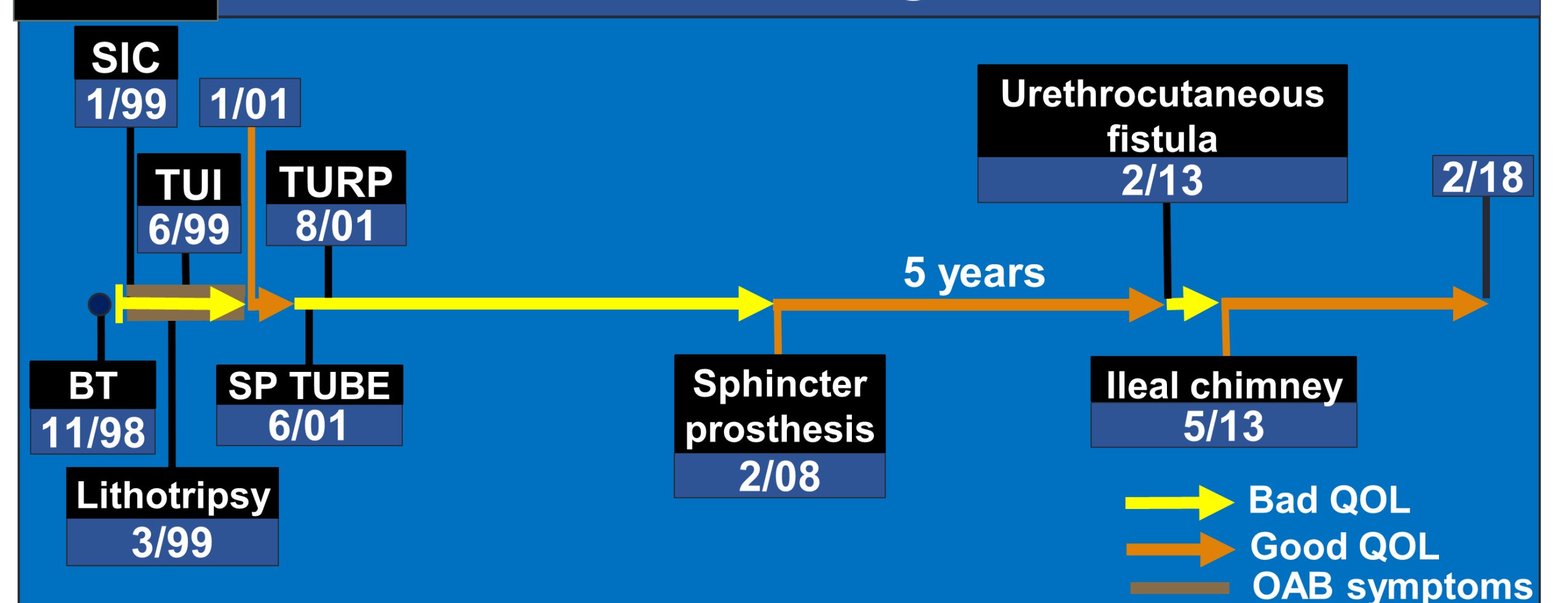
Table 1.

Results

Age	67 – 87 yrs. (mean 76; SD 6)	
Brachytherapy alone	7/11 (63%)	
Brachytherapy + XRT	4/11 (36%)	
Follow-up	4 mos. – 19 yrs. (median 2.2 yrs.)	
Initial Prostate Stone Treatment	N (%)	
Lithotripsy and/or manual removal	11/11 (100)	
+TURP	5/11 (45)	
+TUIP	3/11 (27)	
+Urethrotomy	3/11 (27)	
Subsequent surgeries	25	
TUIP	7/11 (64)	
TURP	6/11 (55)	
Suprapubic cystostomy	4/11 (36)	
Sphincter prosthesis (implant)	4/11 (36)	
Sphincter prosthesis (explant)	2/11 (18)	
Urinary diversion	2/11 (18)	
Current status of patients at last follow-up	N (%)	Mean Follow-up (Range), months
Continent, voiding through urethra (no further surgery)	1/11 (9)	3
Continent, voiding through urethra (sphincter prosthesis)	2/11 (18)	54 (33 – 75)
Incontinent (urethra)	4/11 (36)	6 (5 – 7)
Suprapubic Tube	2/9 (22)	45 (36 – 54)
Urinary Diversion	2/9 (22)	94 (9 – 179)

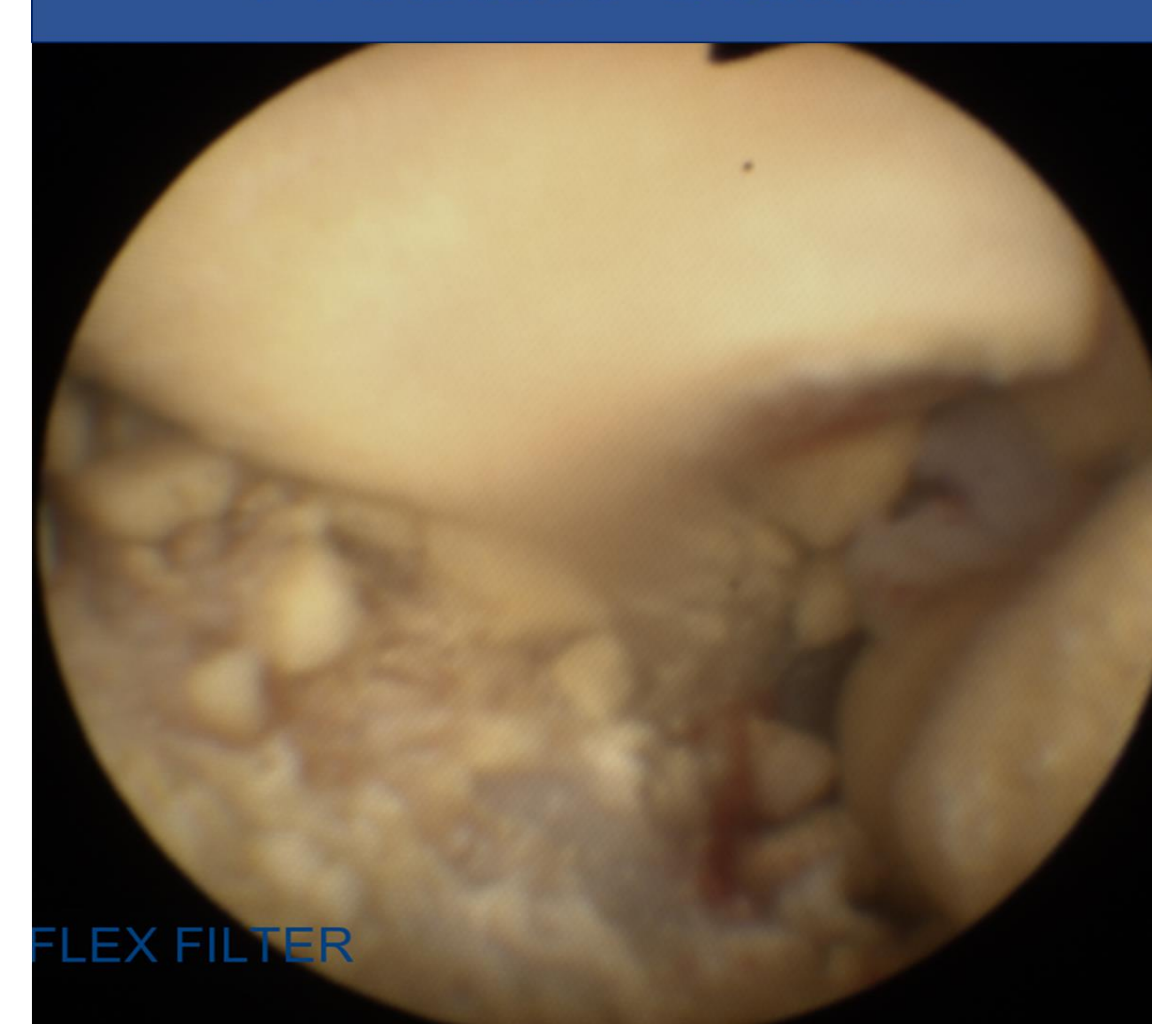
Figure 1.

A 19 Year Saga...

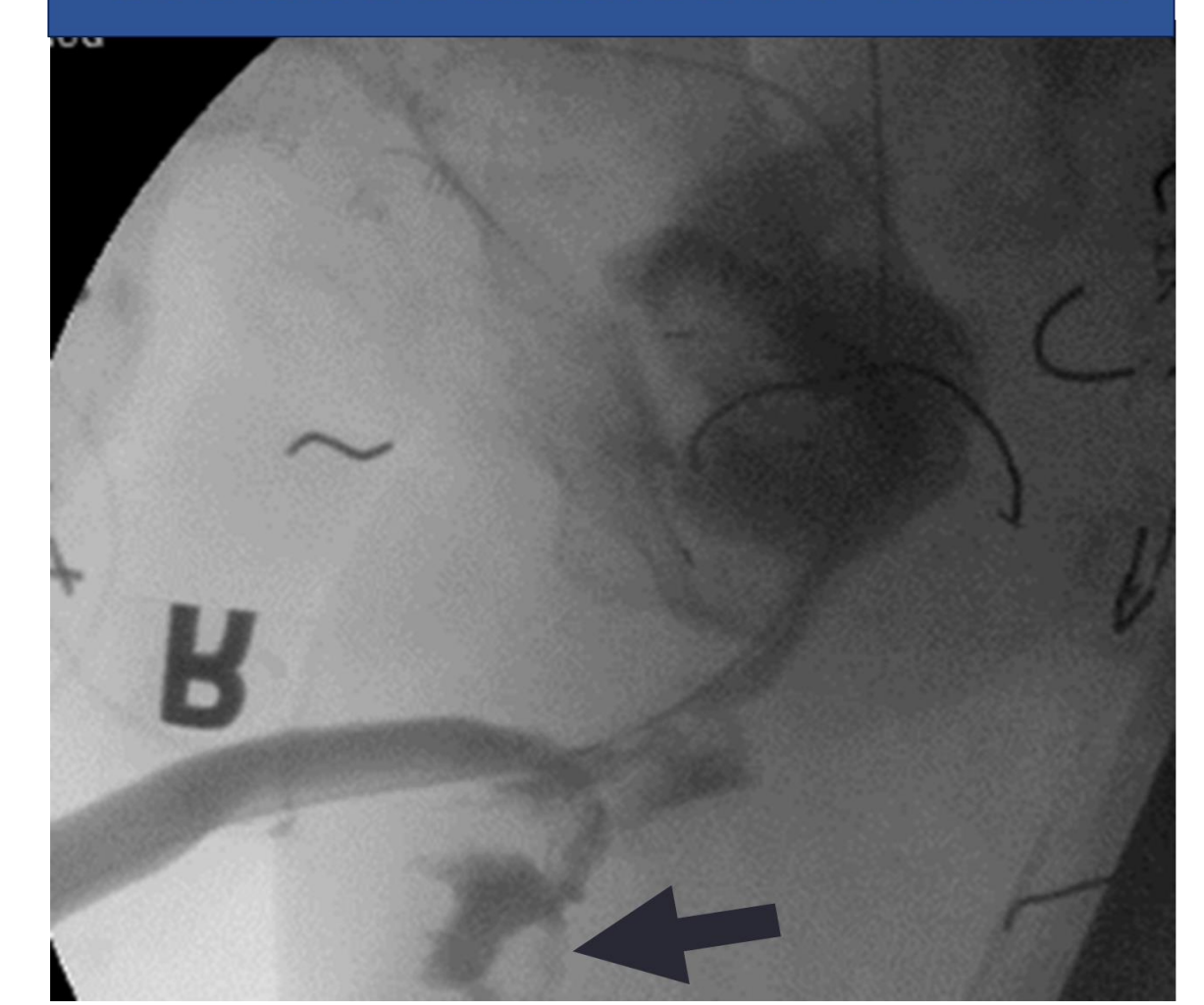


*BT, brachytherapy; SIC, self-intermittent catheterization; TUI, transurethral incision; OAB, overactive bladder; SP tube, suprapubic tube; TURP, transurethral resection of the prostate; QOL, quality of life; OAB, overactive bladder
**Dates are in month/year format

Prostate Stones



Urethrocutaneous fistula



Conclusions

Prostatic urethral stones are the tip of the iceberg in the population of men who have undergone radiotherapy for prostate cancer. Despite some short-term successes, only two patients in this series had successful long-term outcomes with respect to LUTS. We need to determine better ways to prevent (or at least treat) these lifestyle altering complications.