Supplementary Data

Table S1. Recurrence patterns.

Variables	*N* = 166
1st Recurrence pT stage, n (%)	
Tx	10 (6.0)
Tis	6 (3.6)
Ta	134 (80.7)
T1	15 (9.0)
T2	1 (0.6)
1st Recurrence tumour grade, n (%)	
Low-grade	148 (89.2)
High-grade	18 (10.8)
Number of recurrences during follow-up, n (%)	
1	75 (45.2)
2	35 (21.1)
3	25 (15.1)
4 or more	31 (18.7)
Upgrading or/and upstaging during follow-up, n (%)	41 (24.7)
Time to Upgrading/Upstaging, months (IQR)	18 (7.5-47.0)
Progression to HGUC, n (%)	36 (21.7)
Time to HGUC, months (IQR)	20.5 (8-49.75)
Upstaging, n (%)	21 (12.7)
Time to Upstaging, months (IQR)	15 (8-32.5)
Progression to MIBC, n (%)	7 (4.2)
Time to MIBC, months (IQR)	37 (15-44)
Radical cystectomy, n (%)	8 (4.8)

IQR = Interquartile range; HGUC = High grade urothelial carcinoma; MIBC = Muscle invasive bladder cancer

Table S2. Characteristics of patients with recurrence after initial LG NMIBC stratified by risk-group.

Variables	*Low-Risk*	*Intermediate-Risk*	*High-Risk*	*p*
Patients, n (%)	126 (75.9)	31 (18.7)	9 (5.4)	
Age at recurrence (years), median (IQR)	67 (60- 74.3)	79 (75-83)	79 (76.5-82.0)	<0.001
Sex, n (%)				0.738
Male	102 (81.0)	24 (77.4)	8 (88.9)	
Female	24 (19.0)	7 (22.6)	1 (11.1)	
Initial pT stage, n (%)				<0.001
Ta	118 (93.7)	25 (80.6)	4 (44.4)	
T1	8 (6.3)	6 (19.4)	5 (55.6)	
Time to Recurrence (months), median (IQR)	13.5 (7.0-28.3)	10 (6.0-19.0)	7 (4.0-16-0)	0.074
Cystoscopy findings, n (%)				0.122

Negative	0 (0.0)	0 (0.0)	0 (0.0)	
Suspicious lesion	10 (7.9)	1 (3.2)	1 (11.1)	
Positive	116 (92.1)	30 (96.8)	8 (88.9)	
Cytology results, n (%)				0.373
Negative for UC	78 (61.9)	21 (67.7)	5 (55.6)	
Atypia	8 (6.3)	1 (3.2)	0 (0.0)	
Suspicious for UC	14 (11.1)	5 (16.1)	1 (11.1)	
Positive for UC	9 (7.1)	1 (3.2)	3 (33.3)	
Insufficient for diagnosis	17 (13.5)	3 (9.7)	0 (0.0)	
Cytology results grouped, n (%)				0.443
Negative	86 (68.3)	22 (71.0)	5 (55.6)	
Positive	23 (18.2)	6 (19.3)	4 (44.4)	
Insufficient for diagnosis	17 (13.5)	3 (9.7)	0 (0.0)	
1st Recurrence pT stage				0.030
Tx	7 (5.6)	2 (6.5)	1 (11.1)	
Tis	5 (4.0)	0 (0.0)	1 (11.1)	
Ta	106 (84.1)	24 (77.4)	4 (44.4)	
T1	7 (5.6)	5 (16.1)	3 (33.3)	
T2	1 (0.8)	0 (0.0)	0 (0.0)	
1st Recurrence tumour grade				0.015
LG	116 (91.3)	28 (90.3)	5 (55.6)	
HG	11 (8.7)	3 (9.7)	4 (44.4)	
Number of recurrences during follow-up				0.339
1	59 (46.8)	13 (41.9)	3 (33.3)	
2	26 (20.6)	8 (25.8)	1 (11.1)	
3	17 (13.5)	7 (22.6)	1 (11.1)	
4 or more	24 (19.1)	3 (9.7)	4 (44.4)	
Progression to HGUC, n (%)	22 (17.5)	9 (29.0)	5 (55.6)	0.018
Time to HGUC, months (IQR)	20.5 (10.25-50.25)	26 (7.5-69.5)	17 (6-20)	0.367
Upstaging, n (%)	10 (7.9)	7 (22.6)	4 (44.4)	0.002
Time to Upstaging, months (IQR)	12.5 (8.75-37.75)	22 (8-26)	17.5 (4.75-40.0)	0.904
Progression to MIBC, n (%)	5 (4.0)	0 (0.0)	2 (22.2)	0.036
Time to MIBC, months (IQR)	16 (13.5-44.0)	N/A	41.5 (SD ± 3.5)	0.245

LG = Low grade; NMIBC = Non-muscle invasive bladder cancer; IQR = Interquartile range; UC = Urothelial carcinoma; HG = High grade; HGUC = High grade urothelial carcinoma; MIBC = Muscle invasive bladder cancer

Table S3. Abbreviation table.

Abbreviation	Abbreviated term
NMIBC	Non-muscle-invasive bladder cancer
LG	Low-grade
BC	Bladder cancer
HG	High-grade
EAU	European Association of Urology

AUA	American Urological Association
CIS	Carcinoma-in-situ
UC	Urothelial carcinoma
SUO	Society of Urologic Oncology
IRB	Institutional review board
TURBT	Transurethral resection of bladder tumour
UTUC	Upper tract urothelial carcinoma
BCG	Bacillus Calmette-Guérin
IQR	Interquartile ranges
HR	Hazard ratio
CI	Confidence interval
yo	years old

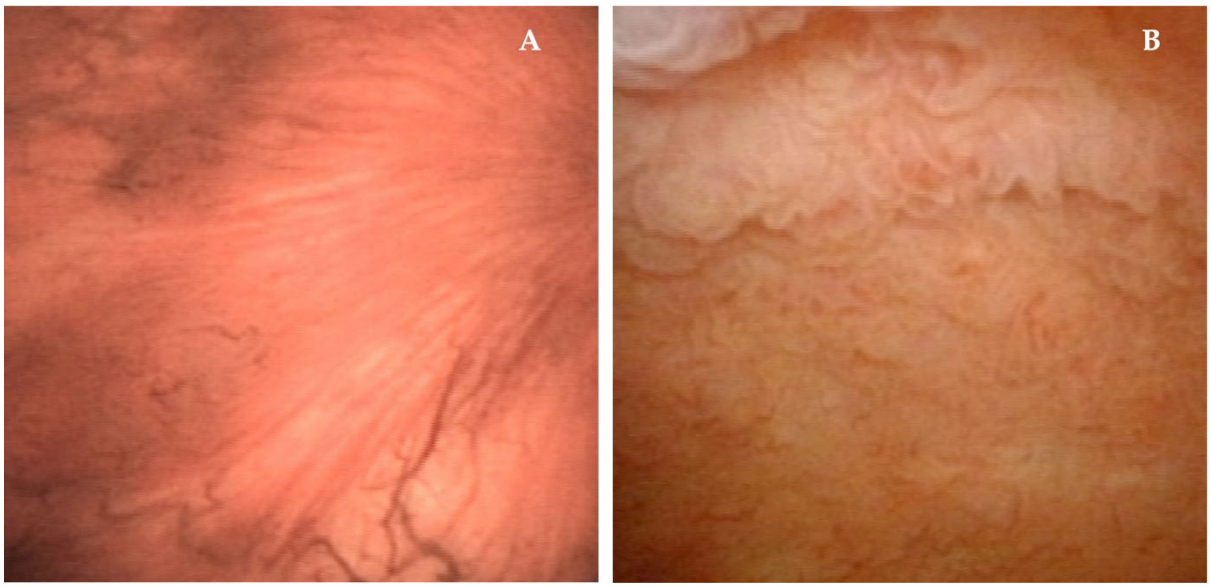


Figure S1. Examples of cystoscopic images categorized as suspicious according to the treating physician notes. In these cases, a positive bladder washing cytology changed the management and diagnosed a recurrence.