



# Urinary Tract Infection Following Radical Cystectomy with an Enhanced Recovery Protocol

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## Background

- Radical cystectomy with urinary diversion (RC) is a complex surgery associated with morbid complications, such as urinary tract infection (UTI)
- Enhanced Recovery After Surgery (ERAS) protocols are improving perioperative care, though the literature has limited data on preventative regimens for UTI
- We assessed the effect of an ERAS protocol on UTI rates following RC

## Materials and Methods

- We reviewed 279 patients after RC with an ERAS protocol (2013-2017)
- ERAS protocol infection control measures included:
  - Perioperative antibiotics
  - Suppressive antibiotics until stent removal
  - Single-dose antibiotic at stent removal (practitioner discretion)
- UTI was defined as:
  - + urine culture and symptoms
  - + urine culture, no documented symptoms, treatment by practitioner discretion
  - or no urine culture with symptoms, clinically presumed
- Urosepsis was defined as SIRS with + blood and urine cultures for same organism
- Assessed for:
  - UTI events within 90 days of RC
  - Urine culture results
  - Protocol-related antibiotic use

## Results

- 107 patients (38.4%) had  $\geq 1$  UTI within 90 days of RC
- 7 events (6.5%) were urosepsis
- Median time to UTI was 13 days
- Most commonly, there was negative culture associated with first UTI (41.1%)
  - 18.7% gram-positive bacteria
  - 22.4% gram-negative bacteria
  - 16.8% fungi
- UTIs most often occurred between postoperative discharge and stent removal (48.6%)
- Postoperative fluoroquinolone use increased UTI-free probability (0.67 vs 0.51 on other regimens,  $p=0.021$ )

Table 1. Clinical and pathologic characteristics of 279 patients who underwent radical cystectomy with an Enhanced Recovery After Surgery protocol.

Variable	All	UTI/Urosepsis	No UTI/Urosepsis	P
Age Median (range)	71 (34-91)	71 (34-91)	70 (37-91)	
Gender				0.12
Male	226 (81.0%)	92 (86.0%)	134 (77.9%)	
Female	53 (19.0%)	15 (14.0%)	38 (22.1%)	
CCI				0.58
0	107 (38.4%)	42 (39.3%)	65 (37.8%)	
1	71 (25.5%)	30 (28.0%)	41 (23.8%)	
$\geq 2$	101 (36.2%)	35 (32.7%)	66 (38.4%)	
Length of Stay Median (range)	4 (2-43)	5 (2-41)	4 (3-43)	
NACHT	109 (39.1%)	40 (37.4%)	69 (40.1%)	0.71
DM	64 (22.9%)	24 (22.4%)	40 (23.3%)	1.0
Pathologic stage				0.73
OC	165 (59.1%)	66 (61.7%)	99 (57.6%)	
EV	53 (19.0%)	18 (16.8%)	35 (20.4%)	
LN+	61 (21.9%)	23 (21.5%)	38 (22.1%)	
Diversion				0.01
Orthotopic	159 (57.0%)	73 (68.2%)	86 (50.0%)	
Continent Cutaneous	18 (6.5%)	6 (5.6%)	12 (7.0%)	
Incontinent	102 (36.6%)	28 (26.2%)	74 (43.0%)	

CCI: Charlson Comorbidity Index; NaChT: neoadjuvant chemotherapy; DM: diabetes mellitus; OC: organ-confined; EV: extra-vesical; LN+: lymph node positive.

## Results (continued)

- On multivariate analysis:
  - Postoperative fluoroquinolones reduced UTI risk (HR 0.57, 95%CI 0.352-0.922,  $p=0.022$ )
  - UTI risk increased with each additional hospital day (HR 1.07, 95%CI 1.042-1.103,  $p<0.0001$ )
  - UTI risk increased with orthotopic diversion (HR 1.70, 95%CI 1.102- 2.605,  $p=0.016$ )

Table 2. Distribution of antibiotics used by time of first UTI event in 279 patients after radical cystectomy with an Enhanced Recovery After Surgery Protocol.

Antibiotic	Patients with first UTI/urosepsis at noted time frame	Patients with no UTI/urosepsis at noted time frame
<i>Prior to Initial Discharge</i>		
Cephalosporin only	15 (6.8%)	205 (93.2%)
Single non-cephalosporin	0 (0%)	8 (100%)
Multiples (with cephalosporin)	2 (9.1%)	20 (90.9%)
Multiples (no cephalosporin)	2 (8.7%)	21 (91.3%)
Total	19	254
<i>Discharge to Stent Removal</i>		
Fluoroquinolone only	41 (19.6%)	168 (80.4%)
Nitrofurantoin only	6 (31.6%)	13 (68.4%)
Trimethoprim sulfa only	2 (25.0%)	6 (75.0%)
Multiple agents	3 (18.8%)	13 (81.2%)
Total	52	202
<i>Stent Removal to 90 days</i>		
Aminoglycoside	22 (18.2%)	99 (81.8%)
No aminoglycoside	8 (9.9%)	73 (90.1%)
Total	30	172

## Conclusions

- Longer hospital stay and orthotopic diversion was associated with higher UTI risk following radical cystectomy with an enhanced recovery protocol
- Suppressive postoperative fluoroquinolone use was associated with reduced 90-day UTI risk under this protocol