

Epidemiology of Urinary Tract Infections in the Renal Transplant Population in a Large Urban Midwestern Hospital: A Retrospective Cohort Study

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Background

- Multidrug resistant organisms (MDROs) are increasingly prevalent, with extended spectrum beta-lactamase (ESBL) producing organisms and carbapenem resistant Enterobacteriaceae (CREs) accounting for more infections
- Renal transplant recipients (RTRs) are at high risk for urinary tract infections (UTI); often have extensive antibiotic exposure and history of hospitalizations when compared to the general population, making them higher risk for infections with MDROs
- UTIs can lead to graft dysfunction, hospitalizations, and more antibiotic exposure, especially with delays in appropriate therapy, as may occur in the event of unforeseen drug resistance

Objectives

- Describe the prevalence of MDRO UTIs in a contemporary cohort of RTRs
- Evaluate frequency of key symptoms and physical exam findings, morbidity, and mortality
- Describe characteristics of MDRO infections

Methods

- Design:** Single-center retrospective cohort study
 - Inclusion:** 18 years or older and underwent transplant between November 26, 2018 - July 11, 2019
- Data collection:** Charts reviewed for demographics, co-morbid medical conditions, clinical and laboratory features of UTIs, and treatment of and outcomes related to UTIs
- Statistical analysis:** Fischer's Exact T-test was used to compare patients with and without MDRO UTIs. Testing was performed with SPSS version 26 (IBM, Armonk, NY). Significance was defined by a $p < 0.05$

Table 1: UTI Characteristics and Outcomes

	All patients with UTIs (36)	Non-ESBL/CRE UTIs (29)	ESBL UTIs (7)	p
Patient-Reported Symptoms				
Fevers	16	11	5	0.137
Frequency	3	3	0	0.006
Dysuria	10	8	2	0.962
Pain Over Allograft	8	4	4	0.081
Clinical Findings				
Fevers	12	8	4	0.205
Graft Tenderness	8	5	3	0.264
CT or US Imaging Performed	22	15	7	0.005
Outcomes				
Hospitalized	23	17	6	0.138
Bacteremia	8	5	3	0.264
1-Year Post-Transplant All-Cause-Mortality	2	2	0	0.489

Table 2: Outcomes in Patients with ESBL UTIs

Patient	1	2	3	4	5	6	7
Characteristics							
Bacteremia	No	Yes	No	No	No	Yes	Yes
Ciprofloxacin susceptibility	R	S	S	R	R	R	R
Fosfomycin susceptibility	ND	ND	R	S	ND	S	ND
Meropenem susceptibility	S	S	S	S	S	S	S
Number of antibiotics received	1	3	3	2	2	2	5
Days before appropriate therapy initiated	0	2	2	1	2	0	3

Results

- Two hundred fifty-two RTRs were evaluated (median age 54.4, 38.3% female gender)
- Thirty-six patients developed UTIs, 33.3% (12) were female and 88% (32) spoke English as their primary language.
- No patients had CRE UTIs
- ESBL UTI prevalence among RTR who developed UTIs was 19.4%
- Mortality rates did not differ significantly between patients with and without ESBL UTI (0% and 6.9%, respectively, $p=0.489$) (Table 1)
- Most common organisms identified were: *E. coli* (17), *E. cloacae* (6), *E. faecalis* (2), *K. pneumoniae* (3), and *Pseudomonas* sp (2)
- In patients with ESBL UTIs, median number of antibiotics received was 2 (range: 1-5) and median time to appropriate coverage was 2 days (range: 0-3)
- Based on documented susceptibilities, oral therapy was an option for 3 of the 7 patients that developed ESBL UTIs

Conclusions

- ESBL-producing organisms account for a substantial number of UTIs among RTR who develop UTIs at a large tertiary midwestern hospital
- A significant difference in mortality was not observed between patients with ESBL and non-ESBL UTIs, but this may have been a result of small sample size