3-Day Ceftriaxone versus Longer Durations of Therapy for Inpatient Treatment of Uncomplicated UTI

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Background

- Current guidelines regarding uncomplicated UTI (uUTI) recommend 3-day courses of highly bioavailable oral agents, such as sulfamethoxazole-trimethoprim (SMZ/TMP) and fluoroquinolones, in the outpatient setting
- In the inpatient setting at many institutions, ceftriaxone (CRO) is often prescribed empirically; patients often complete a 3-day course prior to the receipt of urine culture and susceptibility results
- IDSA guidelines, last updated in 2011, do not address duration of IV antibiotic therapy for treatment of uncomplicated UTI
- With this study, we aimed to determine whether 3 days of CRO is equally effective as longer durations of treatment (DOT) for uUTIs
- Hypothesis: No difference in rate of clinical cure between groups

Objectives

Primary

- Compare clinical cure between patients treated with 3-days of CRO (CRO 3-day) versus longer DOT

Secondary

- Hospital length of stay (LOS), 30-day return visit due to UTI, development of Clostridiodes difficile within 30 days, and adverse drug events

Methods

Study Design & Setting

- Retrospective cohort study
- Trinity Health Saint Mary's in Grand Rapids, MI
- 350-bed community teaching hospital

Study Groups

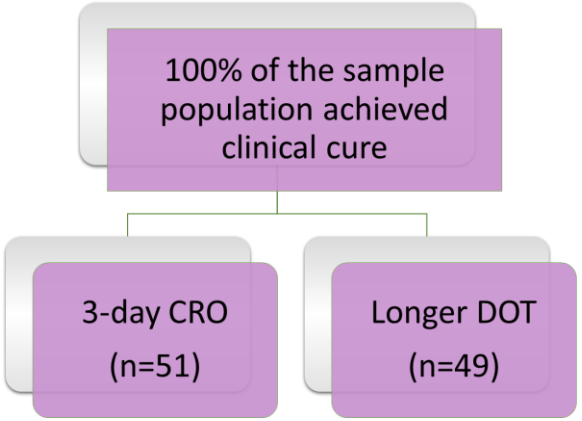
- Patients treated with a three-day course of CRO versus a longer duration of therapy (DOT)

Patient Population

- Hospitalized patients ≥ 18 years receiving antibiotics for documented symptomatic uUTI with a positive urine culture between July 1, 2015, and June 30, 2021
- Screened ~2800 patients with ICD-10 N39.0 until a convenience sample of 100 patients was reached

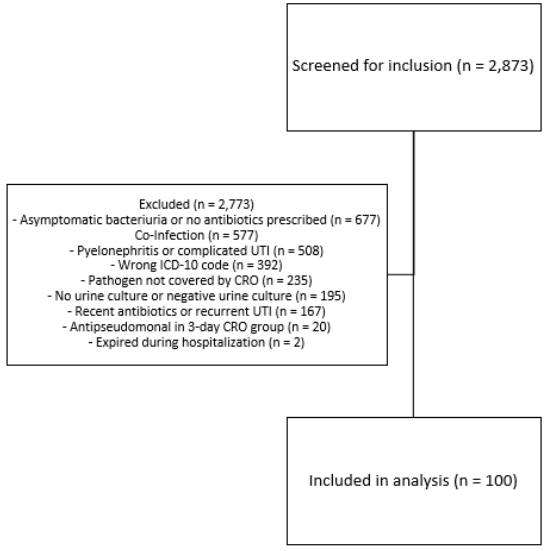
Inclusion criteria	Exclusion criteria	
• ≥ 18 years • uUTI • Patients with positive urine culture • Documented UTI symptoms	• Complicated infection (except for males with cystitis) • UTI within 30 days • Recent antibiotic use (within 7 days) • Contraindication to use of CRO • Empiric treatment with an anti-pseudomonal beta-lactam	• Microbial isolates resistant to CRO • Chronic/recurrent UTI • Co-infection • Negative urine culture • ASB

Clinical Cure & Patient Outcomes



Outcome	3-day CRO (n=51)	Longer DOT (n=49)	p-value
Hospital length of stay, days, median (IQR)	5 (4-7)	4 (3-6.5)	0.48
C. difficile, n (%)	1 (2)	3 (6.1)	0.319
30-day return visit, n (%)	7 (13.7)	3 (6.1)	0.319
Female	6 (85.7)	2 (66.7)	0.284
Male	1 (14.3)	1 (3.3)	1
Location of return visit, n (%)			
Primary care office	3 (5.9)	3 (6.1)	1
Urgent care	0 (0)	0 (0)	1
Emergency dept	2 (3.9)	0 (0)	0.495
Hospital admission	2 (3.9)	0 (0)	0.495
Adverse drug events, n (%)	0 (0)	1 (2)	0.49

Patient Population & Characteristics



Characteristic	3-day CRO (n=51)	Longer DOT (n=49)	p-value
Female sex, n (%)	46 (90.2)	38 (77.6)	0.106
Age, year (+/- SD)	76.5 (13.6)	72.8 (14.2)	0.187
Creatinine Clearance, mL/min (+/- SD)	42.7 (28.4)	44.1 (23.8)	0.780
Charlson Comorbidity Index, median (IQR)	5 (4-7)	5 (4-7)	0.892
Empiric intravenous therapy, n (%)	51 (100)	34 (69.4)	<0.001
Empiric antibiotic received, n (%)			0.003
Amoxicillin	0 (0)	1 (2)	
Amoxicillin/clavulanate	0 (0)	1 (2)	
Ceftriaxone	51 (100)	32 (65.3)	
Cephalexin	0 (0)	10 (20.4)	
Ciprofloxacin	0 (0)	1 (2)	
Pip/tazo	0 (0)	1 (2)	
Nitrofurantoin	0 (0)	2 (4.1)	
SMZ/TMP	0 (0)	1 (2)	
Definitive oral therapy, n (%)	0 (0)	31 (63.7)	<0.001
Pathogen, n (%)			
E. coli	36 (70.6)	35 (71.4)	0.926
Klebsiella	6 (11.8)	8 (16.3)	0.511
Proteus species	3 (5.9)	5 (10.2)	0.335
Enterobacter species	3 (5.9)	2 (4.1)	0.680
Aerococcus species	2 (3.9)	4 (8.2)	0.372
Citrobacter species	3 (5.9)	0 (0)	0.129
Other	1 (2)	1 (2)	0.742

Admission Reason

Reason for admission* n (%)	3-Day CRO (n=51)	Longer DOT (n=49)
UTI	17 (33.3)	12 (24.5)
Cardiovascular	6 (11.8)	10 (20.4)
Neurologic	6 (11.8)	8 (16.3)
Other	6 (11.8)	1 (2.0)
Fall	4 (7.8)	3 (6.1)
Pulmonary	4 (7.8)	3 (6.1)
Endocrine	3 (5.9)	2 (4.1)
Renal	2 (3.9)	3 (6.1)
Substance use	1 (2.0)	2 (4.1)
GI	1 (2.0)	4 (8.2)
Psychiatric admission	1 (2.0)	0 (0)
Oncology related	0 (0)	1 (2.0)

*p > 0.05 for all variables

Discussion and Conclusions

- Findings support a short course of parenteral therapy with CRO for inpatient treatment of uUTI
  - No difference in efficacy or safety endpoints
- Strengths
  - Few studies on parenteral agents for uUTI, or inpatient treatment of uUTI
  - Inclusion of males with uUTI
- Limitations
  - Retrospective, single-center study
  - Reliance on available electronic health record data
  - Low yield of included patients

References

1. Gupta K, Hooton TM, Naber KG, et al. Infectious Diseases Society of America; European Society for Microbiology and Infectious Diseases. International clinical practice guidelines for the treatment of acute uncomplicated cystitis and pyelonephritis in women: A 2010 update by the Infectious Diseases Society of America and the European Society for Microbiology and Infectious Diseases. Clin Infect Dis. 2011;52:e103-20.

Disclosure:
Authors of this presentation have the following to disclose concerning possible financial or personal relationship with commercial entities that may have a direct or indirect interest in the subject matter of this presenter

Balsam Elajouz, PharmD: Nothing to disclose
Lisa Dumkow, PharmD, BCIDP: Nothing to disclose
Lacy Worden, PharmD: Nothing to disclose
Kali VanLangen, PharmD, BCPS: Nothing to disclose
Andrew Jameson, MD, FACP, FIDSA: Nothing to disclose