Volume 6, Issue 1 April 2021

Case Study

The Value of Intermediate^ or “I^”

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Case 1: A 75-year-old male with diabetes and chronic kidney disease with an estimated glomerular filtration rate (eGFR) of 40 ml/min presented to the clinic with onset of urinary frequency and dysuria over 2 days without any systemic symptoms. A urinalysis showed 4+ glucose, 1+ blood, many white blood cells (WBCs,) and was positive for nitrites and leukocyte esterase. A urine culture was obtained, but given the lack of systemic symptoms and pending culture results, he was not prescribed an antimicrobial agent. The culture grew >10^5 CFU/mL *Escherichia coli* with susceptibility results as shown in Table 1.

Table 1. *Escherichia coli* Results

Antimicrobial Agent	MIC (µg/mL)	Interpretation
Ampicillin	16	R
Cefazolin (urine breakpoint)[a]	16	S
Cefuroxime (oral)	**16**	**I**
Ciprofloxacin	0.5	S
Nitrofurantoin	8	S
Trimethoprim-sulfamethoxazole	>4/76	R

[a] Predicts the activity of the oral agents cefaclor, cefdinir, cefpodoxime, cefprozil, cephalexin, and loracarbef..

Cefuroxime has been shown to be an effective choice for treatment of uncomplicated urinary tract infections (uUTIs) in the elderly population seen at this clinic. Although cefazolin can be tested as a surrogate for oral cephalosporins, cefazolin may overcall resistance to cefuroxime (also for cefdinir and cefpodoxime) for some isolates. Consequently, the antimicrobial stewardship team who works with this clinic requested that the laboratory report both cefazolin and cefuroxime on all urine isolates of *E. coli, K. pneumoniae* and *P. mirabilis.*

For this particular patient, the clinician called the laboratory to ask why there was a discrepancy between the cefuroxime and cefazolin results. The laboratory indicated that the cefuroxime MIC of 16 µg/mL should be considered “I^,” meaning likely susceptible when cefuroxime is prescribed orally for isolates from uUTIs.

An optional comment can be added to the laboratory report, to help explain this discrepancy such as: “Cefuroxime concentrates in the urine. An MIC of ≤16 µg/mL indicates a high probability of clinical efficacy for treatment of uncomplicated urinary tract infections.”

This case reflects a common clinical scenario for managing uUTIs in elderly patients. Where possible, clinicians should avoid unnecessary use of the fluoroquinolones for treatment of uUTIs as the risks of tendon rupture, neurologic abnormalities and other adverse events outweigh the value of using these agents for treating relatively mild infections. These risks are outlined in black box warnings for the fluoroquinolones in the drug label. In addition, because this patient has poor kidney function (indicated by low eGFR), some clinicians would avoid use of nitrofurantoin. The clinician prescribed cefuroxime for 5 days and the patient’s symptoms resolved within 2 days. Other oral cephalosporins (eg, cephalexin) also attain very high concentrations in the urine. Cefuroxime can be given less frequently than some of the other agents, and as such is an attractive choice for this type of case.