Citrobacter amalonaticus - C farmeri C koseri C sedlakii (LTR62800)

Edit Approved By: Solomon, Natalia (06/08/2022) **Revision: 8.00**

Organism	**Citrobacter amalonaticus / C. farmeri / C. koseri / C. sedlakii**
Clinical	These organisms are found in water, soil, food and the gastrointestinal tracts of humans and animals. Common infections include urinary tract infections, bacteremia, and bone and soft tissue infections (often associated with ulcers, burns or trauma). In neonates, *C. koseri* has a predilection for causing CNS infection (meningitis, ventriculitis and/or brain abscesses).
Usual susceptibility pattern	These organisms produce a class A chromosomal penicillinase resulting in intrinsic resistance to ampicillin and cephalothin. Cefazolin and beta-lactamase inhibitor combination drugs remain susceptible. Hyperproduction of this penicillinase results in resistance to cefazolin, beta-lactamase inhibitor combination drugs, ceftriaxone and cefotaxime (ceftazidime may still test susceptible but should be avoided). There are reports of some isolates producing plasmid mediated extended spectrum beta-lactamases.
Susceptibility method	VITEK2 (except *C. sedlakii*). Additional tests (Disc diffusion or Etest method) are performed using Mueller-Hinton agar incubated in ambient air at 35°C for 16-20 hours. **Note**: For Etest use 0.5 McFarland suspension in saline. For mucoid strains use 1.0 McFarland.

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Susceptibility reporting

	CSF/ Brain +	Blood/ Sterile Body Site/ Endovascular Catheter	Urine	Other	Comments
Amikacin		3	3	3	3rd line if gent and tobra I/R Disc diffusion
Amoxicilin/ Clavulanate oral			✓	✓*	***See Special Considerations**
Amoxicilin/ Clavulanate IV		2*		2*	2nd line if ampicillin R, cefazolin I/R and ceftriaxone S *Report if anaerobes, *Enterococcus* or *S. aureus* (MSSA) co-isolated and ceftriaxone S Report same as AMC oral
Ampicillin	R	R	R	R	
Cefazolin		✓	✓*	✓	*Always report if R. If MIC ≤4 offer sens. Refer to Beta-Lactam Resistance Detection Charts.
Cefixime			✓		
Ceftriaxone	✓*	2*	2*	2*	Always report if I/R, 2nd line if cefazolin I/R *For patients <1 months – report cefotaxime instead of ceftriaxone using the same interpretation.
Ciprofloxacin		✓	2*	✓	Do not report in patients < 18 y 2nd line if cefixime and SXT I/R. Always report if I/R ***See Special Considerations**
Doxycycline			2		2nd line if cefixime and cipro I/R For patients ≤17 y report 2nd line if cefixime I/R If patient <8 y **See Special Considerations**
Ertapenem		3	3	3	3rd line if ceftriaxone or ceftazidime I/R If S do not report in patients < 3 months
Gentamicin	*	✓**	✓	✓**	* Report only in neonates (< 1 month) ****See Special Considerations**
Imipenem *		3	3	3	3rd line if ceftriaxone or ceftazidime I/R
Meropenem	✓	3	3	3	3rd line if ceftriaxone or ceftazidime I/R
Nitrofurantoin			✓		Add comment: - For uncomplicated lower UTI only #f1
Piperacillin/ Tazobactam		3* †		3*	3rd line if AMC IV R and ceftriaxone S * Report if *P. aeruginosa* co-isolated and ceftriaxone S † For bloods report if I/R and ceftriaxone S **See Special Considerations**
TMP-SMX	*	✓	✓	✓	* Report only at physician request
Tobramycin		2*	2	2*	2nd line if gent I/R ***See special considerations**

+See note

* Do NOT report Imipenem from the VITEK

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Note Consult microbiologist if organism isolated from CSF – meropenem is drug of choice, often in combination with another antibiotic (quinolone, TMP-SMX).

Special considerations

Amoxicillin/ Clavulanate oral:	A MIC of 8/4 µg/mL is at upper limit of susceptibility. This may be adequate to achieve reasonable pharmacodynamics in urine but may not be optimal for non-urinary sites. For all non-urinary sites if MIC 8/4 µg/mL and interpretation is S add comment: "This isolate tests at the upper limit of susceptibility for amoxicillin/ clavulanate. Clinical failure may occur despite in vitro susceptibility". #A315
Ciprofloxacin:	For urine cultures add the following comment when **not** reporting ciprofloxacin (patients ≥ 18 y): "Ciprofloxacin is not routinely reported, given the potential for significant adverse events and increasing antimicrobial resistance." &3206
Doxycycline:	If reporting doxycycline on <8 years add the following comments: "Doxycycline can now be prescribed for children <8y for short-course (<21 d) therapy; OTHER tetracyclines are still contraindicated for this age group." **(27664)**
Gentamicin/ Tobramycin:	Organisms testing at upper limit of susceptibility (4µg/mL) may not achieve optimal pharmacokinetics/pharmacodynamics. **For non-urine isolates:** If MIC 4.0 µg/mL add comment: "This isolate tests at the upper limit of susceptibility for gentamicin. Clinical failure may occur despite in vitro susceptibility". #A312 **or** "This isolate tests at the upper limit of susceptibility for tobramycin. Clinical failure may occur despite in vitro susceptibility". #A313 **or** "This isolate tests at the upper limit of susceptibility for both gentamicin and tobramycin. Clinical failure may occur despite in vitro susceptibility". #A314
Piperacillin/ tazobactam:	This antibiotic is frequently used as empiric therapy for polymicrobial infections (i.e. co-infections with S. aureus, Enterococcus, Pseudomonas aeruginosa and/or anaerobes), febrile neutropenia or sepsis syndromes. **Note**: Do not report as S if ceftriaxone or ceftazidime I/R (≥2 µg/mL) as piperacillin/ tazobactam is not recommended if either an extended spectrum beta-lactamase (ESBL) and/or a cephalosporinase is present.

Interpretation

For Etest, report actual MIC result. For interpretation (S, I, or R) report according to the nearest higher doubling dilution **(Appendix 1)**.

Use **CLSI** interpretive document for **Enterobacterales.**

For Beta-lactam drugs – Refer to Beta-lactam Resistance Detection Charts. For amoxicillin/clavulanate, gentamicin, and tobramycin – Refer to Special Considerations.