



Know Your Antibiotic: Ceftazidime Coverage Conundrum

Ceftazidime is a broad-spectrum, intravenous, third-generation cephalosporin that works by inhibiting the cell wall synthesis of bacteria. Ceftazidime is approved for multiple indications, and the package insert notes activity against gram-positive and gram-negative organisms, and resistance with anaerobic organisms.¹ While the package insert may endorse ceftazidime for a variety of bacteria, does that mean it's a wonder drug? Or does its spectrum of activity present a clinical coverage conundrum?

Gram-negative spectrum

Consistent with other third-generation cephalosporins, ceftazidime has excellent activity against Enterobacterales (e.g. *E. coli*, *Klebsiella* spp) but is unique due to activity against *Pseudomonas aeruginosa*. In fact, some strains of *P. aeruginosa* maintain susceptibility to ceftazidime despite being resistant to cefepime.² This is why ceftazidime is often utilized for nosocomial infections.¹ However, like all third-generation cephalosporins, ceftazidime can be inactivated by AmpC hydrolysis. Ceftazidime is not recommended for serious infections due to organisms at high risk for inducible AmpC production, even if it tests susceptible.³

Gram-positive spectrum

Ceftazidime has less reliable activity against gram-positive bacteria. In fact, no breakpoints exist for ceftazidime. Table 1 displays ceftazidime MIC₉₀ for common gram-positive bacteria.⁵ Notably, ceftazidime has much higher MICs for many MSSA isolates. Ceftazidime has no activity against MRSA. Additionally, one study assessed antimicrobial activity of nearly 200 clinical *Streptococci* isolates and found ceftazidime to have the least amount of activity - even worse than vancomycin, ceftriaxone, cefepime, penicillin, and erythromycin.⁴

Table 1. Concentrations that Inhibit 90% of Isolates (MIC₉₀)³

	<i>Streptococcus agalactiae</i>	<i>Streptococcus pyogenes</i>	Viridans Group <i>Streptococcus</i>	Methicillin Susceptible <i>Staphylococcus aureus</i> (MSSA)
Ceftazidime	0.5 µg/mL	0.25 µg/mL	2 µg/mL	32 µg/mL

Key Takeaway: Ceftazidime demonstrates excellent activity against gram-negative organisms, but has less activity against many gram-positive bacteria; ceftazidime is especially unreliable against MSSA.

References:

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