

Oral is the New IV*

BOTTOM LINE: Oral antimicrobials are safe and effective in the treatment of most common infections.

BUSTING ANTIMICROBIAL MYTHS

1. Intravenous (IV) is “better” than oral (PO) - **FALSE**
2. Sick patients require IV therapy - **FALSE**

Background:

Historical medical dogma suggests that IV antimicrobials are better – “stronger”, more effective, safer – than oral antimicrobials for treatment of many infections. As a result, IV antimicrobials are often prescribed or prolonged in situations where oral antimicrobials would be appropriate. A growing body of high-quality evidence demonstrates that oral antimicrobials are non-inferior to IV antimicrobials in the settings of complicated urinary tract infections, complicated intra-abdominal infections, bone and joint infections, bacteremia, and endocarditis (Table 1)¹.

Oral antimicrobials also have many benefits, including avoidance of peripheral IV lines and central venous catheters (such as PICCs) and their associated complications, shorter hospital stays, improved quality of life, reduced carbon footprint, and lower costs for patients and the healthcare system²⁻⁷.

Efficacy:

In order to ensure adequate efficacy of oral antimicrobials, patients should meet the following criteria:

- able to take and absorb oral medications
- NO hypotension/shock (i.e. gut circulation NOT impaired).

Oral antimicrobials should also be culture- and susceptibility-directed wherever possible, have high oral bioavailability, and be used at an optimal dosage for site of infection and patient demographics (e.g. age, weight, renal function) (Table 2).

Table 1: Summary of Evidence to Support Oral Therapy by Infection Type (adapted from [Oral Antibiotic RCTs | mysite \(bradspellberg.com\)](#))

Type of Infection	Number of RCTs	Total number of patients	% Success PO vs IV
Complicated urinary tract infection (cUTI)	4 ⁸⁻¹¹	264	89% vs 84%
Complicated intra-abdominal infection (cIAI)	7 ¹²⁻¹⁸	1763	83% vs 81%
Osteomyelitis (OM)	9 ³⁰⁻³⁸	1381	84% vs 83%
Bacteremia**	11 ¹⁹⁻²⁹	850	81% vs 76%
Infective Endocarditis (IE)	3 ³⁹⁻⁴¹	523	77% vs 70%

**Oral therapy not appropriate for management of *Staphylococcus aureus* bacteremia without Infectious Diseases involvement.

The 34 randomized controlled trials (RCTs) in Table 1 demonstrated either no difference in clinical efficacy, or superiority of oral versus IV-only antimicrobial therapy, including for mortality. In no study was IV-only treatment superior in efficacy. The frequency of line-related adverse events and duration of inpatient hospitalization were both greater in IV-only antimicrobial therapy groups.

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Antimicrobial Stewardship Backgrounder

Table 2: Oral antimicrobial options for transition from intravenous

Oral Antimicrobial	Organisms Targeted*	Oral Bioavailability ⁴²⁻⁴⁴ (more available from Bugs & Drugs)	Type of Infection	Oral Adult Dose**
Amoxicillin	Gram positive incl. <i>Streptococcus</i> spp, <i>Enterococcus faecalis</i>	80%	cUTI	500 mg TID
			cIAI	500 mg TID
			OM	1 g TID
			Bacteremia***	1 g TID
Amoxicillin-clavulanate	Gram positive incl. <i>Streptococcus</i> spp, MSSA and <i>Enterococcus faecalis</i> , Gram-negatives, anaerobes	Amoxicillin 80%; clavulanate 30-98%	cUTI	875-125 mg BID
			cIAI	875-125 mg BID
			OM	875-125 mg TID
			Bacteremia***	875-125 mg BID-TID
Cephalexin	<i>Streptococcus</i> spp., MSSA	90%	OM	1 g QID
Ciprofloxacin	Gram negatives, incl. <i>Pseudomonas aeruginosa</i>	70%	cUTI	500-750 mg BID
			cIAI	500-750 mg BID
			OM	750 mg BID
			Gram negative Bacteremia	500-750 mg BID
Doxycycline	MSSA, MRSA, some Gram negatives	95%	OM Bacteremia***	100 mg BID
Fluconazole	<i>Candida</i> spp	90%	cUTI, cIAI, OM, Candidemia, IE†	400 – 800 mg daily
Linezolid	Gram positive, incl. MRSA and VRE	100%	OM, Bacteremia, IE†	600 mg BID
Metronidazole	Anaerobes	100%	IAI	500 mg BID
			OM	500 mg TID
			Bacteremia	500 mg BID
Sulfamethoxazole-trimethoprim	Beta-hemolytic streptococci, MSSA, MRSA, some Gram negatives	85%	cUTI	1 DS BID
			cIAI	1 DS BID
			OM	2 DS BID
			Bacteremia***	1-2 DS BID
	MSSA, MRSA		Staph IE†45	2 DS TID

*General guide - should be confirmed with susceptibility results.

**Dose in non-obese adult patients with normal renal and hepatic function. Antibiotics can be given orally or via feeding tubes.

***ID consultation recommended for consideration of oral therapy for Enterococcal/Staphylococcal bacteremia

† ID consultation recommended for consideration of oral therapy for IE.

Abbreviations: cUTI = complicated urinary tract infection; cIAI = complicated intra-abdominal infection; IE = infective endocarditis; MRSA = methicillin-resistant *S. aureus*; MSSA = methicillin-susceptible *S. aureus*; OM = osteomyelitis; VRE = vancomycin-resistant *Enterococcus* spp

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