

## Clindamycin\*

### Class: Lincosamide

#### Overview

The lincomycin derivative, clindamycin, was introduced in 1966 and features improved absorption and antibacterial activity when compared with its parent compound. About 90% of an oral dose is absorbed and peak plasma levels are achieved much more rapidly than with lincomycin. Clindamycin effectively penetrates tissues and bone, but not CSF. By combining with the 50S ribosomal subunit, clindamycin facilitates opsonization, phagocytosis and intracellular killing of bacteria by interfering with protein chain elongation. Oral clindamycin is usually supplied as clindamycin palmitate and the injectable is supplied as clindamycin phosphate. Clindamycin is largely (80-90%) metabolized in the liver and is excreted in bile and urine. Metabolites may retain activity. Liver disease, therefore, may alter biotransformation of clindamycin. Coadministration of kaolin also reduces absorption of the drug. Due to activity at the same ribosomal site, clindamycin should never be used together with erythromycin or chloramphenicol.

Adverse effects of clindamycin use include erythema multiforme, anaphylaxis, *Clostridium difficile*-associated diarrhea and pseudomembranous colitis, and to a lesser extent hepatotoxicity, thrombocytopenia and reversible neutropenia. The *Clostridium difficile*-associated diarrhea may be due to the prolonged presence of the drug in the gastrointestinal tract due to enterohepatic circulation.

#### Resistance

Resistance to clindamycin is primarily mediated by genes that encode for a ribosomal methylase and the resultant alterations at the ribosomal binding site. Erythromycin resistant organisms that are initially susceptible may rapidly develop resistance to clindamycin due to the macrolide-lincosamide-streptogramin cross-resistance mechanism. Low level resistance to group B *Streptococcus* organisms exists and appears to vary geographically and by chemical make-up of the polysaccharide capsule. This low level of resistance seems to be increasing and has led to changes in guidelines for empirical therapy. In addition, resistance in *Bacteroides fragilis*, an anaerobe, is increasingly recognized.

#### Effectiveness

With the exception of *Clostridium difficile* and *Fusobacterium varium*, Clindamycin is effective against both Gram-positive and Gram-negative anaerobic organisms. Clindamycin is commonly employed in therapy for systemic infections caused by *B fragilis* and is effective against *Peptostreptococcus*, *Prevotella*, *Porphyromonas* and *Fusobacterium* species. The drug is also effective against Gram-positive aerobes excluding enterococci. Clindamycin is particularly effective against

staphylococci and streptococci and reduces toxin formation by *Staphylococcus aureus* and capsule formation by *Streptococcus pyogenes* and *S. pneumoniae*. Gram-negative aerobic organisms and most mycoplasmas, however, are uniformly resistant. Clindamycin is used in therapy for methicillin sensitive *Staphylococcus aureus* and is considered an alternative therapy in non-fulminant infections of community acquired methicillin resistant *S. aureus* (MRSA). Clindamycin is not recommended for fulminant or serious MRSA infections. This antimicrobial is also used in therapy for wounds, skin infections, soft tissue infections, pyodermas, abscesses, osteomyelitis and cervical lymphadenitis caused by oropharyngeal infections. Clindamycin can be used in combination with other antimicrobials. Examples of this combined use are combinations with fluoroquinolones in the treatment of chronic otitis media and infected bites, with trimethoprim-sulfamethoxazole in the treatment of bites, with gentamicin or cephalosporins in therapy of peri-rectal abscesses and with both ampicillin and gentamicin in treating peritonitis associated with bowel perforation or appendicitis.

Topical clindamycin preparations are used in therapy for bacterial vaginosis, acne vulgaris and rosacea.

**\*References available by request. Call the Infectious Disease Epidemiology Section, Office of Public Health, Louisiana Department of Health and Hospitals (504-219-4563)**