THERAPEUTICS SNAPSHOT
PEER REVIEWED

Clindamycin

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Clindamycin is an orally bioavailable antibiotic effective against many infections in dogs and cats.

Clinical Applications

Clindamycin, a lincosamide antibiotic, is labeled for oral treatment of bacterial infections of the skin, soft tissue, periodontal tissue, and bone.

- **Dogs & cats:** Dental and soft tissue infections; skin infections (wounds and abscesses) caused by susceptible organisms
  - —**Dogs:** 5.5–33 mg/kg PO q12h[1]
  - —**Cats:** 11–33 mg/kg PO q24h[1]
- **Dogs only:** Osteomyelitis
  - —11–33 mg/kg PO q12h[1]
    - In one study of canine posttraumatic osteomyelitis, 11 mg/kg q12h appeared more effective than a lower dose of 5.5 mg/kg q12h.[2]
    - In a more recent study, in vitro resistance was documented in 59% of organisms cultured from dogs with osteomyelitis (predominantly posttraumatic and staphylococcal).[3]

Clindamycin is also used for treatment of toxoplasmosis in cats.

- 25 mg/kg PO q24h or divided q12h[4]
  - Except for ocular lesions, which typically require adjunct therapy, clinical signs resolve in most cats.[4]

Inducible resistance to clindamycin may occur in methicillin-resistant staphylococci (even those reported sensitive in vitro) and is mediated by ribosomal modification.[5]

- Cross-resistance can occur between macrolides and lincosamides.
  - —When strains of methicillin-resistant staphylococci are reported resistant to erythromycin, inducible clindamycin resistance (not detectable by standard susceptibility methods) should be suspected.[5,6]
  - —In one study, 47% of MRSA and 74% of MRSP isolates from dogs and cats were reportedly resistant to clindamycin.
    - More testing showed that 58% of isolates initially reported as erythromycin-resistant but clindamycin-sensitive had inducible clindamycin resistance.[6]

Mechanism & Spectrum of Action

As a lincosamide, clindamycin inhibits bacterial protein synthesis by binding to the 50S ribosomal subunit.

- Because they share the same mechanism of action, lincosamides and macrolides (eg, azithromycin) may interfere with each other's antibacterial activity when used together.

Spectrum of action includes gram-positive organisms and anaerobes, as well as *Mycoplasma* spp and some protozoa.

- Susceptible organisms include
  - —Gram-positive aerobes: Streptococci, coagulase-positive staphylococci
  - —Anaerobes: *Clostridium perfringens, C tetani, Bacteroides* spp (eg, *B fragilis*), *Peptococcus* spp, *Peptostreptococcus* spp, *Fusobacterium* spp, *Prevotella* spp, *Actinomyces* spp
    - One study showed that some strains of *Bacteroides* spp (17% of veterinary isolates) and *Clostridium* spp (20%) may be resistant.[7]
  - —Protozoa: *Toxoplasma* spp, *Neospora* spp

Pharmacokinetics

Oral absorption in dogs and cats is rapid.[1]

- FDA-approved veterinary use: PO formulation (ie, tablets, capsules, oral liquid)
- Extralabel use: Anecdotally, injectable formulation marketed for humans has been used in dogs and cats.
  - —Generally used for patients that cannot be medicated orally or when GI disease may limit oral absorption
  - —Parenteral dosing is similar to PO formulation because of high bioavailability by all routes studied.
    - **Dogs:** Bioavailability at least 87% after IM administration[8,9] and 73% after PO administration[10]
  - —Rapid IV injection of undiluted clindamycin has been associated with cardiac arrest and hypotension in humans, so dilution and slow IV administration is advised in animals.

Clindamycin undergoes hepatic metabolism and is excreted primarily in bile (less in urine).[1]

- Half-life after PO administration[1]
  - —**Dogs:** 5 hours
  - —**Cats:** 7.5 hours
- Prolonged half-life may be seen in patients with significant hepatic or renal dysfunction.

Because clindamycin undergoes hepatic metabolism and is primarily excreted in bile, prolonged half-life may be seen in patients with significant hepatic or renal dysfunction.

MRSA = methicillin-resistant *Staphylococcus aureus*, MRSP = methicillin-resistant *Staphylococcus pseudintermedius*

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Clindamycin is well distributed into respiratory tissue, skin, other soft tissue, bone, and joints and can be found in pancreatic and prostatic secretions.

- Although high concentrations are not found in the cerebrospinal fluid of healthy cats, clindamycin does penetrate brain tissue[11] and may more easily cross inflamed meninges.

Adverse Reactions & Cautions

Adverse effects in dogs and cats include vomiting, diarrhea, and inappetence.[1,8,12]

In cats, capsules have been associated with esophageal strictures.[13]

- Avoid dry-pilling[13]

Because clindamycin has neuromuscular-blocking properties, use with caution in the presence of anesthetics or other neuromuscular-blocking agents.[1]

Administer with caution in patients with very severe renal disease and/or hepatic disease accompanied by severe metabolic aberrations.[1]

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MRSA = methicillin-resistant *Staphylococcus aureus*,
MRSP = methicillin-resistant *Staphylococcus pseudintermedius*

MORE on page 33 ▶

THERAPEUTICS SNAPSHOT

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◀ MORE from page 4

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◀ MORE from page 7

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◀ MORE from page 16

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