THERAPEUTICS SNAPSHOT
PEER REVIEWED

Minocycline

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Minocycline, a tetracycline antimicrobial agent, has good tissue penetration and broad-spectrum activity against a variety of infections in dogs and cats.

Clinical Applications

Like other tetracyclines, minocycline is a broad-spectrum antimicrobial agent with activity against gram-positive and gram-negative bacteria, rickettsial organisms, and some protozoa.[1]

- In dogs and cats, susceptible bacteria include *Bordetella* spp, *Listeria monocytogenes,* and *Pasteurella* spp; other susceptible organisms include *Giardia lamblia* and *Toxoplasma gondii.*

Minocycline also has activity against most *Mycoplasma* spp, *Chlamydia* spp, *Chlamydophila* spp, *Leptospira* spp, *Brucella* spp, *Bartonella* spp, *Mycobacterium* spp, and methicillin-resistant *Staphylococcus pseudintermedius* (MRSP) in both dogs and cats.[2,3]

Tetracycline or doxycycline resistance as reported on culture and susceptibility testing may not be accurate for nor applicable to minocycline.[3,4]

- Minocycline is not affected by the common tetracycline resistance genes tetK and tetL.[3]
- Consider requesting specific testing at the diagnostic laboratory to confirm minocycline susceptibility.
- The Clinical and Laboratory Standards Institute (CLSI) guidelines for canine MRSP are <0.125 µg/mL, <0.25 µg/mL, and >0.5 µg/mL for susceptible, intermediate, and resistant organisms, respectively.[3]

Pharmacokinetics & Pharmacodynamics

Minocycline is highly lipophilic and has good tissue penetration into cerebrospinal fluid (CSF), aqueous fluid, synovial fluid, and the prostate, even in the absence of inflammation.[1]

Minocycline is bacteriostatic and inhibits bacterial protein synthesis through its interaction on the 30S ribosomal subunit.[1]

- Efficacy is maximized in cases of actively growing pathogens with high metabolic demands.
- The mechanism of action may therefore be antagonized with bactericidal drug classes, such as β-lactam and aminoglycoside antimicrobial agents.

Protocol

The suggested dosage for dogs is 5 mg/kg PO every 12 hours for pathogens with a minimum inhibitory concentration (MIC) of ≤0.25 µg/mL based on pharmacokinetic and pharmacodynamic (PK/PD) studies in healthy animals.[2,3]

- A dose of 10 mg/kg PO every 12 hours is recommended for MRSP strains with a MIC value of ≤0.5 µg/mL.[3] Of note, duration of treatment is highly variable and depends on infection location as well as pathogen load.

The suggested dosage for cats is 8.7 mg/kg PO every 24 hours or 4.3 mg/kg PO every 12 hours for pathogens with a MIC of ≤0.5 µg/mL based on PK/PD studies in healthy animals.[5]

Precautions

Concurrent administration of sucralfate can impair minocycline absorption.[2]

- If sucralfate or other aluminum-containing drugs are indicated, administer minocycline at least 2 hours *before* administration of sucralfate and other chelating agents.[2]

After oral administration, the most commonly reported adverse effect is vomiting consistent with gastric irritation.[3,5]

- This may be mitigated by administering the oral dose with a small amount of food. However, avoid foods with cations (eg, calcium), as they can chelate and reduce absorption.[6]
- Esophageal strictures have not been reported with use in cats.[5,6]

Administer minocycline slowly when using IV route in dogs and cats.[3,5]

- Although the most common and useful route of administration is PO, the IV route is sometimes used under very specific circumstances.

Minocycline is highly lipophilic and has good tissue penetration into CSF, aqueous fluid, synovial fluid, and the prostate, even in the absence of inflammation.[1]

CLSI = Clinical and Laboratory Standards Institute, CSF = cerebrospinal fluid, MIC = minimum inhibitory concentration, MRSP = methicillin-resistant *Staphylococccus pseudintermedius*, PK/PD = pharmacokinetic and pharmacodynamic

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- In dogs, rapid IV administration has been associated with severe hypotension.[3]
- In cats, IV administration has been associated with transient tachycardia that resolved once drug administration was concluded.[5]

Although no specific cases have been reported, use in pregnant, nursing, or young animals may result in dental lesions consistent with other drugs of this mechanistic class.

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Rapid IV administration has been associated with severe hypotension in dogs[3]; in cats, IV administration has been linked to transient tachycardia.[5]

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