DOXYCYCLINE

Drug Class: Tetracycline

Spectrum: Doxycycline has a broad spectrum of activity, including activity against pathogens such as *Borrelia, Rickettsia, Chlamydia, Leptospira, Actinomyces* and *Mycoplasma*. Activity against bacteria such as beta-hemolytic streptococci enterococci is variable. There is little or no activity against *Pseudomonas* and activity against enteric Gram negatives such as *E. coli* is limited.

Resistance: Acquired resistance is relatively common in many bacterial species.

Mechanism of Action: Activity is via inhibition of the bacterial 30S ribosomal subunit. Doxycycline is typically bacteriostatic but may be bactericidal at high doses. It exhibits a combination of time and concentration dependent activity, with the AUC:MIC ratio being most important. Therefore, high and infrequent dosing may be optimal.

Distribution: There is good distribution throughout the body, including synovial fluid, bile, the eye and bronchial fluids. CSF penetration is moderate and unlikely to be effective for most pathogens in the presence of an intact blood-brain-barrier.

Route of Elimination: Doxycycline is mainly excreted into feces via the intestinal tract. There is reasonable renal excretion, and doxycycline can therefore be useful for cystitis.

Adverse Effects: The main concern is esophagitis and subsequent esophageal stricture in cats, which can occur if doxycycline tablets remain in the esophagus after administration (see Additional Information below). Other adverse effects tend to be uncommon, predominantly gastrointestinal disease.
Rapid IV administration can lead to transient collapse and cardiac arrhythmias, so IV doses should be administered slowly.

Contraindications: Tooth and bone staining may occur in growing animals, but this is of limited clinical consequence and is less of a concern as compared with tetracycline. Use in pregnancy, particularly latter stages, may be a concern because of the potential to affect fetal bone development.

Common uses: Doxycycline has various potential uses. It is a first line drug for the treatment of leptospirosis, various tick borne diseases and bacterial upper respiratory tract infections.

Dosing:

- ***T5 mg/kg PO/IV q12h or 10 mg/kg PO/IV q24j***

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Veterinary Drug Director Category: III (Medium importance).

Approved veterinary products in Canada:

- In cats, care should be taken to ensure doxycycline tablets pass into the stomach. This may include lubricating the tablet prior to administration and following tablets with sufficient water.
- Doxycycline breakpoints for isolates from animals are different than those from humans and have recently changed. It is important to ensure that diagnostic laboratories are using proper breakpoints; otherwise, isolates may be erroneously reported as susceptible.
- Tetracycline susceptibility indicates doxycycline susceptibility. However, some tetracycline resistant isolates are doxycycline susceptible.
- There may also be anti-inflammatory properties, through inhibition of matrix metalloproteinases. However, the clinical relevance of this is unclear and doxycycline should not be used solely for anti-inflammatory purposes.