

INTRODUCTION TO COMMON ORAL MEDICATIONS

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Anti-infectives: Antibiotics, Antifungals, Antivirals

ANTIBIOTICS: How do they work? Common ones? Warning labels? Client Education?

We use these all the time so I went into a little more depth. There are about 7 main “classes” of antibiotics. They work to either kill or stop the spread of bacteria. As use of antibiotics has progressed, through natural mutation, some strains of bacteria have become resistant to an antibiotic, leading to the constant development of new antibiotic medications and antibacterial-resistant bacteria. Often within a couple of days of administration of oral antibacterials, clinical signs observed in a patient will be much improved because most of the targeted bacteria have been killed. Some bacteria are harder to kill though and stopping the administration of a course of antibiotics early is how these hardier bacteria take hold and thrive. Therefore client education is important to inform them to administer the entire course of the prescribed medication. Sometimes an infection is more difficult to clear, then we will recommend CULTURING a sample of the infected tissue with a reference lab to see what antibiotics it is resistant to and thus treat most effectively.

Bacterial strains are described in microbiology as being gram positive or gram negative depending on how they stain, as well as aerobic or anaerobic in response to whether or not they need oxygen to live.. Therefore antibacterials are described as being effective against “gram +” or “gram -”, or “broad spectrum” in their targeting. Antibiotics are further classified as being time or concentration dependant, which describes whether the effectiveness of an antibiotic is based on the time it is in the bloodstream at an inhibitory concentration or on the concentration of the drug in the bloodstream to cause inhibitory effects. The pharmacodynamics of antibiotics are to either rupture the cell membrane of the bacterium causing death, impeding bacterial cell division (reproduction), stopping growth and causing death, inhibit or interfere w/ bacterial DNA, causing death.

The most commonly seen “classes” of antibiotics are:

Penicillins: penicillin, ampicillin, amoxicillin, clavamox

Cephalosporins: cephalexin, cefazolin, cefoxitin, cefpodoxime, cefiotor

Tetracyclines: doxycycline, tetracycline

Aminoglycosides: amikacin, gentamycin

Fluoroquinolones: ciprofloxacin, enrofloxacin, marbofloxacin

Macrolides /Lincosamides: clindamycin

Sulfonamides: Sulfa drugs, albon

Nitrofurans

*****Metronidazole***** doesn't really fit in a class. Effective anti-biotic, anti-diarrheal, anti-protozoic, anti-parasitic

Client education: Give with food, Give until gone.

My best encouragement is to familiarize yourself with the antibiotics we use the most. Many of the re-constituted powders for oral use will settle out in suspension and need to be shaken before administration as well as kept in the refrigerator.

Anti-fungal : effective against fungal infections. Can have strong GI side effects and cause liver compromise

Ketoconazole, miconazole, itraconazole, fluconazole
(often a component of topical ear / skin meds)

ANTI-NAUSEA MEDS:

Maropitant: Cerenia. Works on the vomiting center chemoreceptor trigger zone in the brain to tell the brain not to vomit. Need to make sure P is not a FB prior to administration.

Metoclopramide: Reglan: enhances GI motility to speed up GI tract and reducing vomiting by having stomach empty faster. Also need to make sure not a FB

Ondansetron (Zofran): anti-nausea, often w/ chemo patients

GI PROTECTANTS:

Famotidine: H2 receptor antagonist, blocks the release of hydrochloric acid into stomach, making stomach less acidic and reducing vomiting

Omeprazole: proton pump inhibitor, binds the enzyme that releases hydrogen ions into stomach, reducing acidity of stomach and vomiting

Pantoprazole (Protonix): injectable proton pump inhibitor

Sucralfate (Carafate): gastromucosal protectant administered as a slurry on an empty stomach coats and protects GI mucosa

NSAIDS: Non- Steroidal Anti-inflammatories: Inhibit the release of the enzyme cyclo-oxygenase (COX). (There is actually COX I and II.) When there is damage from trauma or toxins at a cellular level, COX release triggers a cascade at the cell membrane that leads to inflammation. Inhibit COX = prevent/reduce inflammation. But COX also stimulates the production of gastric mucosal lining so in GI compromised patients NSAIDS must be used w/ care and are often contra-indicated.. Steroids ALSO affect how the cell membrane responds to trauma/toxins which is why they CANNOT BE USED TOGETHER. Steroids act higher on the cell membrane cascade than COX does so are more potent against inflammation but provide no analgesia. NSAIDS are also anti-pyretics.

Carprofen: Levafen, Rimadyl

Onsior (robinoxib)

Galliprant (grapiprant): more kidney sparing w/ chronic use than carprofen

Client Education: Do not administer w/ steroids, other NSAIDS, aspirin (an NSAID). Do not administer if vomiting / diarrhea / inappetance develops. **Why?**

CARDIAC / RENAL

DIURETICS: used in cardiac patients to reduce pre-load and effects of CHF, reduce plasma volume

Furosemide: Lasix: reduces re-absorption of sodium and other electrolytes in the kidney tubules. Water follows salt, so reduce re-absorption of sodium into bloodstream = more sodium and more water are excreted as urine.

Client Education: P will need to urinate more frequently and must have water available to drink

ACE INHIBITORS: block the conversion of the enzyme angiotensin I to angiotensin II, which decreases aldosterone secretion. (Aldosterone causes sodium and water retention.), reducing peripheral arterial resistance and alleviating vasoconstriction. Used in renal and cardiac patients

Enalapril: used to treat hypertension by causing vasodilation

Benazapril: same but easier to dose in cats

POSITIVE INOTROPES: improve cardiac contractility, increase cardiac output

Pimobendan

ANTI- CONVULSANTS: prevent or control seizures

Phenobarbital: oral or injectable, controlled

Leviteracitem (Keppra): often used in combination w/ pheno

Potassium Bromide: often used in combination w/ pheno

Client Education: May cause drowsiness. Phenobarbital will need to have bloodwork periodically to ensure is at a therapeutic level. These are generally a medication P will be on for life.

ANTI-PARASITICS:

Strongid: Pyantel: safe for puppies and kittenx, affective against roundworms and hookworms only. Needs to be re-dosed in 14 days.

Fenbendazole: Panacur: available as granules or liquid. 5 day course. Affective against roundworms, hookworms, whipworms, giardia, some tapeworms (not the common ones). Needs to be re-dosed in 14 days.

Praziquantel: Drontal: affective against all intestinal parasites and tapeworms, a little more expensive

Albon: a sulfa drug: affective against the protzoa coccidia

Profender: a topical. Protects against intestinal parasites, tapeworm in cats, monthly

Metronidazole: Flagyl: affective against giardia, some tapeworms (not the common ones)

****Interceptor, Sentinel are monthly heartworm preventatives that also prevent against intestinal parasites. We don't have to deal a lot w/ intestinal parasites here in Alaska beyond puppies and kittens or pets in a state of compromise. We need to be prepared to educate clients about heartworm disease/prevention, intestinal parasites, fleas/ticks if they are travelling outside Alaska with their pets. There are a LOT of monthly preventatives available as orals or topicals that protect against intestinal parasites/heartworm/fleas/ticks. There is not ONE product that gets everything so it is usually a combination of something for intestinal parasites/heartworm + something else for fleas and ticks. ****

I'd recommend learn the products that we have and be ready to offer clients the basics on what they will need to protect their pets against in the areas they are visiting/

STEROIDS: Reduce inflammation at the level of the cell membrane but strong side effects. CANNOT BE USED W/ NSAIDS. No analgesia. No anti-pyretic. Immuno-suppressant. Because the body reduces the production of its own steroids while a patient is receiving steroid therapy they can't be stopped cold turkey but must be tapered

Prednisone

Prednisolone

Dexamethasone SP (injectable)

Dexamethasone (injectable)

Temeril P: contains both anti-histamine and steroid, effective against itching/cough

Client Education: May cause increased thirst, urination, appetite. Cannot be abruptly discontinued. Cannot be administered in combination w/ NSAIDS

ENDOCRINE (thyroid): The endocrine system is largely the body's thermostat, trying to regulate production of hormones that regulate homeostasis

Methimazole: suppresses thyroid production in hyperthyroid cats

Levothyroxin: stimulates thyroid production in hypothyroid dogs

Vetoryl (trilostane): suppresses cortisol production in hyperadrenocorticism (Cushings)

Percortan: Replaces cortisol in hypoadrenocorticism (Addison's)

Client Education: These are usually a drug the pet is on for life. BW will be monitored periodically to ensure at a therapeutic level

ANALGESICS: analgesia = pain control

Many of our hospitalized patients will receive injectable analgesia. We will try to use a multi-modal approach to pain control to maximize effect while minimizing amount of any one drug. As a patient goes home, they need to be doing well enough for the owner to be able to administer oral medications at home successfully. (Injectable opioids: hydromorphone, fentanyl, butorphanol, buprenorphine, methadone. All controlled and generally not scripted out to go home.)

Fentanyl Patch: **the exception** transdermal. Releases fentanyl transdermally for 48-72 hours. Takes 12-24 hours to become start working. Client education: do not allow children or other pets to eat, play with, or handle patch. Dispose of properly. May not be appropriate for some owners if substance abuse is a concern.

Tramadol: synthetic opioid available as oral tablet or mini melt for dogs. Controlled. We won't script out large volumes with lots of refills due to potential for substance abuse by owners. Not effective against CHRONIC pain but good for ACUTE pain

Gabapentin: Calcium channel inhibitor between nerve synapses in pain pathway. Blocks pain by interrupting nerve transmission. Not controlled. Not adequate for severe pain. tablet, liquid, or min-melt oral analgesia in dogs or cats.

Buprenorphine 0.3 mg/mL oral liquid: transmucosal analgesic, very effective pain control in cats. Controlled and not a schedule 2 so easier to Rx out (schedule 3)

NSAIDS: see above. Achieve pain control by reducing inflammation

Amantadine: similar to ketamine but not controlled. Adjunctive analgesia in combination w/ something stronger

CBD products: Not a lot of research to support but available

Chinese Herbs: Under Dr. Wilson

Acupuncture: Dr. Wilson or Dr. Alce

Laser Therapy: Stimulate cellular activity

SKIN:

Apoquel: inhibits cytokines on a cellular level to stop the sensation of itch. Very effective for allergy pets that have been chronically itchy. Prior to Apoquel being available many of these dogs were on steroids for life.

Cytopoint: injection very similar to apoquel for chronically itchy pets / allergy dogs

ANTIHISTAMINE;

Diphenhydramine: blocks the release of histamine in response to the introduction of a foreign antigen. Available orally as benadryl or as an injectable. Injectable is faster than oral as far as being effective against histamine release so recommended when a patient is experiencing inflammation in an allergic reaction. Pets with Mast Cell Tumors may be on benadryl. Often administered with a blood transfusion.

Temeril P see above

Loratidine, Ceterizine

SEDATIVES::

We try to use a multi-modal approach to analgesia. Some pets are anxious or fractious during a DVM visit. Sometimes our DVMs can prescribe an oral sedative to provide a little pre-emptive calming prior to a stressful event such as a toe nail trim. Sometimes pets may benefit from a little sedation at home going home from a surgical procedure to help them be more willing to rest as directed and minimize tension / movement on their surgical site. Other pets can benefit from sedation for stressful events like thunderstorms or fireworks.

Alprazolam: (Zanax): CONTROLLED. benzodiazapine, short term management of anxiety.

Trazodone: a serotonin antagonist and re-uptake inhibitor. anti-anxiety, safe, broad dosing range. Not controlled.

Acepromazine: tranquilizing drug, NO ANALGESIA, P is aware but unable to move or respond. Can have a long duration of effect, not reversible. Very cost effective. Profound hypotension possible in seniors. Not reversible.

Gabapentin: See above. Can have a sedative effect

Sileo Gei: a dexmetetomidine derivative, oral mucasol gel for noise aversion

QUESTIONS??

Resources:

Plumbs Veterinary Drug Handbook: Available as hard copy or online. Look up any veterinary drug you aren't familiar with.

Applied Pharmacology for Veterinary Technician's 4th Edition, Wanamaker.. In our tech library. Learn about physiology of body systems and how drugs affect them.

Pharmacology is beyond what any of us can address in 1 hr, so spend time on your own becoming familiar and confident in the drugs we send home all the time. Look up something you've never seen before. Double check always! Pharmacology is about 15% of VTNE.