

PAIN MANAGEMENT in the CANINE PATIENT

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PART 3

Basic Pain Pharmacology for the Rehab Practitioner

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Basic Pain Pharmacology

- Tip of the hat... Nod of the head...
 - NOT within the context of this course:
 - Local Anesthesia (nerve blocks)
 - Epidural Analgesia
 - (Immediate peri-operative pain management)



Basic Pain Pharmacology

- Opioids
- NSAIDS
- Corticosteroids
- Tylenol
- Tramadol
- Amantadine
- Gabapentin
- Muscle Relaxants



Basic Pain Pharmacology

- **OPIOIDS**

- Work primarily at pre- and post-synaptic receptors present in the PNS & CNS
- Activation of opioid receptors (exogenous or endogenous) inhibits the presynaptic release of excitatory neurotransmitters from the nerve terminals in the dorsal horn of the SpC.
- *Essentially they inhibit the processing of pain at the periphery, the spinal cord, & the brain.*

OPIOIDS

Basic Pain Pharmacology

- **OPIOIDS – Types:**

- **Morphine:**

- Low cost. For moderate – severe pain
- Can cause histamine release (IV given)
- May be less effective in cats
- Duration 3 – 5 hours



- **Hydromorphone / Oxymorphone:**

- For moderate to severe pain
- Usually IV given
- Less side effects / some sedation
- Okay in cats
- Duration 2 – 4 hours



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Basic Pain Pharmacology

- **OPIOIDS – Types:**

- **Fentanyl IV or IM:**

- For moderate to severe pain
- 100 x more potent than Morphine
- Short duration if IV or IM injected (30 – 60 min)

- **Fentanyl Patch**

- Onset ranges from 12 – 24 hours
- For mild to moderate pain
- Duration 3 days (3 – 5 days in cats)



Basic Pain Pharmacology

- **OPIOIDS – Types:**

- **Butorphanol**

- For mild to moderate pain
- 45 – 60 mins of analgesia + hours of sedation
- Reduced side effects

- **Buprenorphine**

- For mild to moderate pain
- 2 - 40 mins onset / 6 – 12 hrs analgesia
- Can be given orally to cats
- Not easily reversed

- **Methadone**

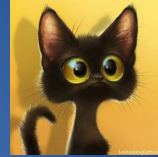
- Moderate to severe pain
- Duration 4 – 6 hrs



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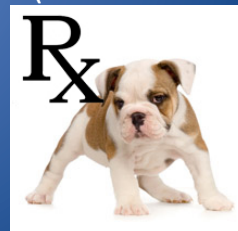
Basic Pain Pharmacology

- **OPIOIDS – side effects**
 - Sedation
 - Can reduce heart rate & in cats can increase body temperature
 - Some may cause vomiting
 - (beware of increased intra-ocular, intra-abdominal, or esophageal pressure)
 - Dysphoria (particularly in cats) in some animals



Basic Pain Pharmacology

- **NSAIDS (non-steroidal anti-inflammatory drugs)**
 - Analgesic
 - Anti-inflammatory
 - Modulating pain at the peripheral receptor level (see next slide) and at the spinal cord level (mechanism unknown)



Basic Pain Pharmacology

- **NSAIDS (non-steroidal anti-inflammatory drugs)**
 - Work by blocking prostaglandin synthesis
 - Via inhibiting of cyclooxygenase (COX) enzymes
 - Thereby reducing production of inflammatory mediators.
 - You have COX-1 & COX-2 inhibitors
 - As a general rule, one is looking primarily for COX-2 - specific-inhibitor-NSAIDS
 - Since COX-1 is needed for making prostaglandins used in normal GI, renal & platelet functions

Basic Pain Pharmacology

- **NSAIDS (non-steroidal anti-inflammatory drugs)**
 - Lots to choose from!
 - **Carpophen:** 4.4 mg/kg qd Dogs / 1 – 2 mg/kg qd Cats
 - Lasts 12 – 24 hrs
 - **Aspirin:** 10 – 25 mg/kg Dogs / 10 – 15 mg/kg Cats
 - Lasts 8 – 12 hrs (dogs) / 24 – 72 hrs (cats)
 - **Meloxicam:** 0.2 mg/kg initially, 0.1 mg/kg thereafter Dogs & 0.1 mg/kg initially, 0.025 mg / kg thereafter Cats
 - Lasts 24 hrs
 - **Ketoprofen:** 2.0 mg/kg initially, 1.0 mg/kg thereafter Dogs & 1.0 mg/kg initially, 0.5 mg/kg thereafter Cats
 - Last 24 hrs
 - **Dericoxib:** 3.0 – 4.0 mg/kg x 7 days post op & 1 – 2 mg/kg for chronic pain Dogs only
 - Lasts 24 hrs

Basic Pain Pharmacology

- NSAIDS (non-steroidal anti-inflammatory drugs)

- Lots to choose from... OTHERS

- Etodolac
- Tepoxalin
- Tolfenamic acid
- Firocoxib



- If one NSAID is not working, try another (with a washout period in between)

- Can combine with Tylenol (Acetaminophen)

- – (see future slide)

- Can combine other other adjunctive pain meds...

Basic Pain Pharmacology

- NSAIDS – *Side Effects & Contraindications*

- Smart to have base-line blood work done before prescription & once or twice a year follow-up

- Some NSAIDS (i.e. aspirin) may reduce clotting times

- Careful use if animal has a history of GI bleed or renal disease

- May react with other drugs

- Do not use with Steroid... need a washout to switch between (up to 14 days)

Basic Pain Pharmacology

- **CORTICOSTEROIDS**

- Used for acute pain (e.g spinal cord compression)
- Or chronic pain (spinal cord... or ? Intra-articular injection)
- Oral or injectable
- i.e. Prednisone, Prednisolone, Hydrocortisone, Dexamethasone, Betamethasone...



Basic Pain Pharmacology

- **CORTICOSTEROIDS – Peculiarities...**

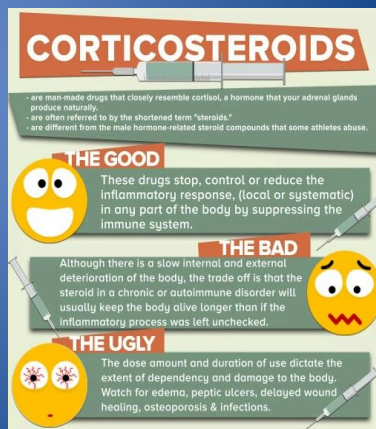
- Not first line of Rx
 - (except in cases of Spinal Cord Injury)
- Can be used if all else fails
- Controversial as a joint injection for OA (but could work)



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Basic Pain Pharmacology

- **CORTICOSTEROIDS – Peculiarities...**
 - Ligament or Tendon damage if chronic use
 - Weight gain
 - GI ulceration
 - Diabetes in cats
 - Great thirst = greater peeing
 - Increased appetite



Basic Pain Pharmacology

- **ADJUNCTIVE ANALGESIC AGENTS**
 - **TYLENOL**
 - Acetaminophen / Paracetamol
 - NOT an NSAID
 - Can be used for chronic pain, breakthrough pain, or for those that can't take NSAIDS
 - *Can be used during a Medication 'wash out period'*



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Basic Pain Pharmacology

• ADJUNCTIVE ANALGESIC AGENTS

– TYLENOL

- 10 – 15 mg/kg BID or TID use 3 – 5 days, break for 2 – 3 days
- *Last 8 – 12 hrs*
- *Monitor hepatic function*
- & *NEVER EVER in CATS*



Basic Pain Pharmacology

• ADJUNCTIVE ANALGESIC AGENTS

– TRAMADOL

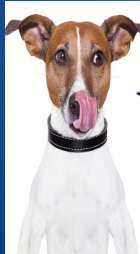


- Serotonin & norepinephrine reuptake inhibitor
- For Moderate to severe chronic pain
- Loses efficacy when used long term
- May be less effective when used alone
- 2 – 10 mg/kg Dogs (Cats unknown or 3 -5 mg/kg)
- Lasts 12 – 24 hrs
- Don't combine with antidepressants (i.e. Amitriptyline)
- Side effects: as per opioids

Basic Pain Pharmacology

- **ADJUNCTIVE ANALGESIC AGENTS**

- AMANTADINE

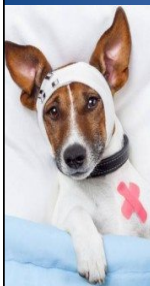


- Originally an antiviral drug.
- May work in dogs with OA pain when added to NSAID
- For mild to moderate chronic pain
- Dosage 3 – 5 mg/kg once a day (Dogs or Cats)
- Lasts 24 hrs
- (Try for 3 – 4 weeks, then d/c & reassess... could put on-board for a second course). Could be used chronically

Basic Pain Pharmacology

- **ADJUNCTIVE ANALGESIC AGENTS**

- GABAPENTIN - (*Neurontin*)



- Originally an anticonvulsant
- Seems to decrease neurotransmitter release and transmission of pain signals
- Used for neuropathic pain
- Also cancer, spinal cord, or OA pain
- (Evidence in both acute & chronic pain situations)

Basic Pain Pharmacology

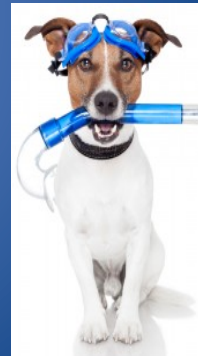
- **ADJUNCTIVE ANALGESIC AGENTS**

- GABAPENTIN - (*Neurontin*)

- Dosage (5 – 20+ mg/kg) TID – QID dogs & cats
- Lasts 12 – 24 hrs

- Side Effects:

- Ataxia & drowsiness
- If using in Geriatric patients and they start 'slowing down', then try reducing the dose.
- Avoid if decreased renal function



Basic Pain Pharmacology

- **ADJUNCTIVE ANALGESIC AGENTS**

- AMITRIPTYLINE (tricyclic antidepressant)

- For Chronic, neuropathic pain
- Modulates brain opioid system via serotonergic and noradrenergic neuromodulation
- 1 – 2 mg / kg SID – BID Dogs & 0.5 – 2.0 mg / kg Cats once a day
- Lasts 12 – 24 hrs

- Side effects

- Drowsiness, disorientation, agitation
- Don't use with Tramadol



Basic Pain Pharmacology

- **ADJUNCTIVE ANALGESIC AGENTS**

- MUSCLE RELAXANTS

- **METHOCARBAMOL** (*Robaxin*)

- NOT Robacivet, Robaxicol, etc

- 15-20 mg/kg TID

- May help with sleep... could be used as a 'night time' drug.



Basic Pain Pharmacology

- Sometimes, it's just good for the 'non-vet' rehab practitioner to **KNOW** these things, or to talk to the rDVM about them!
- Often times, clients ask question. It's good to know some simple answers.
- Sometimes you have to advocate for an adjunctive medication.
- Sometimes you have to stop clients from doing something stupid!

Basic Pain Pharmacology

- **References:**

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