

Multi-modal Analgesia. We Have Other Friends Besides Opioids..

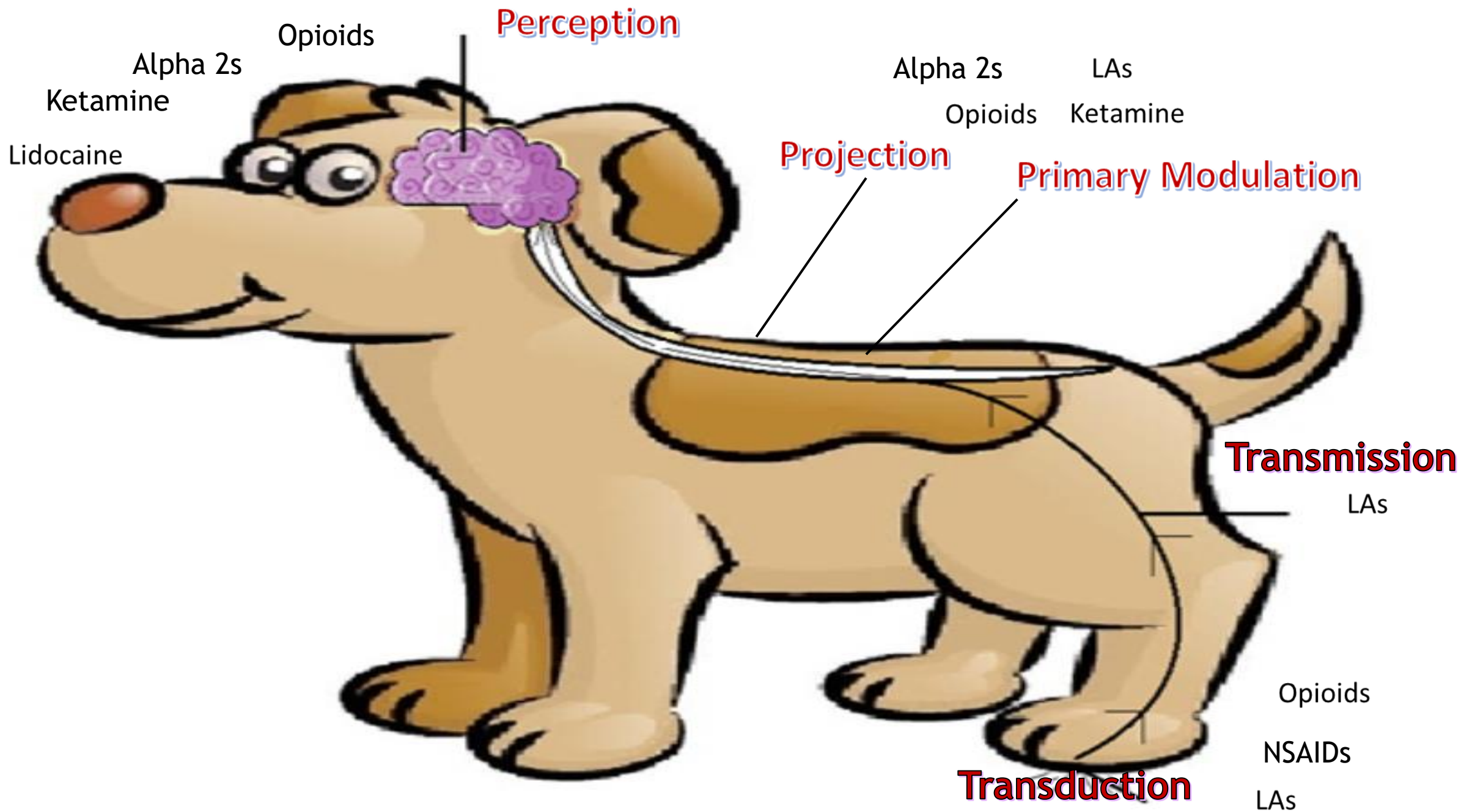
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Who am I??

- Graduated from Iowa State University College of Veterinary Medicine in 1992
- General practice for 13 years (variety of stuff)
- Internship and residency at Iowa State University College of Veterinary Medicine 2005 – 2009
- Mississippi State University College of Veterinary Medicine as Service Chief of Anesthesiology from 2009 – 2016.
- Michigan State University College of Veterinary Medicine Staff Supervisor and Service Chief 2016 – 2022
- Currently Associate Professor Anesthesiology at Oregon State University College of Veterinary Medicine

Goals of this discussion

- Review standard drugs used for multi-modal analgesia during the pre- and peri-operative period for dogs and cats
- Review CRI options of intra-operative analgesia
- Post-op can be a confusing time to consider analgesia options. We will review some options for..
 - Immediate post-op
 - Longer term post-op
- Review and discuss some options for chronic pain
 - Non-pharmaceutical options
- PSA (Procedural Sedation and Analgesia)
- Disclaimer time!!



Preemptive

Pain score

Preemptive analgesia

Opioids

NSAIDs

Etc.

Local-regional anesthesia

Intra-op

Intermittent injections

Opioids

Constant rate infusions

FLK

HLK

MLK

DLK

LK

Continued locoregionals

Post-op

Immediate

Post op analgesia

Patient welfare

First two weeks

Long-term care

Patient no longer needs analgesia

Rehabilitation

AP

LLL

Etc...

Preventive analgesia

Multimodal analgesia

Pre-operative

- Pain scoring
 - Glasgow Composite Pain Scale (Canine)
 - Glasgow Composite Pain Scale (Feline) - Feline Grimace Scale
 - Colorado versions
 - Should be done pre-operative and post-operative
- Some of the options will be discussed again later with co-morbidities
- Typically, sedation protocols
 - Neuroleptanalgesia: opioid + sedative (tranquilizer)
 - Plus others stuff

Pre-operative

- Sedative options
 - Acepromazine
 - Alpha 2 agonists
 - Benzodiazepines
 - Ketamine
- Sedative/other options
 - Ketamine
 - Alfaxalone
 - Lidocaine
- Misc.
 - Maropitant
 - Others
- Opioids
 - Morphine
 - Hydromorphone
 - Buprenorphine
 - Methadone
 - Butorphanol
- NSAIDs

Sedatives

- Acepromazine
 - Phenothiazine
 - Long-acting heavy sedation
 - Tried and true
 - Anti-emetic
 - Use early morning
 - Dose dependent vasodilation
 - Organs of blood capacitance.
 - No reversal
 - No analgesic properties
- Benzodiazepines
 - Midazolam and diazepam (and zolazepam)
 - Very versatile mild sedation
 - Muscle relaxation
 - Paradoxical excitation
 - I prefer NOT as premed
 - Use with dissociate NMDA ant.
 - Use with other drugs up front
 - Cardiac happy

Sedatives

- Alpha 2 agonists
 - Dexmedetomidine
 - Profound sedation
 - Analgesia
 - Muscle relaxation
 - Reversible
 - Can be used as CRI
 - Zenalpha[®]
 - Medetomidine + Vatinoxan
- Has anyone noticed with very excited/other patients Dexmed doesn't seem to work?
- Alfaxalone
 - IV induction agent
 - IM can be used as sedative
 - 0.5 - 2 mg/kg
 - Combine with midazolam and opioid up front
 - Cardiac patients
 - Sick patients (liver patients)
 - PSA (IV = anesthesia) **Come On People!!**
- Ketamine
 - Analgesia, premed, anesthetic
 - Combined with benzo
 - Very versatile!!

Opioids

- The issues...
 - ...what is available
 - ...controlled drugs/diversion
 - ...effects on patients
- Mu agonists
 - Morphine
 - Hydromorphone
 - Ok for cats?
 - Methadone
 - NMDA antagonist
 - \$\$
 - Fentanyl/remifentanyl
 - 2.5 - 5 mcg/kg IV, IM
 - Meperidine
- Partial mu agonist
 - Buprenorphine
 - Very versatile
 - Dogs vs. cats vs. other
 - Buprenex®
 - Simbadol®
 - Zorbium®
- Kappa agonist/mu antagonist
 - Butorphanol
 - How long does this last?
 - Good or not-so-good analgesic?
 - CRI 0.1 - 0.3 mg/kg/hr
 - Nalbuphine (Nubain)

Opioid Free Analgesia

Misc. Pre-operative

- Pre-pre-operative
 - Gabapentin
 - Trazadone
 - Maropitant
 - Others (Cisapride)
- Anti-emetic/anti-nausea
 - Maropitant
 - JMO: SQ maropitant vs. vomiting
 - Ondansetron
- NSAIDs
 - Is it safe to start administer pre-operatively?
 - Robenacoxib
 - Carprofen
 - Ketoprofen
 - Meloxicam
 - Etc.
- Lidocaine
 - IV analgesic

Couple examples: combinations

- Normal, healthy ortho dog
 - Hydro + Dexmed (Ace) IM
 - +/- alfaxalone (crazy dog)
 - Ketamine 3 mg/kg IV
 - Propofol midazolam Sammy
 - Ready for CRIs...
- Cat stun
 - Opioid (Buprenorphine)
 - Ketamine
 - Dexmed
 - Maybe a little alfax?
 - NOT kitty magic!!
- Benzo “Sammy”
 - Induction agent IV (1/4-1/3 dose)
 - Midazolam 0.2 mg/kg IV
 - Induction agent to effect
 - Intra-op muscle relaxation
- Police dog
 - Midazolam 0.3 mg/kg
 - Dexmed 3 mcg/kg
 - Opioid
 - Methadone 0.3 mg/kg
 - Hydro 0.1 - 0.2 mg/kg
 - Touch of alfax anyone?
- Police cat
 - Methadone 0.5 mg/kg
 - Ketamine 3-5 mg/kg
 - Alfaxalone 1 mg/kg
 - Dexmed 3 mcg/kg

Intra-operative

- Do not confuse anesthesia with analgesia
 - Conscious vs. unconscious movement
- Isoflurane > 2%
- Sevoflurane > 2.5%
- Loco-regionals
- NSAIDs
- Intermittent injections
 - Opioids
 - Ketamine
 - Dexmed
- Constant rate infusions
 - FLK
 - HLK
 - MLK (morphine or methadone)
 - BLK
 - Butorphanol 0.05 - 0.3 mg/kg/hr
 - **DLK
- Lidocaine
 - 1-2 mg/kg load
 - 25 - 50 mcg/kg/min
- Dexmed CRI
 - Load w/ premed
 - 1-2 mcg/kg/hr
 - Reversible

Nocita®

Even w/ loco-regionals I do ketamine CRIs

Ketamine...remastered...

- Historically ketamine has largely been used as a sedation/induction drug, most often combined with benzo.
- Often issues with heart, kidney, and brain (seizures, ICP) patients
- Ketamine has been shown to be safe at lower doses for these patients, therefore we can use it as part of our analgesia protocol for most patients.
- I will often include ketamine as part of my premed or adjunct induction
 - Premed 1 - 5 mg/kg IM
 - Induction adjunct 1 - 4 mg/kg IV
 - CRI 10 - 20 (30) mcg/kg/min
- Benzo not always necessary at low ketamine doses especially when using another muscle relaxant effects like an alpha 2 or alfaxalone

Post-operative (immediate)

- When recovery is less than ideal
 - Emergence delirium
 - Opioid dysphoria
 - Discomfort/grumpy
- Immediate post-op
 - Often follow-up with another dose of opioid
 - Dexmed
 - Ace (sedation only)
 - Ketamine
- Maropitant
- If you have 24-hour care
 - Continue CRI
- Oral opioids not much there
 - Acetaminophen w/ Codeine
 - Tramadol?
- Simbadol®
- Zorbium®
- Gabapentin
- Amantadine
- Pregabalin
- NSAIDs

Post-op (long term)

- NSAIDs
 - Mainstay of long-term pharm care
 - Carprofen vs. others
 - Galliprant
- Amantadine
- Gabapentin
- Pregabalin
- Amitriptyline
- CBD oils and cannabinoids
 - Cannabinoid (CB-1/CB-2 receptors)
 - Use with opioids and/or NSAIDs
- Monoclonal vaccines
 - Librela®
 - Solencia®
- SQ Ketamine
 - End of life palliative care
 - 0.5-1 mg/kg SQ
 - Dose to relieve pain without sedation
- Fentanyl patches
 - 24 hours to start effects

Non-pharm

- Rehabilitation
- Integrative medicine
 - AP
 - Electro-AP
 - Cold laser
 - Others
- Exercise
 - Human-Animal Bond
- Weight loss

Chronic Pain

- Chronic OA most common
 - > 70% dogs >12years old
- cOAST
 - Canine Osteoarthritis Staging Tool
- Approx 90% cats >12 yrs old have OA
- Wind-up usually takes time
- Neuropathic not-so-much
- Wind-down takes time
 - May never occur
- Monoclonal Abs (vaccines)
 - Designed for chronic OA based on radiographic (other) diagnosis
 - Designed to work based on diagnosis.
 - Many (25%) OA patients have a neuropathic component
 - +/- relieve neuropathic pain?
 - NOT designed for catch-all, anything goes pain or whatever..
- My experience with these vaccines so far...

Procedural sedation and analgesia (PSA)

- Fear free initiative
- Human-animal bond
 - Animal (patient) welfare
- Sedate vs. anesthetize
 - Sometimes anesthesia is safer
 - ASA III or greater
- Sedative + opioid
 - Sedation
 - Analgesia
- The alfaxalone dilemma
 - IM = sedation
 - IV = anesthesia
- If you anesthetize you should intubate and have fluids...
- Zenalpha®
- Have back-up plan and equipment ready
- Monitoring

Patient safety is the best idea..

Zenalpha®

- Dechra Veterinary Products
- Medetomidine
 - Non-purified (racemic mixture)
- Vatinoxan
 - Non-central acting alpha 2 antagonist
 - Outcompetes peripheral vasoconstriction w/out reversing the central sedation/analgesic/muscle relaxation effects of medetomidine
- Approved as a sedation option in dogs
 - IM
 - Sedation/analgesic
 - Exam/minor procedures
- Not cats

Dosing..

- Chart (body surface area)
- Medetomidine is half as potent as dexmedetomidine; therefore...
- Whatever you would use for dexmedetomidine, approx. double for Zenalpha®
- Example
 - Routine sedation for a dog
 - 1 - 5 mcg/kg dexmed
 - 2 - 10 mcg/kg Zenalpha
 - Don't dose the vatinoxan, just record the mgadministered.
- Extra label uses...

References lecture #3

- Sarah Moore, Managing Neuropathic Pain in Dogs, Front Vet Sci, 2016, 3:12
- Ketamine applications beyond anesthesia - A literature review, Agata Nowacka, Malgorzata Borczyk, Eur J Pharmacol, 2019 Oct 5:860
- COAST; Canine OsteoArthritis Staging Tool, Elanco, COASTDevGroup@gmail.com
- The Role of Anti-Nerve Growth Factor Monoclonal Antibodies in the Control of Chronic Cancer and Non-Cancer Pain, Bimonte S, Cascella M, Forte CA, Esposito G, Arturo Cuomo A, J Pain Res. 2021; 14: 1959-1967
- Zenalpha® Dechra Veterinary Products, support@dechra.com

Questions & Discussion

