Approach to Visceral Pain Management

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Objectives

- Pain recognition
- Pathophysiology of deep and visceral pain
- Treatment of visceral pain
- Case examples

Importance of Pain Recognition

- Client perception and demand
- Veterinary responsibility
- Preemptive analgesia
- The 4th vital sign?
- Part of 2003 AAHA Standards of Accreditation, Quality of Care

Pain Recognition Categories

- Vocalization
- Temperament changes
- Postural changes
- Mobility changes
- Inappetance
- Physical exam abnormalities

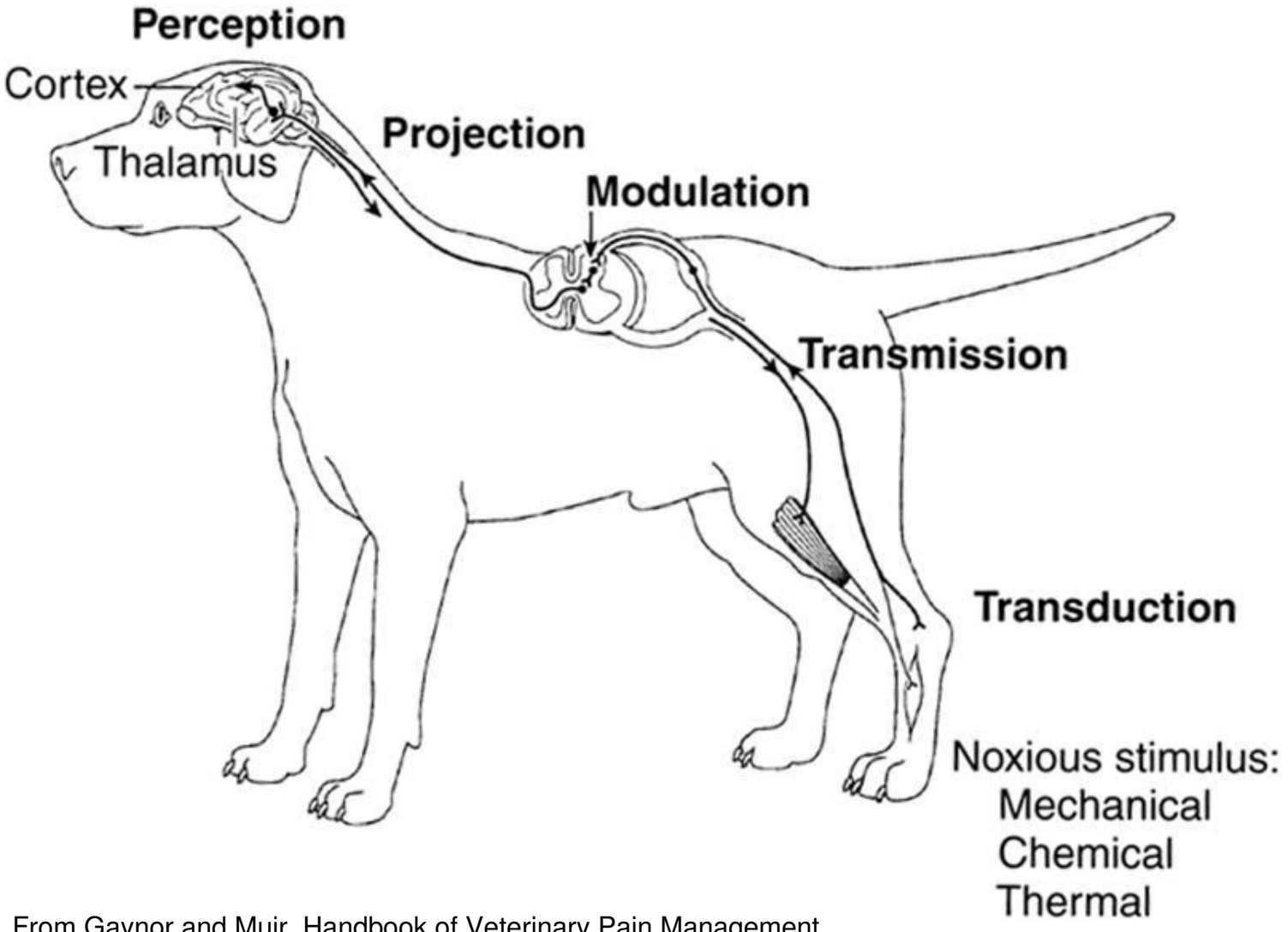
Animals That Don't Exhibit Pain

- Just because an animal is not exhibiting pain, does not mean it is not in pain
- Videotape study showed animals hide pain when people are around
- If you think it would hurt you, then treat the animal as if it hurts!

Preemptive Analgesia

- The concept that treating pain prior to inducing pain prevents wind-up phenomenon
- This allows for more easily controlled and effective pain management postoperatively

Pain Pathways



From Gaynor and Muir, Handbook of Veterinary Pain Management

Multimodal Pain Relief

- More effective in controlling pain than single agent pain relief

Sources of Deep and Visceral Pain

The Abdominal Viscera

- Bowel
- Biliary/Hepatic
- Pancreatic
- Splenic
- Kidney/urinary
- Uterine
- Mesenteric
- Peritoneal

The Thoracic Viscera

- Heart
- Vascular
- Lung
- Esophagus
- Pleura

What is visceral pain?

Descriptors of Visceral Pain

- Dull
- Aching
- Boring
- Poorly localized
- Individual variation
- Malaise
- Illness
- Vomiting/nausea
- Deep
- Pressure
- Periodic
- Discomfort
- Tightness
- Squeezing
- Restlessness
- Referred pain

Systemic Response to Visceral Pain

- Stimulation of autonomic nervous system
- Sweating
- Vasomotor responses
- Change in blood pressure
- Change in heart rate

Causes of Visceral Pain

- Distension or spasm
- Stretching
- Ischemia/necrosis
- Inflammation
- Compression of ligaments/vessels
- Algesic substances (peritonitis)

Sources of Somatic Pain but not Visceral Pain

- Cutting
- Crushing
- Clamping
- Burning

Why is visceral pain different than somatic pain?

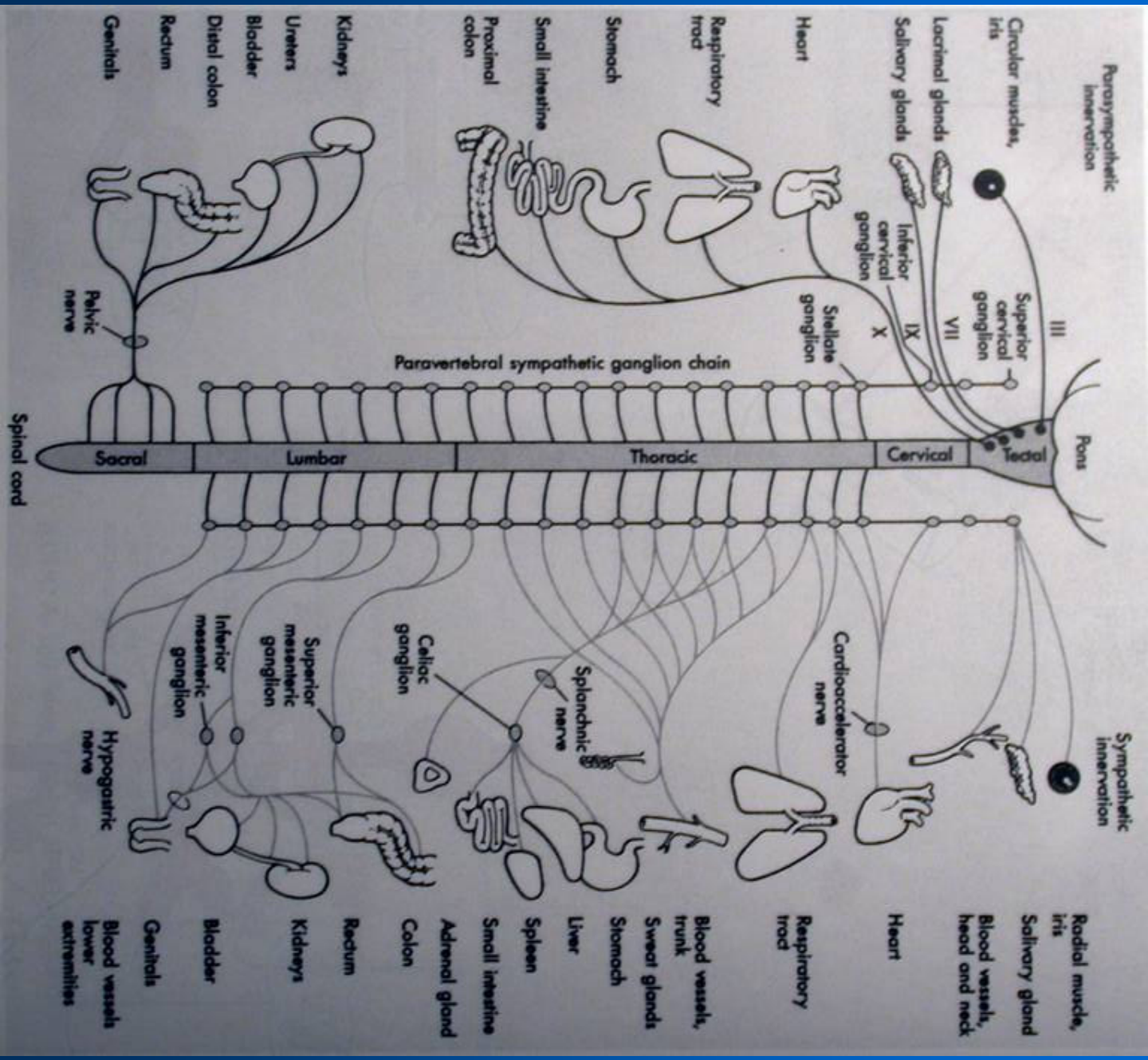
Visceral vs. Somatic Pain

- A fiber (myelinated) to C fiber (unmyelinated) ratios are different
  - 1:2 in skin
  - 1:8 – 1:10 in viscera
- Therefore, visceral pain primarily stimulates C-polymodal receptors
- Fewer visceral afferents compared to cutaneous afferents

Visceral Afferent Pathway

- Follow vagus nerve, splanchnic nerves, and pelvic/hypogastric nerves
- Courses through sympathetic ganglion

From Miller, Anesthesia

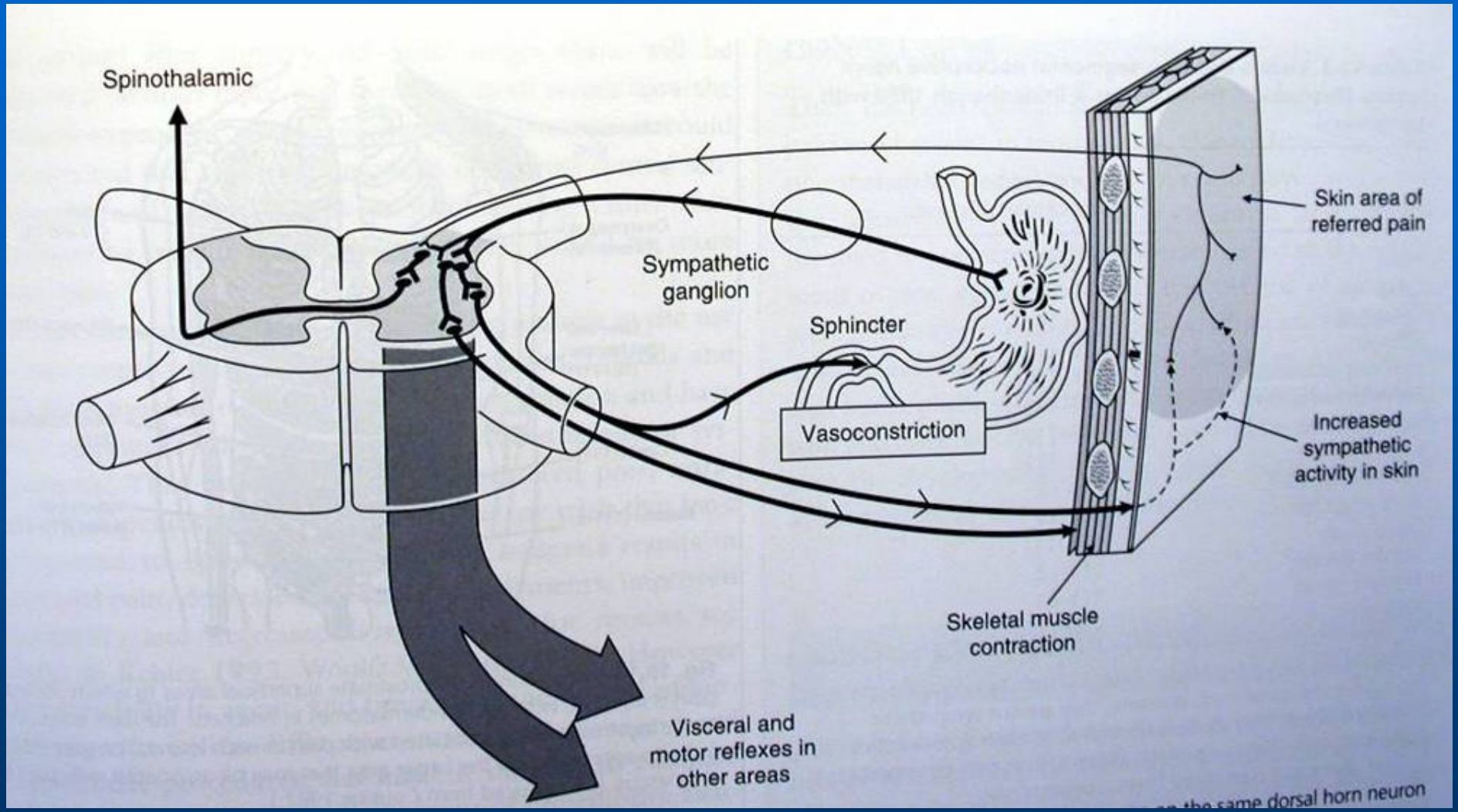


Visceral Afferent Pathway

- Converge onto second order neurons, which are either somatic or viscerosomatic
- Convergence of polymodal somatic and visceral nociceptive impulses leads to referred pain and poor localization
- Ascends in spinothalamic tract

Referred Pain

- The spinal cord segment receiving the visceral stimulus may activate the corresponding:
  - Dermatome (superficial, localized skin)
  - Sclerotome (deep, bone)
  - Myotome (deep, muscle)



From Gaynor & Muir, Veterinary Pain Management

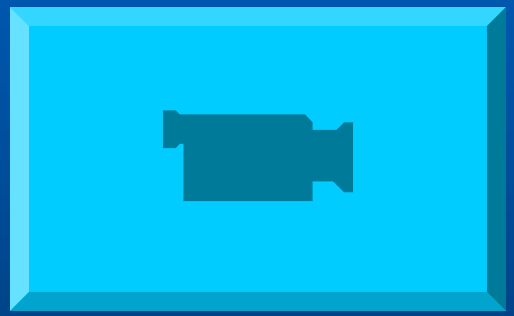
Is visceral pain treated differently than somatic pain?

Acute Analgesics

- Opioids
- Local anesthetics
- Ketamine
- Alpha-2 agonists
- NSAIDS

Visceral Pain Treatment

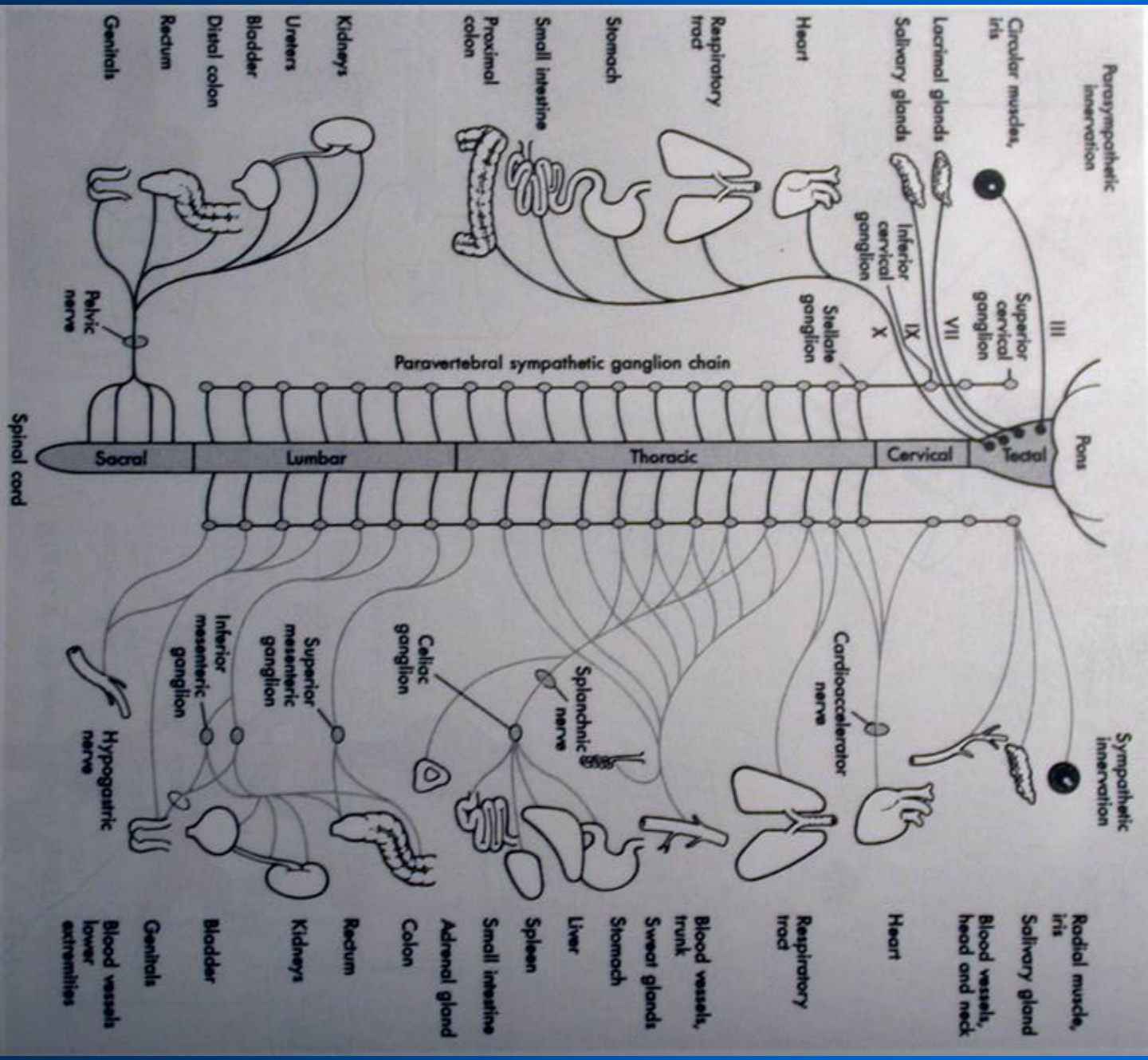
- May be more responsive to kappa opioid agonists vs. mu agonists
  - Most commonly used kappa agonist in veterinary medicine is butorphanol
    - Short acting
    - Expensive to use as CRI in large dogs
  - Mu agonists frequently used systemically despite supposedly better responsiveness to kappa agonists



Visceral Pain Treatment

- Lower abdominal pain may be treated with opioid/local anesthetic epidurals
- Upper abdominal pain may be treated with opioid only epidurals
- Upper abdominal pain may be treated with intrapleural blocks
- Thoracic pain may be treated with intercostal or intrapleural blocks

From Miller, Anesthesia

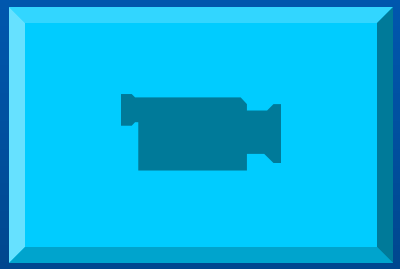


Visceral Pain Treatment Options

- Local anesthetics instilled into abdominal cavity
- Low-dose parenteral lidocaine
- Low-dose ketamine
- NSAIDs
- Alpha-2 agonists
- Peritoneal lavage

Case Examples

Case 1



Signalment & Presentation

- 6 yr MC Great Dane
- 6 hour history of non-productive retching
- Diagnosis: GDV

Pain Control - Considerations

- Visceral pain present
- Would like to give something parenterally for pain and anxiety
- In shock, so need something cardiopulmonary sparing

Pain and Anxiety Control

- Consider a neuroleptanalgesia
  - Will help with pain, anxiety, and may help pass stomach tube
- Benzodiazepines are most cardiopulmonary sparing sedatives
- Would like a pure opioid agonist to allow reversal if necessary and to allow use of intraoperative opioids
- 0.05 mg/kg hydro and 0.25 mg/kg valium IV

Pain Considerations in the Shock Patient

- Use reversible drugs
- Use cardiopulmonary sparing drugs
- Titrate to effect
- Monitor vitals closely
- Avoid NSAIDs, acepromazine, and alpha-2 agonists in shock state

Intra and Postoperative Analgesia

- Fentanyl CRI
  - 20 mcg/kg/hr intraoperatively
  - 2-5 mcg/kg/hr postoperative
- Consider lidocaine CRI
  - 30 – 75 mcg/kg/min
- Consider low-dose ketamine CRI

Case 2

- 4 yr Fl Mixed Breed Dog
- In active labor x 2 hours
- One puppy present in birth canal
- Known to have 2 more puppies in uterus

Pain Considerations

- Visceral pain present due to dystocia and uterine contractions from labor
- Labor is reportedly one of the most painful experiences one can have
- Visceral afferents ascend with pelvic and hypogastric nerve, therefore, very responsive to epidural analgesia
- Epidural is very helpful if c-section is necessary

Pain Considerations

- Want to give drugs that quickly redistribute and won't compromise puppy cardiopulmonary systems
- Best to give reversible drugs
- Epidural drugs have less systemic effects on fetuses
- Opioids can get ion trapped in placenta due to pH differences

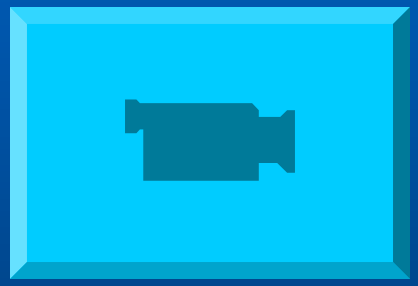
Epidural Considerations

- Local anesthetics work well, but frequently cause hindlimb paresis/paralysis
  - May be an issue for care of young
- Epidurals can cause urine retention
- Animal frequently needs to be immobilized in order to give epidural
  - Consider propofol (if volume resuscitated)

Pain Protocol

- If IV pain control needed, consider low dose opioids
  - Hydromorphone, oxymorphone, or butorphanol
- Epidural bupivicaine/morphine or morphine alone
- Consider propofol for induction
- Consider line-block with lidocaine if c-section necessary

Case 3



Signalment and Presentation

- 3 yr FS Calico
- 2 day history of progressive dyspnea and anorexia
- Diagnosis: Pyothorax

Is Pyothorax Painful?

- Visceral pain is likely present due to pleuritis, which is extremely painful in people
- Veterinarians frequently don't treat pyothorax with analgesics unless chest tubes are placed (somatic pain)
- Should we be more aggressive with analgesics in these cases?

Pain Considerations

- Opioids
  - Butorphanol CRI 0.1 – 0.2 mg/kg/hr
  - Low-dose hydromorphone CRI
  - Be cautious of respiratory depression
- Intrapleural local anesthetics
  - Be aware of total doses used
  - Lidocaine/Bupivicaine
  - May not be very effective with effusion and inflammation/infection

Case 4

- 3 yr MC DSHA
- PC: Stranguria for 48 hours with no urine production seen for 24 hours
- Diagnosis: Urinary obstruction

What Sedation and Pain Protocol Would Be Appropriate?

- Neuroleptanalgesia
  - Butorphanol (0.2 mg/kg IV)
  - Valium (0.2 mg/kg IV)
- Ketamine (2 mg/kg IV)
- May repeat butorphanol, valium, or ketamine doses if needed
- Be aware that ketamine is excreted unchanged through kidney in the cat – if unable to unblock, do not continue to use ketamine as anesthetic

Post-obstruction Pain Control

- Consider one time dose of an NSAID
- Opioids
  - Butorphanol CRI (0.2 mg/kg/hr) OR
  - Buccal buprenorphine (6-10 mcg/kg into buccal pouch q 6-8 hours)

Case 5

- 8 yr FS Miniature Schnauzer
- PC: 3 day history of vomiting
- Diagnosis: Severe pancreatitis

Pain Management Considerations

- Need a multimodal approach that allows easy tailoring to severity of pain
- Pancreatic pain is one of the most painful conditions in people

Pain Management Considerations

- Systemic opioids
  - Fentanyl or Hydromorphone CRI
  - Be aware of possible ileus and interference with the sphincter of Oddi
- Low dose ketamine CRI
- Low dose lidocaine CRI

Pain Management Considerations

- Local anesthetic techniques (be aware of toxic doses if using systemic lidocaine; be cautious in cats)
  - Intraabdominal
  - Intrapleural
- Epidural opioids
- Anxiolytics as needed
- Anti-emetics
- Avoid NSAIDS and Steroids

Pain Management Considerations

- Abdominal flushing (surgically and/or with peritoneal catheter)

Summary

- Visceral pain tends to be a dull, aching, poorly localized pain
- Referred pain is common due to afferent pathways
- A multimodal approach to visceral pain management, using a combination of parenteral and local analgesic techniques, is generally effective in controlling visceral pain