

Sedation of the Emergency Patient

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“There are no safe anesthetic agents;
There are no safe anesthetic procedures;
There are only safe anesthesiologists.”

- Robert Smith



Key points

- Initial stabilization
- Pain management
- Sedation
- Chemical Restraint



Initial Stabilization



An Important Task!

- Emergency patients that aren't in obvious shock are frequently in compensatory shock
- Prevention and treatment of shock is foremost
- Sedatives, anesthetics, and pain medications block the sympathetic nervous system



Diagnostics and Treatment – Hypovolemic and Distributive Shock

- Oxygen
- IV or IO catheter
- Fluid therapy
- PE
- ECG
- BP
- Pulse oximetry
- Temperature



The Decision for Sedation or Anesthesia



Approaching Physiologic Normalcy

- Response to treatment!
- Heart rate normalizing
- Tachypnea resolving
- Pink mucous membranes
- Normal CRT
- Improved mentation



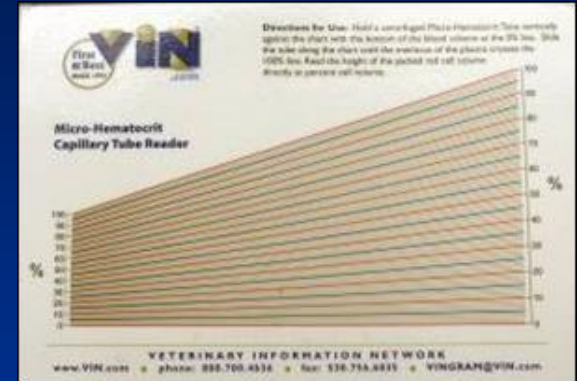
Approaching Physiologic Normalcy

- Mean arterial BP > 80 mmHg and stable when fluids decreased
- Strong, easily palpable pulses
- Body temperature approaching normal



Minimum Laboratory Data

- PCV/TP
- Glucose
- Azostix (BUN or creatinine)



Additional Lab Data

- Acid-base status
- Electrolytes
- Oxygenation-ventilation status
- Urine specific gravity (pre-fluids)
- Coagulation
- Platelet count
- WBC count



Important Lab Values for the Anesthetist

- Hemoglobin levels
- Acid-base status
- Electrolytes
- Oxygenation-ventilation



When Normalcy Can't Be Reached...

- Dedicated anesthetist
- Frequent data collection
- Careful monitoring
- Practitioner judgment



A Bit of Good News...

- Sedatives and anesthetics slow metabolic rate
- Sedated and anesthetized patients are usually provided supplemental oxygen
- Slight blood pressure buffer zone (MAP > 60 mmHg)



Cases In Which To Avoid Sedation/Anesthesia If Possible

- Head trauma
- Pulmonary contusions
- Severe arrhythmias
- Pneumothorax
- Severe electrolyte disturbances



The Final Decision

- Patient condition pros and cons
- Sedative/anesthetic effects on the patient
- Nature of the problem
- Consequences of waiting or proceeding
- Alternative options
 - Example: urine diversion



Taking the Sedation or Anesthetic Plunge



The Protocol

- Tailored to each patient
- Veterinarian drug familiarity
- Cardiopulmonary sparing drugs
- Titration to effect



The Importance of Titration

- Sedative and anesthetic drugs need to reach effective brain concentrations to work
- Despite a good resuscitation, it is likely physiologic normalcy has not been reached



The Importance of Titration

- Low cardiac output states delay anesthetic delivery to the brain
- Patience and titration is necessary to avoid early deep anesthetic planes



Balanced Sedation and Anesthesia

- Uses drugs from different drug categories in order to reduce the amount of drug given from one drug group = multimodal approach
- Frequently leads to less hypotension and a smoother induction



Balanced Sedation/Anesthesia Drugs

- Cardiopulmonary sparing
- MAC reduction
- Titratable
- Reversible



Pain Control



Pre-emptive Analgesia

- Prevented pain is easier to control than pain after-the-fact
- Pain leads to excessive sympathetic stimulation, which may be detrimental
- Included in new AAHA regulations



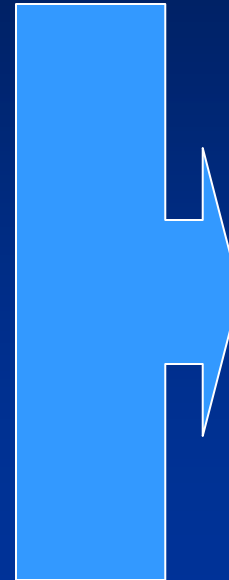
Acute Pain

- Acute pain tends to be easier to control than chronic pain because the pain pathways aren't chronically stimulated (wind-up)



Acute Pain Drugs

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



Multimodal approach is key to successful pain management of difficult pain cases!

Sedation



Sedation

- A calm state in which the animal can be aroused
- Does not equal anesthesia
- Commonly interchanged with tranquilization
- Used for minor procedures



PHENOTHIAZINES

BENZODIAZEPINES

THE SEDATIVES

ALPHA-2
AGONISTS

OPIOIDS



PHENOTHIAZINES

BENZODIAZEPINES

Diazepam
Midazolam
Zolazepam

THE SEDATIVES

ALPHA-2
AGONISTS

OPIOIDS



Midazolam vs. Diazepam

- Midazolam
 - Water soluble
 - Expensive
- Diazepam
 - Propylene glycol base
 - Painful IM
 - Unreliable IM or SQ absorption



Benzodiazepines

- Overall a nice adjunct to sedation
- Great for critical patients or emergency patients
- 0.2 to 0.5 mg/kg



PHENOTHIAZINES

Acepromazine
Chlorpromazine

BENZODIAZEPINES

THE SEDATIVES

ALPHA-2
AGONISTS

OPIOIDS

Acepromazine

- Great for anxious dogs
- Can be given orally
- Cats can be fairly resistant to effects
- Okay by itself, but better sedation with an opioid
- Need 15-30 minutes to see full effects
- Excellent to treat dysphoria



PHENOTHIAZINES

BENZODIAZEPINES

THE SEDATIVES

ALPHA-2
AGONISTS

OPIOIDS

Xylazine

Medetomidine

Romifidine

Alpha-2 Agonists

- Useful in aggressive animals
- Useful in cats
- Great if more significant restraint is needed
- Use in young, healthy animals



PHENOTHIAZINES

BENZODIAZEPINES

THE SEDATIVES

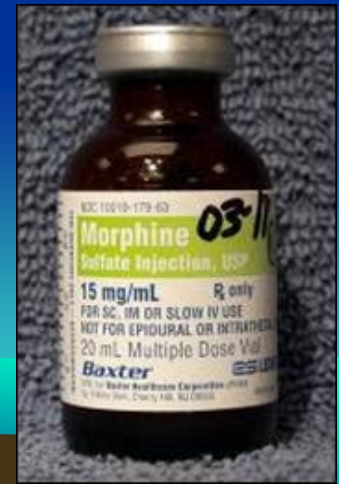
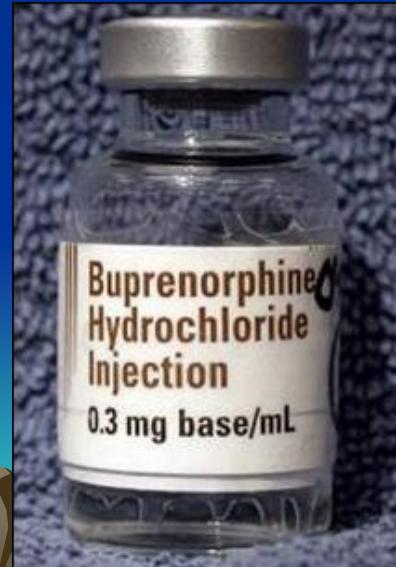
ALPHA-2
AGONISTS

OPIOIDS



Opioids

- Morphine
- Fentanyl
- Hydromorphone
- Oxymorphone
- Methadone
- Butorphanol
- Buprenorphine



Neuroleptanalgesia

- Term used when combining an opioid with a sedative
- Good for minor procedures
 - Ultrasound guided aspirates
 - Mild wound debridement
 - Orthopedic radiographs
 - IV catheter placement



PHENOTHIAZINES

BENZODIAZEPINES

NEUROLEPTANALGESIA

ALPHA-2
AGONISTS

OPIOIDS



Good Combinations

- Opioid and benzodiazepine
- Opioid/acepromazine
 - BAG (butor, ace, glyco)
- Opioid/medetomidine
- Opioid + benzodiazepine + medetomidine



Neuroleptanalgesia



Neuroleptanalgesia

- An opioid and benzodiazepine neuroleptanalgesia is one of the safest and commonly used sedations used in emergency veterinary medicine



Opioid/Benzodiazepine Neuroleptanalgesia

- “Takes the edge off”
- Does not cause excessive immobilization
- Cardiopulmonary sparing, so is excellent in critically ill animals
- More respiratory depressant than each drug individually



Opioid/Benzodiazepine Neuroleptanalgesia

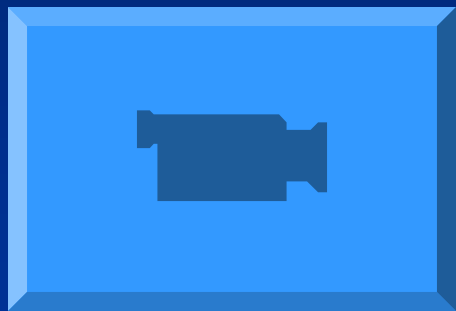
- Short acting (15 to 30 min)
- Reversible
- Use caution in cats (may cause excitement and aggression)



Minor Procedure Restraint: Neuroleptanalgesia

- U/S, IV catheter, thoracocentesis
- Opioid (choose one):
 - 0.2 mg/kg butorphanol
 - 0.025-0.05 mg/kg hydromorphone
- Sedative (choose one):
 - 0.2 mg/kg midazolam (IM or IV)
 - 0.2 mg/kg diazepam (IV)





Chemical Restraint



Chemical Restraint Definition

- A drug used to control acute, episodic behavior that restricts the movement or function of an animal



Chemical Restraint

- Frequently used for short-term immobility that allows minor diagnostics or procedures to be performed



Chemical Restraint Administration

- Subcutaneous
- Intramuscular
- Intravenous
- Frequently combines 2-4 drugs to provide a balanced chemical restraint



Minor Procedure Restraint: Neuroleptanalgesia + Dissociative

- Wound flushing, urinary catheter placement, U/S guided FNA
- Opioid: Butorphanol, hydromorphone, or oxymorphone
- Sedative: Midazolam or diazepam
- Dissociative: Ketamine



Neuroleptanalgesia/Ketamine Combo Considerations

- Cardiopulmonary sparing
- Short acting
- More immobilization than neuroleptanalgesia alone



Neuroleptanalgesia/Ketamine Combo Considerations

- Ketamine stings IM
- Precautions:
 - Cardiovascular disease
 - Urinary obstruction



Telazol

- Tiletamine and zolazepam
- Good for fractious cats
- Small volumes can be given IM
- 20 – 40 minutes of restraint
- Use in combo with analgesics
- May have prolonged recoveries





DOMITOR 

(medetomidine hydrochloride)

Sterile Injectable Solution—1.0 mg/mL

Sedative and Analgesic

For use in dogs only

Caution: Federal law restricts this drug to use by or on the order of a licensed veterinarian.

NADA #140-999, Approved by FDA

Net Contents: 10 mL



ORION
PHARMA

NDC 50989-249-06

Ketavet[™]
KETAMINE HCl INJ., USP
Equivalent to 100 mg per mL Ketamine

NET CONTENTS: 10 mL

VEDCO

NADA 206-942
Approved by FDA

Caution: Federal law restricts this drug to use by or on the order of a licensed veterinarian.

NDC 0856-2030-19

Torbutrol [®] 
BUTORPHANOL TARTRATE

Veterinary Injection

FORT DODGE[®]

contains 0.5 mg
butorphanol base per mL as
butorphanol tartrate, USP

10 mL

CAUTION: Federal law restricts this drug to use by or on the order of a licensed veterinarian.

NADA 102-990, Approved by FDA

035-1

“DKT”

- Domitor (medetomidine)
 - 0.025 mg/kg
- Ketamine
 - 5 mg/kg
- Torbugesic (butorphanol)
 - 0.2 mg/kg



DKT Considerations

- Excellent chemical restraint for short surgical procedures
- IM injection – fractious cats
- 30 – 45 minutes of deep chemical restraint
- Dose of medetomidine is high
- Medetomidine is reversible



General Anesthetics as Chemical Restraint?

- Dissociatives
- Propofol
- Thiopental
- Etomidate
- Inhalation agents



Anticholinergics

- Decrease salivation
- Consider use during procedures involving high vagal tone or opioid use
 - GI/urogenital procedures
 - E-tube placement
 - Ocular manipulation
 - Joint procedures



Monitoring and Treatment During Sedation and Chemical Restraint

- IV Catheter
- Oxygen (including preoxygenation)
- Fluid therapy
- EKG
- BP
- Audible pulse (Doppler)
- Respiratory monitoring
- Pulse oximeter
- Temperature
- Eye lubrication



Summary: Keys to Safe Sedation and Anesthesia of the ER Patient

- Use cardiopulmonary sparing, reversible drugs and titrate to effect
- Have a thorough knowledge of the drugs being used and be aware of patient analgesic needs
- Provide appropriate resuscitation prior to sedation or anesthesia
- Provide diligent monitoring
- Anticipate common complications associated with sedation and anesthesia

