Euthanasia of Exotic Species

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Overview

• Basics of euthanasia
• Challenges of exotic species
• Owner discussion
• Species protocols

Euthanasia

• “Eu” – Good
• “Thanatos” – Death

• “Ending the life of an individual animal in a way that minimizes or eliminates pain and distress”

• AVMA Guidelines for the Euthanasia of Animals: 2013 Edition
Euthanasia decision making

Euthanizing agents

- 3 basic mechanisms:
  - direct depression of neurons necessary for life function
  - hypoxia
  - physical disruption of brain activity

- Minimize or eliminate pain, anxiety, and distress prior to loss of consciousness

Confirmation of death

- Combination of criteria
  - Lack of:
    - Pulse
    - Breathing
    - Corneal reflex
    - Response to toe pinch
    - Inability to hear heartbeat by use of stethoscope/doppler
    - Greying of mucous membranes
    - Rigor mortis
      - Rigor alone can confirm death in most species
  - AVMA guidelines
Euthanasia common procedure

• Examination
• QoL discussion with owner
• Euthanasia
  • Sedation/induction
    • Gas vs injectable
    • IV/IC overdose barbiturate or potassium chloride
    • +/- IV

What about exotics?

• Quality of life challenges
• Owner personalities/discussions

• Vascular access?

Quality of life

• Exotics challenges
  • Normal behavior?
    • Majority prey species- meant to hide signs of disease
    • Eating/defecating normally?
    • Some animals eat constantly, others can go for 6+ months
    • Normal interactions with owner

• Owner education
Owner personalities

- Primary caretaker of animal
  - Child vs Adult
- Previous experience of caretakers
- Ability of owner to assess quality of life

Owner present or not present?

- Dependent factors
  - Species presented
  - Comfort level of doctor/technician
  - Methods of euthanasia used
    - Human health hazards
    - Gas anesthesia
  - Type of practice
    - ER vs private practice

  - The author commonly allows the owner to be present for IM sedation and for the euthanasia injection in many cases

Disposal of remains

- Cremation
  - Communal or private
- Home disposal
  - Check your local laws and regulations
  - Often elected due to size of animal
  - Concern for residual drugs in environment
  - Use minimal drug dosing and best judgement
Species specifics

• All recommendations are for individual animals in a private practice setting
• General recommendations with tips and tricks
• The author acknowledges there are multiple approaches that depend on the clinical situation
• For more information, for info on group euthanasia or animals not discussed, please see the AVMA Guidelines for the Euthanasia of Animals

Drug doses

• Not discussed in detail here
• In general
  • Sedation: Administer same classes of drugs as for surgery, but at 3-5 times the dose
  • Sodium pentobarbital (use to effect)
    • Mammals - similar dosing to dog/cat - 1mL/10lb
    • Birds - 1mL/1kg
    • Reptiles/amphibians - 1mL/300g
  • Potassium chloride
    • 1 to 2 mmol/kg (75-150 mg/kg) IV
    • Must be done under sedation

Small mammals

• Rabbits
• Guinea Pigs
• Chinchillas
• Ferrets
• Hedgehogs
• Hamsters/mice
Rabbits

• Medication sites
  • IM injection sites - Epaxial mm, semimembranous/semitendinosus mm.

• Vascular access
  • IVC placement - cephalic, lateral saphenous, marginal ear vein
  • IV access - cephalic, lateral saphenous, marginal ear vein

• Alternate sites
  • Intrarenal injection
  • Intrahepatic injection
  • Intracardiac injection

Guinea pigs/chinchillas

• Medication sites
  • IM injection sites - Epaxial mm, semimembranous/semitendinosus mm.

• Vascular access
  • IVC placement - cephalic, lateral saphenous
  • IV access - cephalic, lateral saphenous

• Alternate sites
  • Intrarenal injection
  • Intrahepatic injection
  • Intracardiac injection

Intracardiac injection

• Caudal approach
  • Animal in dorsal recumbency
  • Needle entry at the point of the xyphoid on midline
  • Angle shallow to the sternum with constant negative pressure
  • Administer medication when you get blood drawn back
Ferrets

- Medication sites
  - IM injection sites: epaxial mm, semimembranosus/semitendinosus mm.

- Vascular access
  - IVC placement: cephalic, lateral saphenous, jugular (difficult)
  - IV access: cephalic, lateral saphenous, cranial vena cava

- Alternate sites
  - Intrarenal injection
  - Intrahepatic injection
  - Intracardiac injection - More caudal than other mammals

Hedgehogs

- Challenges
  - Spined skin dorsally
  - Tight ball formation when threatened

- Consider inhalant anesthesia to facilitate injections

- Medication sites
  - IM injection sites: semimembranosus/semitendinosus mm.

Hedgehogs

- Vascular access
  - IVC placement: cephalic, lateral saphenous
  - IV access: cephalic, lateral saphenous, jugular vein

- Alternate sites
  - Intrahepatic injection
  - Intracardiac injection
Hamsters/Mice

• Medication sites
  • IM injection sites: Epaxial mm, semimembranosus/semitendinosus mm.
  • Gas anesthesia
• Vascular access
  • IV access: cephalic, lateral saphenous
• Alternate sites
  • Intrarenal injection
  • Intrahepatic injection
  • Intracardiac injection

Birds

• Psittacines
• Passerines
• Chickens
• Ducks
• Raptors

Birds

• High metabolic rate
  • Inhalants work rapidly
• Highly vascular muscle
  • IM injections more rapidly absorbed than mammals
• Veins very superficial
Psittacines/passeres

- Medication administration:
  - IM: pectoralis mm.
  - Intranasal: Midazolam
  - Gas administration via mask

- Vascular access:
  - IVC: jugular (right) v., mediometatarsal v., basilar v.
  - IV access: Jugular (right) v., mediometatarsal v., basilar v.
  - IO catheterization:
    - Proximal tibiotarsus or distal ulna
    - NEVER HUMERUS OR FEMUR: air sacs within bone in many species

Psittacines/passeres

- Alternate site
  - Intrahepatic injection: avoid air sacs
  - Intracardiac injections
    - Long needles, can be dorsal or ventral approach behind keel

Chickens/waterfowl

- Differences:
  - Generally farm animals/outdoor animals
  - Prominent tarsometatarsal veins for IV access
  - Carcass remains
    - Recommended cremation
    - If taking home, environmental concerns based on drugs used
Raptors

• Very similar to psittacines in process and site selection for medications
• Know your local and federal laws for wildlife
  • Especially for endangered species
• Form a relationship with local wildlife rehab as a resource

Reptiles

• Lizards
• Snakes
• Turtles
• Crocodilians

Reptiles

• General considerations
  • HEAT
    • Optimal temperature zone for drug metabolism
    • 80-85°F in general
    • Warm for at least 20-30 minutes prior to any drugs, ideally
    • 30 min post heating, then sedation
    • When sedate, then administer euthanasia solution
Reptiles

• General considerations
  • HEAT
    • Breath holding and shunting (for hours in some species)
  • Non-acceptable methods
    • Hypothermia
      • Decapitation as sole agent
      • Brain has high tolerance for hypoxia and hypotensive conditions
        • Pithing post decapitation needed
  • Hypothemia
  • Decapitation as sole agent

Reptiles

• Confirmation of death
  • Rigor mortis
  • Lack of corneal reflex
  • Lack of laryngeal reflex
  • Lack of heartbeat >5 minutes (in majority of species)

Lizards

• Medication administration
  • IM - musculature of the front limbs
    • Injections in front legs/tail may be caught in renal portal system
  • Gas anesthetics - caution with breath holding

• Venous access
  • SI-ventral lad v, ventral abdominal v. (visible in some species)
  • IO - humerus, femur

• Alternate sites
  • Intraperitoneal injection
  • Thoracic grid in most species
  • Mention - more caudal
  • Direct injection through parietal eye into brain - Under heavy sedation only
Snakes

- Medication administration
  - IM-epaxial mm, first half of body
  - Injects in cauda/half may be caught in renal portal system
  - Gas anesthetics
    - Can directly intubate without prior sedation in the majority of snakes
- Venous access
  - Fr-ventral tail v, heart (common site of blood collection), jugular v (less practical)
- Alternate sites
  - Intraperitoneal injection
  - Intracardiac injection
    - 1/4 to 1/3 of the way down the body, can visualize movement through skin

Turtles and tortoises

- Euthanasia challenges
  - Long time to process drugs
  - Hearts can beat for hours post brain death
- General plan:
  - Sedatives to the point of anesthesia
  - IV euthanasia solution
  - Keep warm in incubator for 12-24hr, then confirm death
    - Chalk outline to monitor for movement

Turtles and tortoises

- Medication administration
  - IM-musculature of the front limbs
    - Injects in hind limbs/hind may be caught in renal portal system
  - Gas anesthetics: Can breath hold for hours
- Venous access
  - Fr-subcarapacial sinus, jugular v, brachial v (in tortoises), dorsal tail v, ventral tail v
    - (some species)
  - IO-humerus, femur, cranial plastron
- Alternate sites
  - Intraperitoneal injection
  - Intracardiac injection
  - Ultrasound guided injection helpful
Amphibians

• Frogs
• Toads
• Salamanders/newts

Amphibians

• General considerations
  • Absorption of drugs through skin
  • Immersion bath
  • Topical medications
  • Temperature
    • Heat, but generally less than reptiles - Aim for 70-75°F

Amphibians

• Medication administration
  • IM medications in forelimbs
  • Intralymphatic injection of anesthetics
  • Gas anesthesia - caution with breath holding
  • Transcutaneous absorption of drugs - Tricaine methanesulfonate (buffered), Iso/Sevoflurane, Benzocaine hydrochloride, alfaxalone, propofol

• IV access
  • IV: Ventral abdominal v, femoral v, lingual v, ventral tail v (newts and salamanders), facial v (true frogs, Ranidae)
Amphibians

- Alternative sites
  - Intracardiac injection
  - Intrahepatic/intracoelomic injection

- Pithing as secondary euthanasia method after drug administration

Aquatic species

- Fish
- Invertebrates

Fish

- General considerations
  - Immersion bath for sedation/handling
    - Disposal of immersion water?

- Previously considered dead after 30 min of ceasing gill movement
  - Evidence to suggest need for second step in euthanasia
Fish

• Medication administration
  • Transbrachial absorption of drugs
    • Tricaine methanesulfonate (buffered), ketamine, alfentanyl, propofol

• IV access
  • IV- tail vein, intracardiac injection

Aquatic invertebrates

• Highly variable
• Expect 24-48 hours before confirmed death

• Various medications used
  • Ethanol
  • Magnesium sulfate/chloride

Resources

• AVMA Guidelines for the Euthanasia of Animals: 2013 Edition
• Exotic Animal Formulary, 5th edition
  • Sedation and anesthesia combinations and dosages
Summary

• Although there is a great species variation, the general methods are consistent
  • Heavy sedation
  • Euthanasia
• As you stray further from mammals, methods become a bit more challenging
• Take you time in discussion with owners