

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

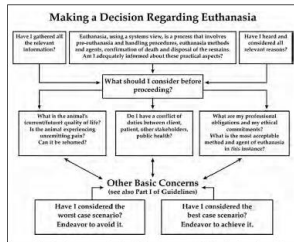


Figure 1—Veterinarians may appeal to this decision tree as a way to decide whether euthanasia is warranted when the proper course of action is not clear. AVMA Guidelines for the Euthanasia of Animals: 2013 Edition

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
 - +/- IVC

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 care takers
- 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/500g
 - Potassium chloride
 - 1 to 2mmol/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, semimembranosus/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, semimembranosus/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/semitendonusus 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/semitendonusus 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/passerines

- 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/passerines

- 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
- Crocodylians

Reptiles

- General considerations
 - HEAT
 - Optimal temperature zone for drug metabolism
 - 80-85F 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

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 hind limbs/tail may be caught in renal portal system
 - Gas anesthetics- caution with breath holding
- Venous access
 - IV- ventral tail v, ventral abdominal v. (visible in some species)
 - IO- humerus, femur
- Alternate sites
 - Intrahepatic injection
 - Intracardiac injection
 - Thoracic girdle in most species
 - Monitors- more caudal
 - Direct injection through parietal eye into brain- Under heavy sedation only

Snakes

- **Medication administration**
 - IM- epaxial mm, first half of body
 - Injections in caudal half may be caught in renal portal system
 - Gas anesthetics
 - Can directly intubate without prior sedation in the majority of snakes
- **Venous access**
 - IV- ventral tail v, heart (common site of blood collection), jugular v (less practical)
- **Alternate sites**
 - Intrahepatic 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
 - Injections in hind limbs/tail may be caught in renal portal system
 - Gas anesthetics- Can breath hold for hours
- **Venous access**
 - IV- subcarapacial sinus, jugular v., brachial v. (in tortoises), dorsal tail v., ventral tail v. (some species)
 - IO- humerus, femur, cranial plastron
- **Alternate sites**
 - Intrahepatic 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 70-75F

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), Isoflurane, alfaxalone, 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
