

Procedures for Humane Euthanasia

Humane Euthanasia of Sick, Injured, and/or Debilitated Livestock



J. K. Shearer, DVM, MS

and

Paul Nicoletti, DVM, MS





PROCEDURES FOR THE HUMANE EUTHANASIA OF SICK, INJURED, AND/OR DEBILITATED LIVESTOCK

Prepared by:

J. K. Shearer, DVM, MS and Paul Nicoletti, DVM, MS

Preface

The topic of euthanasia is unpleasant under any circumstances. It is, however, one of those tasks that veterinarians and others who work with livestock must be prepared to do. In many cases it is the only practical way to provide prompt relief of otherwise uncontrollable animal suffering. To that extent, it is a responsibility of all who own or work with livestock to have the proper equipment and knowledge to conduct this procedure with maximum efficiency and effectiveness.

The purpose of this brochure is to aid those who may be required to perform these procedures in situations where veterinary assistance is not available. Indications for euthanasia along with important human and animal considerations are discussed. Specific anatomical sites for proper placement of penetrating captive bolt or gunshot are described and illustrated for all major livestock species. Certain methods of euthanasia require exsanguination to ensure death therefore, this technique and appropriate methods to confirm death are described. This brochure is intended for use by livestock owners, market operators, law enforcement personnel, persons who transport livestock and others who may need to know proper methods for euthanasia of farm animals. Persons requiring additional information are referred to the web site or J. K. Shearer, Dairy Extension Veterinarian, as listed in this brochure.

Supplementary Materials Available:

- Wall Chart on Euthanasia of Cattle
- Desk Card on Euthanasia of Cattle
- Quick Reference Wallet Card on Euthanasia of Cattle

TABLE OF CONTENTS

Indications for Euthanasia

1

Important Considerations

2

Gunshot or Captive Bolt

4

Aesthetic Concerns

4

Anatomical Landmarks

5 - 8

Exsanguination

9

Confirmation of Death

10

Conclusions

11

References

12

Contact Information

12



UNIVERSITY OF
FLORIDA
EXTENSION
Institute of Food and Agricultural Sciences

PROCEDURES FOR THE HUMANE EUTHANASIA OF SICK, INJURED AND/OR DEBILITATED LIVESTOCK

Prepared Especially For

**Livestock Owners and Producers,
Livestock Market Operators and Transporters
or Others Who may Need to Know**

“Euthanasia” is a Greek term meaning “good death”. In this context, its objectives are met when death is induced which causes no pain or distress to an animal. To avoid pain and distress requires that the techniques which are used cause immediate loss of consciousness followed by cardiac and respiratory arrest that ultimately results in loss of brain function. Persons who perform this task must be technically proficient and have a basic understanding of the anatomical landmarks and equipment used for humane euthanasia of animals.

The purpose of this brochure is to describe proper procedures for humane euthanasia of sick and/or debilitated animals in farm, ranch or other situations where veterinary supervision may not be available.

Indications for Euthanasia

Livestock owners and others who derive all or a portion of their livelihood from animal agriculture share a moral obligation to ensure the welfare of animals. Therefore, when disease or injury conditions arise that diminish quality of life or create pain and suffering that cannot be effectively relieved by medical means, euthanasia is indicated.

Examples include the following:

- Fractures of the legs, hip or spine that are not repairable and result in immobility or inability to stand
- Emergency medical conditions that result in excruciating pain that cannot be relieved by treatment (e.g. terminal colic in horses, or trauma associated with highway accidents)
- Emaciation and/or debilitation from disease or injury that may result in an animal being too weak to be transported
- Paralysis from traumatic injuries or disease that result in immobility
- Advanced eye disease (e.g. lymphoma or cancer eye in cattle)
- Disease conditions for which cost of treatment is prohibitive
- Disease conditions where no effective treatment is known (Johnes Disease in ruminants), prognosis is poor or time to expected recovery is unusually prolonged
- Rabies suspect animals - where there is significant threat to human health (These animals should not be killed by gunshot or other methods which result in head trauma that might cause excessive damage or loss of brain tissue and increase potential for human exposure to the rabies virus. Instead, rabies suspect animals should be attended to by a veterinarian who can properly euthanize the animal and obtain brain tissue for diagnostic purposes.)

Important Considerations

The loss of productive function as a result of disease or injury in livestock presents at least two options: slaughter or euthanasia. Generally speaking, slaughter should be considered for animals that are **not** in severe pain, freely able to stand and walk, capable of being transported, and without disease or treatment that might constitute a public health risk (drug residue). Euthanasia is the appropriate choice whenever the above conditions cannot be met.

When conditions warrant euthanasia, the next consideration is method. There are essentially 2 methods for humane euthanasia in circumstances where veterinary supervision is unavailable:

- 1) gunshot
- 2) penetrating captive bolt in combination with exsanguination (bleeding).

Choices of one over the other should include concerns for human safety, animal welfare, ability to restrain the animal for proper application of the procedure, skill of the person performing the procedure, cost, and possibly, potential need for brain tissue (for diagnostic purposes) in the event that the animal is suspected of having rabies.

Persons conducting euthanasia procedures should attempt to minimize animal distress. If animals are accustomed to human contact the presence of a familiar person may be reassuring and reduce anxiety. On the other hand, for wildlife and animals unaccustomed to human contact, gunshot should be delivered with the least amount of human contact necessary. If the animal to be euthanized is ambulatory and able to be moved without causing distress, discomfort or pain, it may be moved to an area where the carcass may be more easily reached by removal equipment. Dragging of

nonambulatory animals is unacceptable. In cases where movement may increase distress or animal suffering, the animal should be euthanized first, and moved following confirmation of death.

A final consideration is for the person who must perform the task of humane euthanasia. It is important to recognize that this is not a procedure that all persons are mentally or emotionally able to perform. This is particularly true if a person is in a position where they must perform these procedures repetitively. In fact, observation has shown that constant exposure to, or participation in, euthanasia procedures may result in psychological damage leading to work-related dissatisfaction and a tendency toward careless or callous handling of animals. One strategy for managing this problem includes providing adequate training so that euthanasia procedures may be competently applied. Another may be to change work duties as needed to provide relief when it becomes apparent that such duties are causing emotional distress. Euthanasia, regardless of the circumstances, impacts a person's emotional state. Sensitivity to this issue should not be overlooked.



Humane Euthanasia by Gunshot or Captive Bolt in Combination with Exsanguination

Properly applied, euthanasia by either gunshot or penetrating captive bolt, causes less fear and anxiety and induces a more rapid, painless, and humane death than can be achieved by most other methods. However, both methods may involve human risk, and therefore, require skill and experience. Neither method should be attempted by untrained or inexperienced persons.

Gunshot

In most circumstances on the farm or ranch, gunshot is the only practical method of euthanasia. This procedure requires the selection of an appropriate firearm and bullet with sufficient velocity, energy and size to pass through the skull (enter the brain), and cause massive brain destruction. A .22 caliber long rifle bullet fired from either a pistol or rifle is sufficient for young animals. Hollow or soft point .22 caliber bullets increase brain tissue destruction, but may not penetrate the skull in adult animals. Euthanasia of bulls and some adult cows, horses, or Cervidae (elk) by gunshot requires larger calibers such as a 9mm or .357 because of thickness of the skull. Proper placement of the bullet is essential and best achieved by holding the firearm within a few inches of the intended target. The firearm should not be held or placed against the head.

Advantages: When properly positioned the bullet causes massive brain destruction and immediate unconsciousness. Gunshot is inexpensive and does not require close contact with the animal.

Disadvantages: Gunshot may be dangerous. Ricochet of the bullet is possible and therefore, the operator and bystanders must use extreme care in positioning of themselves and others when the procedure is performed. Another disadvantage is, that in cases involving fractious animals, it may be difficult to get close enough to accurately hit the vital target area.

Whereas most animals for which euthanasia by gunshot is indicated are either debilitated or down, opportunity for proper placement of the bullet is less difficult. On the other hand, for animals on their feet and mobile or potentially dangerous, it may be necessary to shoot from a distance. In such cases, the preferred target areas are the head, neck, or lower thorax just behind the elbow.



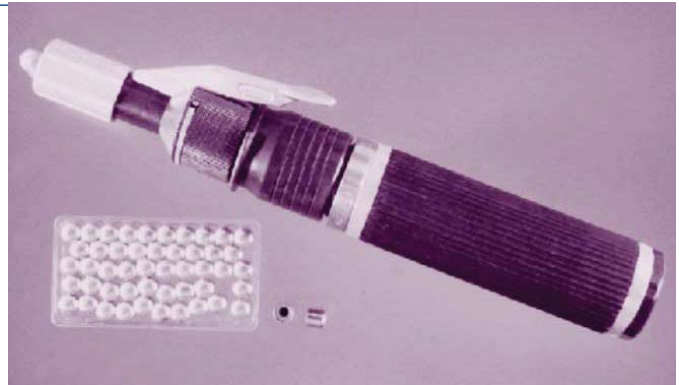
Captive Bolt/Exsanguination

Penetrating captive bolt followed by immediate exsanguination (bleeding out) is the preferred method for euthanasia of cattle in abattoirs (slaughter facilities). The mode of action of a penetrating captive bolt gun is concussion and trauma to the brain. This requires that it be held firmly against the surface of the head over the intended site. This constitutes a major difference between the placement of a firearm and the placement of a penetrating captive bolt. Because placement and positioning of the projectile is critical, some degree of restraint is required for proper use of this device.

There are two types of captive bolt: penetrating and non-penetrating. Both are discharged by gunpowder or compressed air. A penetrating captive bolt works by concussion and trauma to the brain. It causes immediate unconsciousness and destruction of brain tissue as a result of penetration of the discharged bolt. While the destruction of brain tissue with the penetrating captive bolt may be sufficient to result in death, operators are **strongly advised** to ensure death by exsanguination. The non-penetrating captive bolt device works by concussion and only stuns the animal. Since the destruction of brain tissue is minimal and level of consciousness more variable, it should **not** be used for euthanasia of livestock in field situations.

Advantages: Although not without risk, penetrating captive bolt is generally safer for the operator and bystanders. Beyond the initial investment of a captive bolt, continued use is inexpensive.

Disadvantages: Death may not occur unless followed by exsanguination. The operator must be close to the animal and have it adequately restrained in order to get proper placement of the captive bolt. The penetrating captive bolt should not be fired when the animal is moving its head.



Above: Penetrating captive bolt and charges

Lower Left: Photo illustrating proper placement of penetrating captive bolt.

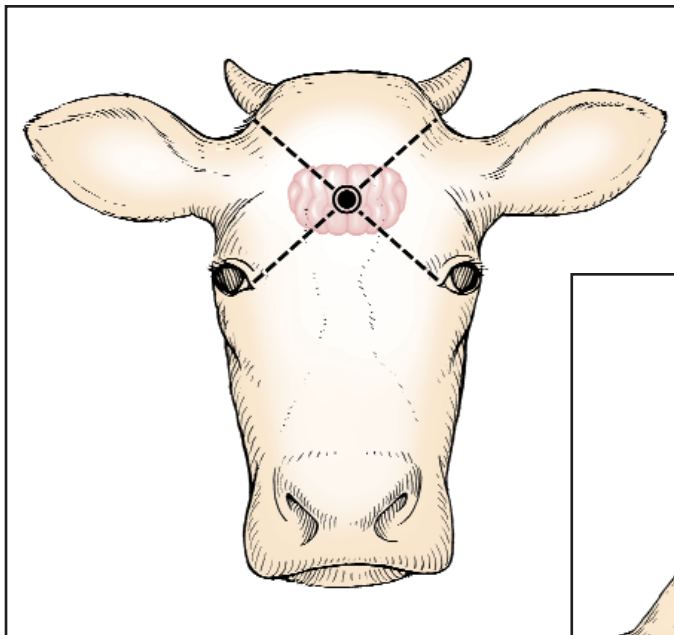


Aesthetic Concerns

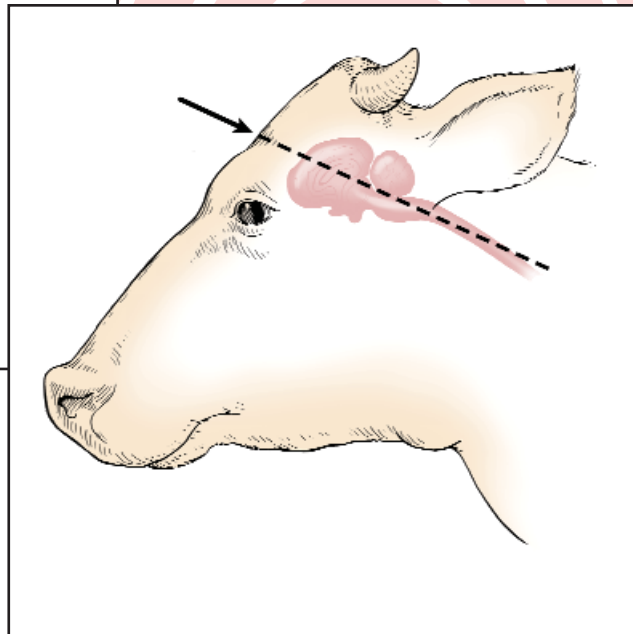
Both gunshot and penetrating captive bolt are aesthetically displeasing procedures. Euthanasia by either technique results in involuntary movements, and occasionally vocalization, that may be inaccurately interpreted as painful to an inexperienced person. Therefore, when and where possible, it is recommended that such procedures be performed in areas out of the public view.

Anatomical Landmarks

Proper positioning of the firearm or penetrating captive bolt is necessary to achieve the desired results. When euthanasia is performed by gunshot, the firearm should be held within a few inches of the intended target. Ricochet may be prevented if the barrel of the firearm is positioned perpendicular to the skull as shown in the diagram. In cattle, the point of entry of the projectile should be at the intersection of two imaginary lines, each drawn from the inside corner of the eye to the base of the opposite horn (or to a point slightly above the opposite ear in a cow without horns). As seen in the diagram below this places the recommended point of entry in the center of the forehead somewhat above a line drawn between the eyes.



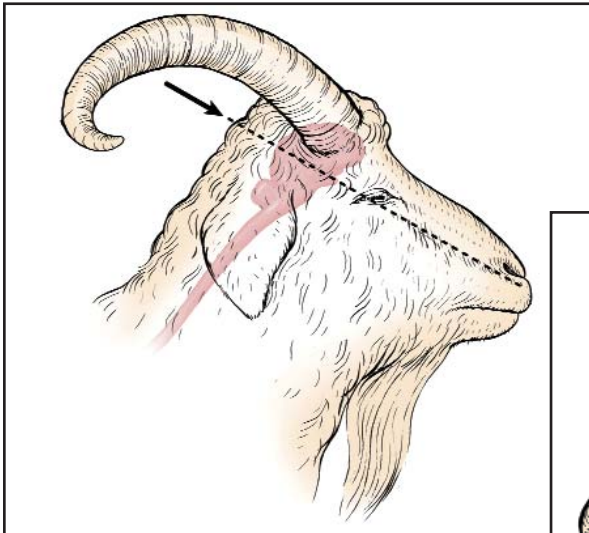
**Not Between the Eyes! –but
above eyes as illustrated.**



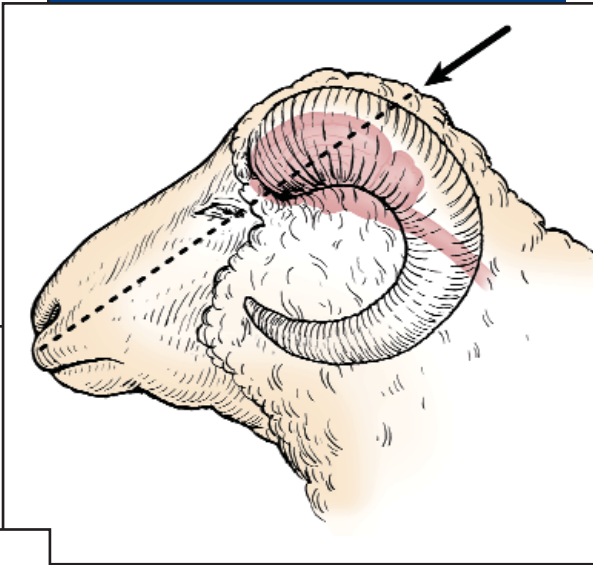
Penetrating captive bolt or gunshot followed by immediate exsanguination are the preferred methods of euthanasia in sheep. For hornless sheep, goats and rams the recommended sites for placement of the gun or penetrating captive bolt include the top of the head or slightly behind the poll. Sheep should be exsanguinated within 10 seconds after stunning by penetrating captive bolt or they may regain consciousness. Exsanguination of cattle and sheep should be performed as described on page 9.

In horned sheep and rams the top of the head is not recommended because of the thickness of the skull in this region. Instead, the preferred position and orientation of penetrating captive bolt or gunshot are on a line starting from behind the poll and aimed in the direction of the animal's muzzle as shown in the figure below. An alternative position for placement of the stunning device is the front of the skull as shown in the figure. One must be careful to avoid ricochet by placing the firearm within inches of the intended target.

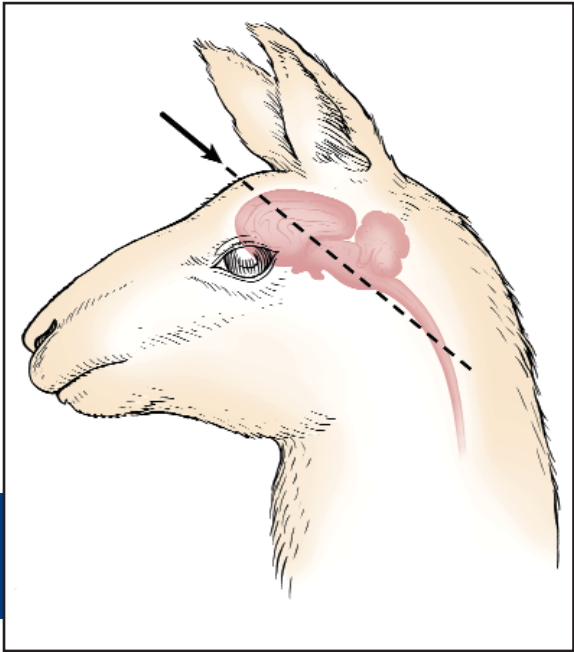
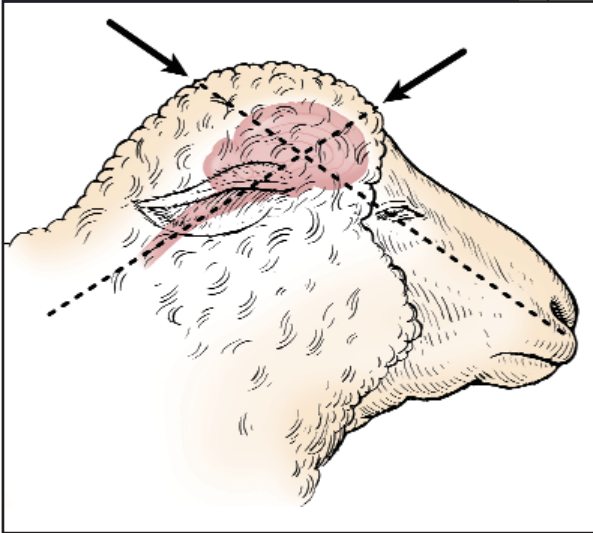
The site for penetrating captive bolt or gunshot placement in horned goats is behind the poll as previously described for horned sheep and rams.



Proper site in horned goats or sheeps is behind the poll as shown.



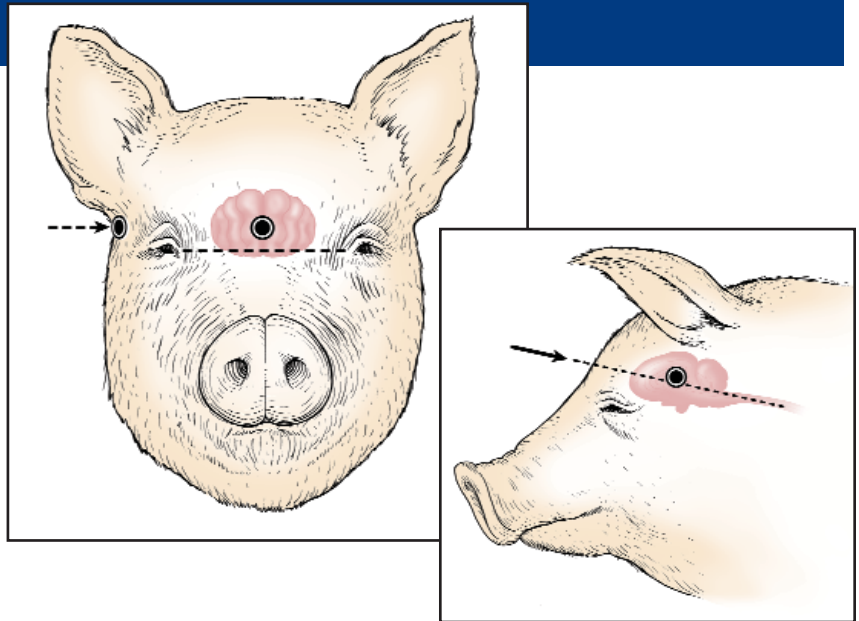
Again, Not Between the Eyes! —but slightly behind the poll or on the top of the head.



Site in llamas is on forehead as shown.

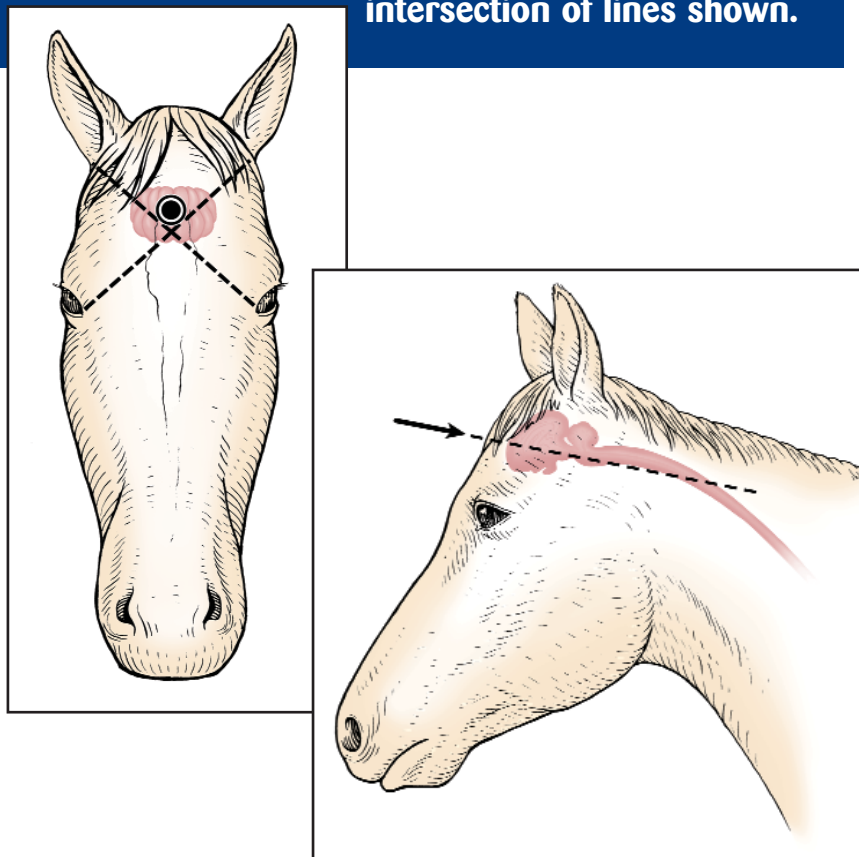
In swine, there are two options, a frontal or temporal site.

For swine, there are two options: a frontal and a temporal site. Recommended placement of the penetrating captive bolt or gun for use of the frontal site is in the center of the forehead slightly above a line drawn between the eyes. Proper placement or aim of the euthanasia device is particularly important since the brain is relatively small and well protected by sinuses. An alternative site for gunshot (only) is the temporal region.



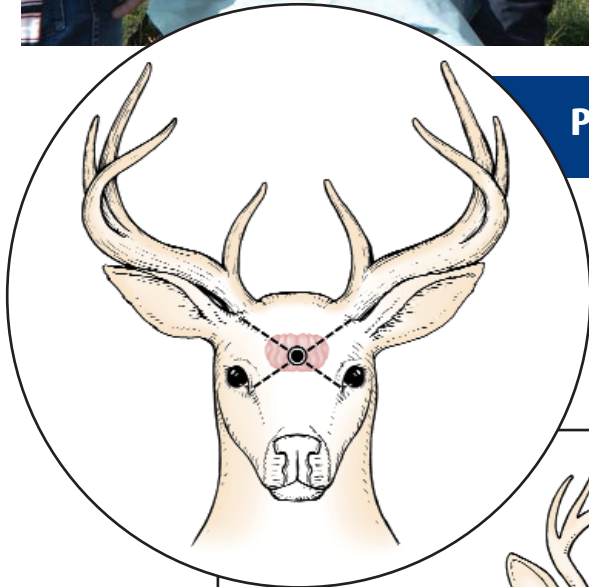
Again, Not Between the Eyes! –but slightly above intersection of lines shown.

Horses may be euthanized by gunshot or penetrating captive bolt. As described previously, use of the captive bolt requires good restraint so that the device may be held in close contact with the skull when fired. The site for entry of the projectile is described as a point slightly above the intersection of two diagonal lines each running from the inside corner of the eye to the base of the opposite ear. Note, that contrary to that described for cattle, the optimum site in the horse is slightly above the intersection of these two lines.



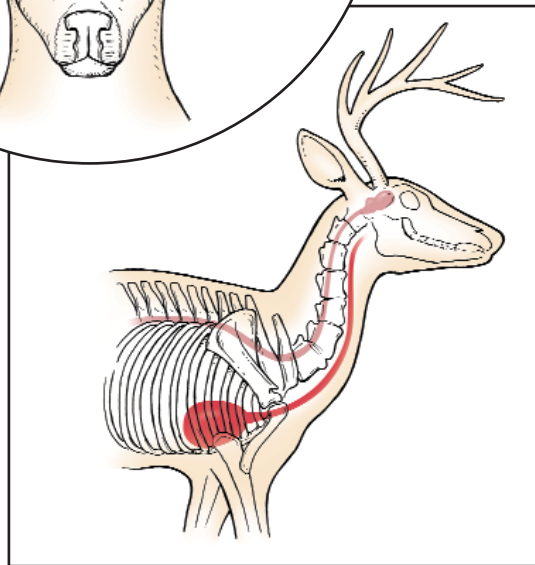


Demonstration/training on the correct use of the captive bolt.



Proper site is in deer similar to that in cattle.

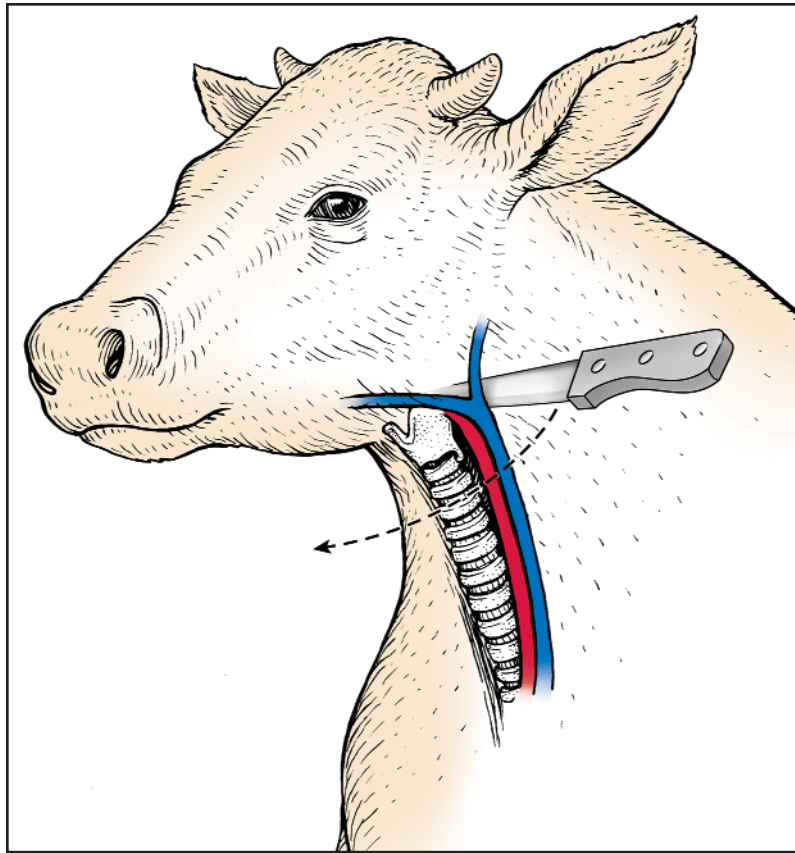
The methods described for emergency euthanasia of deer are similar to those described previously for cattle and small ruminants. Recommended positions and direction for firing of a penetrating captive bolt or gunshot in deer are as shown.



Since deer requiring euthanasia may be encountered on farm or roadside conditions, it is important to consider the natural instincts of fear and anxiety of a farm-raised versus a wild animal. Approaching an injured wild deer will likely increase its distress causing it to attempt to flee which may only compound its misery. In general, whenever wildlife are involved in highway accidents, the best advice is to contact the appropriate State authorities (e.g. in Florida, The Florida Fish and Wildlife Conservation Commission). Their personnel are properly trained to handle these emergencies.

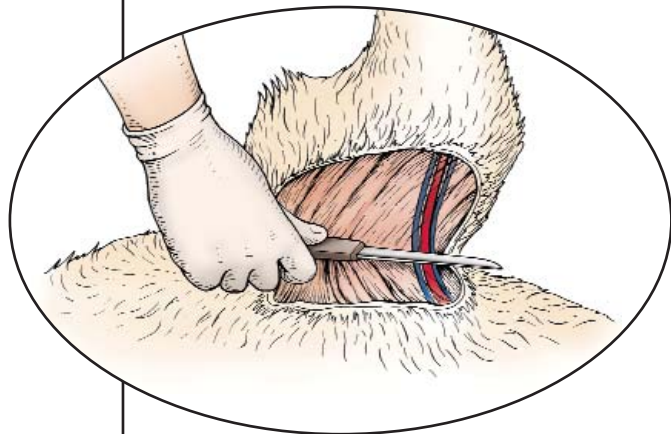
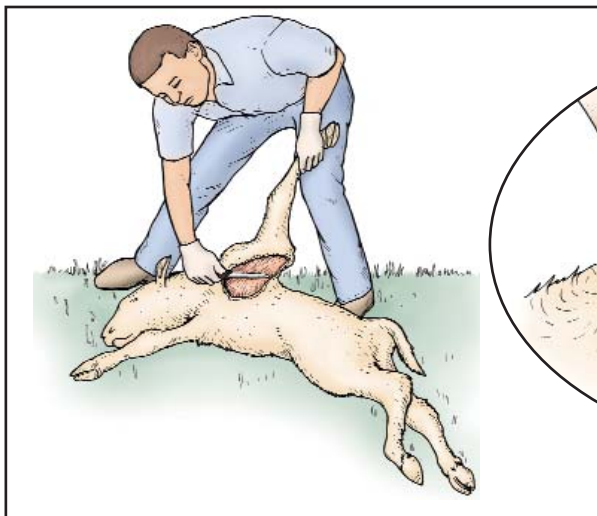
Exsanguination

Once the animal has been rendered unconscious, exsanguination procedures should be initiated to ensure death using a pointed, very sharp knife with a rigid blade at least 6 inches in length. As indicated previously, exsanguination procedures are required with the use of penetrating captive bolt. The knife should be fully inserted through the skin just behind the point of the jaw and below the neck bones. From this position the knife is drawn forward severing the jugular vein, carotid artery, and windpipe. Properly performed, blood should flow freely with death occurring within a few minutes (See diagram at right).



Alternatively, one may sever the brachial vasculature by lifting a front leg and inserting the knife deeply into the axillary area at the point of the elbow and cutting the skin, blood vessels, and surrounding tissue until the limb can be laid back away from the thorax of the animal. Regardless of the method used, great care should be exercised in performing exsanguination procedures. Although unconscious, animals in this state are capable of violent involuntary movement that may cause personal injury (See diagram below).

Exsanguination by severance of major blood vessels in the neck: 1) Jugular Vein, (indicated in blue color), 2) Carotid Artery, (indicated in red color), and 3) Trachea or Windpipe (white tube).



Confirmation of Death

Regardless of the method of euthanasia used, death must be confirmed before disposal of the animal. The following should be used to evaluate consciousness or confirm death.

Lack of a heartbeat
Lack of respiration
Lack of a corneal reflex

The presence of a heart beat can best be determined with a stethoscope placed under the left elbow. Please note that a pulse is usually not palpable under such circumstances and should not be used to confirm death. Movement of the chest indicates respiration but respiration rates may be very erratic and slow in unconscious animals. Therefore, one must be cautious in the interpretation of respiration for confirmation of death. One may test for evidence of a corneal reflex by touching the surface of the eyeball. Normal or conscious animals will blink when the eyeball is touched. Absence of a corneal reflex, failure to detect respiration, and absence of a heart beat for a period of more than 5 minutes should be used to confirm death. An alternative is to observe the animal over a period of several hours. Lack of movement, absence of a heartbeat, respiration, or corneal reflex over an extended period of time provides further confirmation of death.



Special Considerations for Euthanasia of Bulls

Bulls present particular challenges because of size, attitude, and the physical thickness of their skull. Specialized heavy duty penetrating captive bolt guns or higher caliber firearms (9 mm or .357) are required for euthanasia of bulls. As described previously, safety is of paramount importance. Since ideal positioning of either device requires close contact with the animal, restraint is usually necessary. Operators should recognize that restraint alone causes significant distress. By preparing the euthanasia device for use prior to restraining the animal, one can limit the restraint-related stress period.

Unacceptable Methods of Euthanasia

The following is a partial list of methods considered as “unacceptable” for euthanasia of livestock:

- Manually applied blunt trauma to the head such as a large hammer
- Injection of any chemical substance not labeled for use as a euthanasia agent
- Injection of air into a vein
- Electrocuting as with a 120 or 220 volt electrical cord

Under Florida law use of any of the above methods for euthanasia of livestock may be considered a violation of **Chapter 828.12** which states that: A person who intentionally commits an act to any animal which results in the cruel death, or excessive or repeated infliction of unnecessary pain or suffering, or causes the same to be done, is guilty of a felony of the third degree, punishable as provided in section 775.082 or by a fine of not more than \$10,000 or both.

Personnel Training

Large farms and ranches are advised to develop personnel training programs for proper instruction of humane euthanasia techniques. As indicated in the previous discussion, the skill and experience of personnel are of paramount importance when gunshot or penetrating captive bolt/exsanguination are used for euthanasia of sick and debilitated animals. Experience has shown that many people (even those experienced in handling livestock) are not aware of the anatomical landmarks for proper execution of these techniques. Furthermore, persons should be aware that there is significant danger for the operator (or for bystanders with gunshot) whenever these methods of euthanasia are used. On large farms or ranches, most, if not all, persons should be familiar with these procedures

and several should be specifically trained to perform this task. However, only those who can demonstrate a working knowledge and proficiency with the techniques should be permitted to perform euthanasia procedures. When these methods are not properly performed, animals may become injured, have varying degrees of consciousness, and experience needless pain and distress.

Experienced persons should assist in the training of inexperienced persons and utilize carcasses to demonstrate anatomical landmarks and application of the various techniques. Carcasses should be used for practice by trainees until they become competent with the procedures. People must also be aware of how to confirm death. In some cases this may require specific training with, and observation of, live animals.

Conclusions

The objective of humane euthanasia is to induce death without causing pain or distress to the animal. When veterinary options are unavailable, the physical methods of gunshot and penetrating captive bolt/exsanguination are acceptable. Both have advantages and disadvantages, and both require training for safe and effective use. Cadavers or carcasses may be used to perfect techniques and train personnel. Euthanasia is an unpleasant task, but knowing how to perform it competently not only prevents needless suffering, but avoids those even more unpleasant conditions where improper technique may increase pain and distress in animals requiring euthanasia.

References

1. Australian Veterinary Association. Guidelines on humane slaughter and euthanasia. Aust Vet J, 1987;64:4-7.
2. Blackmore DK. Energy requirements for the penetration of heads of domestic livestock and the development of a multiple projectile. Vet Rec, 1985;116:36-40.
3. Daly CC, Whittington PE. Investigation into the principal determinants of effective captive bolt stunning of sheep. Res Vet Sci, 1989;46:406-408.
4. Animal Rights Law, Florida Anti-Cruelty Statutes, Florida Statutes Title XLVI. Crimes. Chapter 828. Animals: Cruelty; Sales; Animal Enterprise Protection, 828.12 Cruelty to Animals.
5. Grandin, T, and Smith GC: Animal Welfare and Humane Slaughter. Web site at: <http://www.grandin.com/references/humane.slaughter.html>
6. Practical Euthanasia of Cattle: Considerations for the Producer, Livestock Market Operator, Livestock Transporter, and Veterinarian. Brochure prepared by the Animal Welfare Committee of the American Association of Bovine Practitioners, 1999.
7. 1993 Report of the AVMA Panel on Euthanasia. JAVMA, 1993, Vol. 202, No. 2, p. 230- 249.
8. 2000 Report of the AVMA Panel on Euthanasia. JAVMA, 2000, Vol. 218, No. 5, p. 669- 696.

For more information:

<http://www.vetmed.ufl.edu/lacs/HumaneEuthanasia.htm>

J. K. Shearer, DVM, MS
Professor and Dairy Extension Veterinarian
University of Florida
College of Veterinary Medicine
2015 SW 16th Avenue
Gainesville, FL 32610-0136
JKS@mail.ifas.ufl.edu

Phone: 352/392-4700, ext. 4112

PROCEDURES FOR THE HUMANE EUTHANASIA OF SICK, INJURED, AND/OR DEBILITATED LIVESTOCK

Prepared by:

J. K. Shearer, DVM, MS	and	Paul Nicoletti, DVM, MS
Professor		Professor
College of Veterinary Medicine		College of Veterinary Medicine
University of Florida		University of Florida
Gainesville, Florida		Gainesville, Florida

BROCHURE REVIEW AND ADVISORY COMMITTEE

Hines Boyd, PhD

Director of the Division of Dairy Industry
Florida Department of Agriculture and Consumer Services
Tallahassee, Florida

Art Darling

Executive Director
Sunshine State Milk Producers
Orlando, Florida

Temple Grandin, PhD

Associate Professor
Department of Animal Sciences
Colorado State University
Fort Collins, Colorado

Owen D. Rae, DVM, MPVM

Associate Professor
College of Veterinary Medicine
University of Florida
Gainesville, Florida

James Reynolds, DVM

Chairman of the Animal Welfare Committee
American Association of Bovine Practitioners
University of California, VMTRC
Tulare, California

Nikki Robinson

Assistant State Attorney
Nineteenth Judicial Circuit of Florida
Fort Pierce, Florida

Kim Staton

Program Coordinator
Humane Society of the United States, Southeast Regional Office
Tallahassee, Florida

For more information:

<http://www.vetmed.ufl.edu/lacs/HumaneEuthanasia.htm>

**J. K. Shearer, DVM, MS
Professor and Dairy Extension Veterinarian
University of Florida
College of Veterinary Medicine
2015 SW 16th Avenue
Gainesville, FL 32610-0136
JKS@mail.ifas.ufl.edu**

Phone: 352/392-4700, ext. 4112