Euthanasia of Rabid and Highly Suspect Rabid Dogs

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Key points
• For a guide to identifying rabid and highly suspect rabid dogs, and where euthanasia is recommended, refer to the guide Rapid Response to Rabid and Suspect Rabid Dog Alerts.
• For other reasons for Euthanasia see ‘Annex’.
• Quarantine and observe all suspect rabid dogs for 10 to 14 days where possible.
• Use only euthanasia drugs recommended here and use pre-euthanasia drugs where instructed.
• Only a qualified veterinarian should diagnose rabies, carry out euthanasia and confirm death.
• Pentobarbitone solution (drug used for euthanasia) should be administered only by a qualified veterinarian by intravenous injection, preferably once an animal is anaesthetised, using the recommended pre-euthanasia drugs. Intrahepatic or intraperitoneal injection is also valid if the animal is anaesthetised.
• Dogs and their owners should be treated with compassion. Euthanasia should occur in a quiet environment—sudden sounds or movements around the animal should be avoided.

Dog capture and handling
Refer to the guide Dog Capture and Handling. Also, please contact World Animal Protection for assistance with finding suitable trainers in dog capture and handling.
Risks and precautions

- Anyone bitten or scratched should wash the wound immediately under running water for 1.5 minutes with soap, then disinfect with ethanol (700ml/l) or iodine (tincture or aqueous solution) if available, and immediately go to the nearest approved hospital or bite treatment centre for an assessment of whether post-exposure rabies vaccination is needed - this includes dog owners assisting staff with vaccination and staff that have been previously vaccinated.

- All staff involved in mass vaccination of dogs should have completed the full course of pre-exposure vaccinations.

- A human First Aid Kit should be taken on every response trip.

- Any person with wounds on their hands or arms should not handle any rabid or suspect rabid dogs.

- Hands should be kept free of dog saliva at all times.

Related guides

Rapid Response to Rabid and Suspect Rabid Dog Alerts

Dog Capture and Handling

Vaccination Day
1. Introduction

1.1 Criteria for euthanasia

Definitions

The term Euthanasia comes from the Greek terms ‘eu’ meaning good and ‘thanatos’ meaning death. World Animal Protection uses the commonly understood meaning of euthanasia, which is also the definition used by the World Organisation for Animal Health (OIE, 2014): the act of inducing death in a humane manner.

The OIE (2014) also states that regarding euthanasia: ‘The general principles in the Terrestrial Code should be followed, with the emphasis on using the most practical, rapid and humane methods and ensuring operator safety.’

World Animal Protection demands euthanasia methods that:

1. are as painless as possible
2. achieve rapid unconsciousness followed by death
3. minimise animal fear, discomfort and distress
4. are reliable and irreversible.

To meet these criteria, the method should take into account the species, age and health of the animal. In addition the method should be accessible, simple to administer, safe for the operator and as psychologically acceptable to the operator as possible (World Animal Protection, 2014).

Euthanasia and rabies

When deemed the most appropriate action, according to the guide ‘Rapid Response to Rabid and Suspect Rabid Dog Alerts’, the euthanasia of highly suspect rabid dogs, unvaccinated dogs bitten by highly suspect rabid dogs or puppies of rabid mother dogs is an act of kindness in preventing animal suffering, and protects human health and reduces the risk of the disease spreading.

For a guide to identifying rabid, suspect rabid, and highly suspect rabid dogs, and appropriate action, please refer to the guide Rapid Response to Rabid and Suspect Rabid Dog Alerts.

Also see other potential reasons for euthanasia in ‘Annex: Criteria for euthanasia unrelated to rabies’.

1.2 Personnel and training

The OIE (2014) states that, “Regardless of the method used, it is important to minimise distress, anxiety and pain (of the dog) by ensuring that operators are appropriately trained”.

Only a qualified veterinarian should diagnose rabies, carry out euthanasia and confirm death.

Note: World Animal Protection recognises that some communities and countries lack the resources to carry out euthanasia in a way that meets the criteria outlined in this guide. For example, the correct drugs, adequate equipment and trained personnel may not be available. In such circumstances it is important for those responsible for animals to do their utmost to minimise animal pain, distress and suffering whilst working to obtain the necessary resources to facilitate the use of humane killing methods (World Animal Protection, 2014).

All methods of euthanasia have the potential to be poorly performed if operators are untrained and unsupported.
All personnel involved with euthanasia should receive training covering:

- behaviours associated with rabies in dogs
- risks and precautions (e.g. use of protective clothing, pre-exposure vaccinations)
- correct dog handling techniques to avoid animal distress and risks to staff
- how euthanasia drugs work
- sedation / anaesthetic procedures
- signs of death

**Protective clothing**

Extreme care should be taken when handling and euthanizing animals suspected of having rabies. All operators handling rabid or highly suspect rabid dogs should:

- cover all exposed skin, with a minimum of closed shoes, long trousers and long shirt (to minimise the risk of a random dog bite)
- wear eye goggles or a face shield (to prevent dog saliva being sprayed into the human eye)
- wear robust gloves, when practical, of a material that cannot be readily pierced by the teeth of a dog (e.g. leather, synthetic material or thick cloth).

**Note:** Gloves can make handling difficult, but once an animal is sedated or anesthetized double-layered, thinner, disposable gloves can be used. Always keep hands clean of saliva.

**Dog capture and handling**

All rabid or highly suspect rabid dogs must be handled in a way that:

- minimises any pain, fear and distress experienced by the dog,
- prevents handlers from being bitten and minimises human contact with animal body fluids.

Rabid dogs respond to sound and sudden movement more than a healthy dog – this can be used to assist the handler in catching or restraining the dog but also emphasises the importance of providing a quiet environment for the euthanasia procedure. (D. Stewart, personal communication, 25 September 2014).

For comprehensive instructions, refer to the guide **Dog Capture and Handling** and Vaccination protocol in the guide **Vaccination Day**.

It is highly recommended that dogs are caught using a net. Where sedation/anaesthesia is to be used, this can be administered through the net. A catch pole can be used if an anaesthetised dog needs to be moved from the net to a transport cage or other.

**Professional and sympathetic conduct**

All personnel involved with euthanasia should show professionalism and respect for animal welfare, the value of animal life, and the safety and care of all people involved. Possibly the most important aspect during euthanasia is the handling of the animal. The animal about to be euthanized should be treated with dignity and in a humane manner.

It is also important to recognise the effect of euthanasia on the owner/carer. It is vital to carefully and sympathetically explain why the euthanasia of their dog is needed and the details of the procedure (emphasising that drugs will be used to ensure that death is painless).
Signs of pain and distress in dogs (also possible clinical signs of rabies)
Handlers should be taught how to detect and alleviate fear, pain, anxiety and distress. The following behaviours or physiological responses may be signs of fear, pain, anxiety and distress (Note: Some of these signs could also represent underlying clinical rabies):
- Aggression towards humans or redirected aggression towards self or inanimate objects e.g. snapping, biting, growling
- Vocalisation - whining, whimpering, high pitched barking, howling, or growling
- Attempting to escape or withdraw from the situation, struggling
- Panting
- Hyperventilating
- Salivating
- Pupils becoming dilated
- Piloerection (hair standing on end)
- Increased heart rate (tachycardia)
- Shivering, muscle tremors and spasms
- Immobility or freezing
- Urination / Defecation
- Anal sacs are emptied (foul smelling liquid is evacuated)

Confirmation of death
Those performing euthanasia must be able to identify when death has occurred. Indicators of death are detailed in the following table. (Note: Most of these indicators must be present to confirm death).

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>No movement of the chest / No signs of rhythmic respiration/breathing</td>
<td>DO NOT rely on this sign alone as the animal’s heart may continue to beat for some time after it has stopped breathing. Agonal, ‘last gasps’ are a sign the animal is in the process of dying.</td>
</tr>
<tr>
<td>No heart beat</td>
<td>Check for this with a stethoscope or by palpating the animal’s chest wall.</td>
</tr>
<tr>
<td>No pulse</td>
<td>Check for this by palpation over the medial aspect of the animal’s hind limb (femoral artery).</td>
</tr>
<tr>
<td>Loss of colour from the mucous membranes in the animal’s mouth (Note: Be careful with an contact with saliva)</td>
<td>Mucous membranes become pale and there is no pink colour if pressure is applied (no capillary refill). With time the mucous membrane becomes dry and sticky. Capillary refill is frequently still evident for prolonged periods after an animal has died.</td>
</tr>
<tr>
<td>Corneal reflex (blink reflex) is lost</td>
<td>After death, the animal’s eyes remain open and the lids do not move when the eyeball is touched.</td>
</tr>
<tr>
<td>Glazing of the eyes</td>
<td>This occurs rapidly after death. The cornea loses its clear, moist appearance and becomes opaque, dry and wrinkled.</td>
</tr>
<tr>
<td>Rigor mortis (Note: does not occur immediately after death)</td>
<td>Limbs of the corpse become stiff and difficult to move or manipulate. If death cannot be confirmed by a veterinary surgeon, or there is any doubt, operators should wait until rigor mortis has set in before disposing of the animal’s carcass</td>
</tr>
</tbody>
</table>
2. Methods for euthanasia
All procedures for euthanasia must comply with veterinary legislation for the region.

2.1 Preparation
Appropriate preparation should always occur to ensure safe and humane handling of animals for euthanasia. Firstly, personnel should ensure that all materials are available at hand and the environment is practical for the procedure.

Environment
Recommended
• A quiet room away from other animals and other people (including a secure area for pre-euthanasia drugged animals)
• An examination table approximately 90cm in height, with a non-slip surface, to facilitate handling and accurate injecting
• Good lighting.

For field euthanasia
• A quiet area away from other animals and other people
• An examination table (as above). If a table is not available, use a flat clean surface, such as a large towel on the ground.
• Good lighting

Owner/carer education
It is recommended that you have a flyer / brochure available to give to all owners/carers of dogs to be euthanized, explaining the importance of vaccination, rabies symptoms, bite prevention and treatment. Please contact World Animal Protection for more information.
**Materials & equipment**

*Note:* Please check the availability of drugs in your region and regulations regarding controlled drugs. To minimise stress and maximise safety while handling, it is suggested that all dogs in a rabies endemic area are at least sedated or, where needed, anaesthetised before euthanasia (see 2.2 Methods for Administering Pre-euthanasia Drugs).

<table>
<thead>
<tr>
<th>Materials &amp; equipment</th>
<th>Quantity per 25 dogs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-euthanasia drugs preferred and used together:</td>
<td></td>
</tr>
<tr>
<td>• Xylazine 20mg/ml, Dose rate: see below</td>
<td>50ml</td>
</tr>
<tr>
<td>• Ketamine 100mg/ml, Dose rate: see below</td>
<td>50ml</td>
</tr>
<tr>
<td>A quiet, secure area for pre-euthanasia procedures.</td>
<td></td>
</tr>
<tr>
<td>Euthanasia drug: Sodium Pentobarbitone</td>
<td>Recommended: Intravenous (IV) injection of 20% Pentobarbitone solution (see Table 4 for quantity per kg dog weight)</td>
</tr>
<tr>
<td>Disposable syringes (with off-centre nozzles); 3, 5, 10 and 20ml</td>
<td>25 of each size</td>
</tr>
<tr>
<td>Disposable needles: 22 gauge and length 1 inch (2.5cm) (convenient for most sized dogs). Some 18 gauge needles for removing pentobarbitone from bottle.</td>
<td>1 box/team (25+) 22 gauge (A new needle for every injection plus spares)</td>
</tr>
<tr>
<td>Catheter (only for dogs with fragile, damaged veins)</td>
<td>1 box/set gauge 22</td>
</tr>
<tr>
<td>Firm plastic boxes or bottles for storing needles and syringes – one for sterile and one for used needles &amp; syringes</td>
<td>1 of each per team</td>
</tr>
<tr>
<td>Disposable gloves</td>
<td>2 packs of various sizes</td>
</tr>
<tr>
<td>Protective clothing</td>
<td></td>
</tr>
<tr>
<td>Cotton wool</td>
<td>500g</td>
</tr>
<tr>
<td>Curved scissors (medium)</td>
<td>1 per team</td>
</tr>
<tr>
<td>Stethoscope</td>
<td>1 per team</td>
</tr>
<tr>
<td>Alcohol 70%</td>
<td>250 ml</td>
</tr>
<tr>
<td>Large plastic bags (bin liners) for dead dogs for later sampling and disposal</td>
<td>30</td>
</tr>
<tr>
<td>Specialist capture and restraint equipment (such as throw nets, pole nets, slip leashes, muzzles (and tools to repair netting)</td>
<td>2 per team</td>
</tr>
<tr>
<td>Strong gauze or bandages for muzzling dogs if needed (do not re-use)</td>
<td>2 rolls per team</td>
</tr>
<tr>
<td>Education materials explaining vaccination, rabies symptoms, bite prevention and treatment</td>
<td>100+</td>
</tr>
<tr>
<td>Human FirstAid box including soap, water, towels, band aids, cotton wool, bandages, antibacterial cream, antiseptic. Telephone number and directions for a range of suitable clinics or hospitals.</td>
<td>1 per team</td>
</tr>
</tbody>
</table>
2.2 Method for administering pre-euthanasia drugs

The use of pre-euthanasia drugs is strongly recommended to facilitate safe and humane handling of animals prior to euthanasia, particularly if they are fractious, aggressive or fearful. Moreover, the prior administration of suitable pre-euthanasia drugs is highly recommended for some euthanasia agents (such as I/H and IP Pentobarbitone) to ensure they are humane.

Please refer to ‘2.3 Methods for Administering Euthanasia Drugs’ for further guidance on when to use pre-euthanasia drugs.

**Recommended Drugs:** Xylazine (sedative agent) and Ketamine (immobilising agent only thus Ketamine must never be used alone).

Where Ketamine is not available, an alternative anaesthetic agent or combination must be used. In some cases, very heavy sedation with higher dosage of Xylazine is acceptable though this may make intravenous injection difficult. In these cases, intrahepatic injection of pentobarbitone is safe and reasonably rapid.

The pre-euthanasia drugs recommended here require minimal animal handling during their administration as they are usually given as an intramuscular injection (unless contraindicated by the manufacturer). Most other pre-euthanasia agents, however, will require intravenous administration.

**Note:** The use of these drugs can add significantly to the time taken to perform euthanasia and this should be considered in advance to safeguard animal welfare.

**Steps**

1. **Capture and handling**

Secure the dog (using a net or lead with muzzle) ready for drug administration according to the guide *Dog Capture and Handling*. If the dog is aggressive, watch it carefully and attempt to capture it using a net once it has calmed down.

2. **Determine dose rate**

Where possible, weigh the dog to determine the dose rate. If this is not possible, experienced personnel may be able to estimate the weight of the dog.

Heavily sedate the dog using a mixture of Xylazine 20mg/ml & Ketamine 100mg/ml in a 1:1 solution and then administer according to the dose rates according to Table 3.

<table>
<thead>
<tr>
<th>Table 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Xylazine (2mg/kg) + Ketamine (10mg/kg):</strong></td>
</tr>
<tr>
<td><strong>Weight (Kg)</strong></td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>5</td>
</tr>
<tr>
<td>10</td>
</tr>
<tr>
<td>15</td>
</tr>
<tr>
<td>20</td>
</tr>
</tbody>
</table>

For example: For a 10kg dog draw up 1ml of Xylazine and 1ml of Ketamine into the same 3ml syringe with a 22G needle attached.
3. Administer pre-euthanasia drug
Administer the injection intramuscularly either in the rear leg or back (through the net if the dog is being restrained in this way). Insert the needle exactly perpendicular to the skin. Note: The Ketamine does unavoidably sting on injection. Xylazine may induce some vomiting.

Risk: Rear leg injection risks damaging the sciatic nerve and leg bones. To avoid this, use experienced injectors only using a short needle injecting in the cranial (forward) muscles of the upper hind leg.

4. Confirm sedation
Wait 10 minutes until the dog is sedated. If more sedation is needed, then give another 1/2 dose intramuscularly. Do not release from the net until absolutely sure the animal is heavily sedated.

5. Proceed with euthanasia drug – refer to ‘2.3 Methods for Administering Euthanasia Drugs’.

2.3 Methods for administering euthanasia drugs

*UNACCEPTABLE METHODS include: Poisoning (Strychnine & Cyanide), electrocution, decompression, gassing, hanging, drowning, shooting*

Pentobarbitone solution (sometimes called Pentobarbitone sodium or sodium pentobarbital) is a barbiturate specifically formulated for euthanasia. The types of pentobarbitone that you use will depend on what is available and registered in your country (Nembutal is commonly used).

Intravenous (IV) injection of 20% Pentobarbitone solution at the rate of 1.50mg /kg is considered ‘best practice’ because it consistently produces a humane death when used as the sole means of euthanasia.

RECOMMENDED: Intravenous (IV) injection of 20% pentobarbitone solution

<table>
<thead>
<tr>
<th>Method</th>
<th>Remarks</th>
</tr>
</thead>
</table>
| Intravenous (IV) injection of 20% Pentobarbitone solution | • Rapid acting  
• Rapid loss of consciousness, followed by cardiac arrest  
• No distressing side effects  
• Requires simple training and practice  
• Relatively cheap  
• Not licensed for use in all countries. Permit required in some.  
• Cost and availability may vary from country to country  
• Sodium Pentobarbitone causes circulatory collapse, respiratory arrest and cerebral death.  |
| Barbiturate (e.g. Nembutal)     | Combinations of high concentrations of barbiturate with a local anaesthetic may also be available and suitable if given intravenously as a euthanasia agent. |

Use of pre-euthanasia drugs

• Light sedation highly recommended, unless very experienced vet is administering euthanasia drug.
• Heavier sedation or full anaesthesia if dog is fearful, fractious or aggressive.
Table 5 Dosages of Pentobarbitone IV (e.g. Nembutal) IV (150mg/kg)

<table>
<thead>
<tr>
<th>Weight (Kg)</th>
<th>50mg / ml</th>
<th>100mg / ml</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3ml</td>
<td>1.5ml</td>
</tr>
<tr>
<td>5</td>
<td>15ml</td>
<td>7.5 ml</td>
</tr>
<tr>
<td>10</td>
<td>30ml</td>
<td>1.5ml</td>
</tr>
<tr>
<td>15</td>
<td>45ml</td>
<td>22.5ml</td>
</tr>
<tr>
<td>20</td>
<td>60ml</td>
<td>30ml</td>
</tr>
</tbody>
</table>

*Dosage for other drugs: As per manufacturers' instructions

**ACCEPTABLE**

The following methods also produce a humane death when used as the sole means of euthanasia. However, there are practical limitations to their use (see table).

- Intrahepatic (IH) or intraperitoneal (IP) injection may be practical alternatives when IV injection is difficult due to collapsed or poor venous access precluding IV injection, or in fractious dogs. IH is preferable as it is quicker acting and easier than IP.
- Intravenous (IV) injection of anaesthetic agents, given as an overdose, may be suitable if animals are already anaesthetised for surgery and, on humane grounds, not permitted to regain consciousness.

<table>
<thead>
<tr>
<th>Method</th>
<th>Remarks</th>
<th>Dosage</th>
<th>Use of pre-euthanasia drugs</th>
</tr>
</thead>
</table>
| **Intrahepatic (IH) injection of 20% Pentobarbitone solution*** Barbiturate (e.g. Nembutal) | • Use when IV is difficult  
• Quicker and easier than IP  
• Takes longer to take effect than IV injection: 5–10 minutes (dependent upon the size of the dog)  
• A larger dose may be required than if given intravenously  
• Can be combined with local anaesthetic to reduce risk of irritation  
• Requires simple training (done with dog on back or on side). | 300mg/ml (i.e. Twice the IV dosage) | Yes always unless the dog is unconscious |
| **Intraperitoneal (IP) injection of 20% Pentobarbitone solution*** Barbiturate (e.g. Nembutal) | • Use when IV is difficult  
• Slow acting  
• Takes 15–30 minutes to take effect (dependent upon the size of the dog)  
• A larger dose may be required than if given intravenously  
• May not be suitable for the euthanasia of larger animals  
• The use of pre-euthanasia drugs may prolong the time until death  
• May cause irritation to the peritoneum, particularly with       | 300mg/ml (i.e. Twice the IV dosage) | Yes always unless the dog is unconscious |
2.3 Methods for administering euthanasia drugs

2.3.1 Method for intravenous (IV) injection of pentobarbitone

A minimum of two people are required for intravenous injections: one person to restrain the animal safely and humanely (referred to hereafter as ‘the assistant’), and the second to accurately deliver the intravenous injection for euthanasia (referred to hereafter as the ‘operator’).

Steps

1. Assess the dog’s temperament and ease of handling
Dogs that are not used to being handled by humans may experience fear when placed in novel surroundings. Any dogs that are likely to be aggressive or difficult to handle may pose a risk to personnel. In these instances it is both more humane and safer for these animals to be sedated prior to euthanasia, see ‘Pre-euthanasia drugs’ in this guide.

Some nervous and aggressive dogs may require muzzling to avoid danger to handlers. If no muzzle is available, a bandage tied around the dog’s nose and then behind the head (also known as a tape muzzle) can work in the short term (see guide Dog Capture and Handling).

2. Determine dose rate
Where possible, weigh the dog to determine the dose rate. If this is not possible, experienced personnel may be able to estimate the weight of the dog. Determine the dose of Pentobarbitone according to the table above or manufacturer’s instructions.

3. Fill the syringe
i. Attach a new, disposable needle to the nozzle of a new, disposable syringe, and then insert into the bottle containing Pentobarbitone for filling. Also have another syringe at hand in case an error occurs in injecting.
ii. To prevent a vacuum forming in the bottle, it is advisable to first inject an amount of air equal to the volume of drug to be used into the bottle.
iii. Fill the syringe with the correct dose.
iv. Remove the needle and syringe from the bottle and replace the cap on the needle for safety.
4. Correct handling and restraint
(Also see guide *Dog Capture and Handling*, and *Vaccination Protocol in the guide Vaccination Day*)

When an examination table is available:
- Gently lift the animal on to the examination table. Large or difficult dogs may require more than one handler for restraint.
- Where possible the animal should be in the sitting or lying position.
- The dog should be facing the operator who will be giving the intravenous injection.
- If the operator is right handed, the assistant should stand on the animal’s left. The assistants’ arm passes over the back of the dog and the other arm holds it under the chin.

[Source: Washington State University, 2014]

When an examination table is NOT available:

a. **Normal conditions** (Pre-euthanasia drugs not given - placid, sick animal posing no danger to handler)
   - If the owner/carer is willing to be present, it is preferable for them to hold the dog as the dog will trust them (they will need to be instructed on how to hold the animal).
   - In most cases the owner will not wish to be present. The assistant and operator should be calm and reassure the animal, working deliberately but not in a rushed, panic way as the dog will sense it. Dogs should be held firmly but not so tightly that it becomes uncomfortable.

[Source: WSPA, n.d.]

5. Prepare site of injection: Cephalic vein

The cephalic vein in the dog’s foreleg is the most convenient site for intravenous injection. When the animal is held correctly the cephalic vein is visible on top of the foreleg. It is usually very helpful to clip a small amount of hair on the foreleg where the injection is to be given.

[Source: WSPA, n.d.]
6. Prepare for the injection
i. The image shows the correct method for holding the leg for injecting. The operator is right-handed and the assistant stands to the side of the dog, and uses their thumb to raise the cephalic vein, enabling the operator to insert the needle.

ii. Insert the point of the needle gently through the skin and up into the vein, parallel to the skin surface. (Place the bevel of the syringe against the animal’s skin).

iii. Before injecting the Pentobarbitone, it is essential to confirm that the needle is correctly positioned in the vein. In large dogs blood will flow naturally back into the liquid within the syringe. In small dogs you may need to draw the plunger back slightly. If positioned correctly blood should flow back into the syringe.

iv. When the needle is correctly positioned, the assistant needs to release their thumb pressure so that the intravenous injection can be given steadily.

8. Ensuring the injection has been delivered
Inject the dose with care ensuring that the needle remains in the vein. Injection into the surrounding tissues is rare but possible especially if the needle is accidentally moved during injection, and causes swelling around the vein and possible pain and irritation to the dog. Should this occur the procedure should be stopped, the syringe and needle removed and a new attempt made at a different position on the vein or using the vein on the other foreleg.

If the dosage and delivery is correct, the dog will normally become unconscious before the end of the injection and death follows almost immediately with complete freedom from pain or distress.

9. Confirm death

Confirm death using the indicators stated in the ‘Introduction’ of this guide.

Note: If there is any doubt, operators can wait for rigor mortis to set in before disposing of the dog’s carcass (BUT this can take several hours and varies with size of the dog).
2.3.2 Method for intrahepatic (IH) injection of pentobarbitone

Note: When injected into the liver, the absorption rate is faster than intraperitoneal but requires anatomical knowledge.

Steps
1. Administer pre-euthanasia drugs
   Preeuthanasia drugs must be administered before the IH injection. See ‘2.2 Method for Administering Pre-euthanasia Drugs’.

2. Dose rate of euthanasia drug
   Where possible, weigh the dog to determine the dose rate. If this is not possible, experienced personnel may be able to estimate the weight of the dog. Determine the dose of Pentobarbitone according to the entry for intrahepatic dosage in the table above or manufacturer’s instructions.

3. Filling the syringe
   i. Attach a new, disposable needle to the nozzle of a new, disposable syringe, and then insert into the bottle containing Pentobarbitone for filling. Also have another syringe at hand in case an error occurs in injecting.
   ii. To prevent a vacuum forming in the bottle, it is advisable to first inject an amount of air equal to the volume of drug to be used into the bottle.
   iii. Fill the syringe with the correct dose.
   iv. Remove the needle and syringe from the bottle and replace the cap on the needle for safety.

4. Positioning of dog
   Gently lift the anaesthetised animal on to an examination table (if available). Place the dog in lateral recumbency (on the right side).

5. Site of injection
   Palpate the liver behind the diaphragm and then inject via the abdominal wall into the liver lobes itself.

6. Confirm death
   The drug will take effect in 5 to 10 minutes. Confirm death using the indicators stated in ‘1. Introduction’.

Note: If there is any doubt, operators can wait for rigor mortis to set in (this can take several hours and varies with size of the dog) before disposing of the dog’s carcass.

(Source: AVMA, 2013)

2.3.3 Method for intraperitoneal (IP) injection of pentobarbitone

Steps
1. Administer pre-euthanasia drugs
   Preeuthanasia drugs must be administered before the IP injection. See ‘2.2 Preeuthanasia Drugs’.

2. Dose rate of euthanasia drug
   Where possible, weigh the dog to determine the dose rate. If this is not possible, experienced personnel may be able to estimate the weight of the dog. Determine the dose of Pentobarbitone according to the entry for intrahepatic dosage in the table above or manufacturer’s instructions.

3. Filling the syringe
   i. Select an appropriate gauge and length of needle depending on the size of the animal.
ii. Attach a new, disposable needle to the nozzle of a new, disposable syringe, and then insert into the bottle containing Pentobarbital for filling. Also have another syringe at hand in case an error occurs in injecting.
iii. To prevent a vacuum forming in the bottle, it is advisable to first inject an amount of air equal to the volume of drug to be used into the bottle.
iv. Fill the syringe with the correct dose.
v. Remove the needle and syringe from the bottle and replace the cap on the needle for safety.

4. Handling and restraint
Restrain the anaesthetised animal in dorsal (on its back) or lateral recumbency (on its side) and elevate animal’s hind legs 10 to 15 cm higher than front legs.

5. Site of injection
Insert the needle midway between umbilical and pelvic area just lateral to the mid line (linea alba). Before injecting draw back and observe for blood, urine, or any other fluid entering into the syringe. If there is nothing aspirated inject the drug into the peritoneal cavity.

6. Confirm death
The drug will take 15–30 minutes to take effect (dependent upon the size of the dog). Confirm death using the indicators stated in ‘1. Introduction’.

Note: If there is any doubt, operators can wait for rigor mortis to set in (this can take several hours and varies with size of the dog) before disposing of the dog’s carcass.

2.4 Carcass disposal
• No animal should be disposed of until death is verified.
• Disposal should take into account local and/or national regulations, including those on disease control and drug residues.

Handling: Special precautions should be taken when handling the carcass of any animal suspected of carrying rabies, including the use of protective clothing as detailed in ‘1. Introduction’.

Disposal: The carcass should be sealed in a plastic bag, as the external surfaces of the carcass can remain infective for several hours after death, and the internal organs can remain infective for several weeks depending upon environmental temperature. Because of this, and possible drug residues, burial is not recommended. Incineration is recommended when using pentobarbital (in any form).

Testing: National or local regulations should require that the head or a sample of brain tissue are sent to a public health authority laboratory for testing and surveillance. Extreme care should be taken when cutting any rabid or highly suspect rabid dog with use of full protective clothing and thorough disinfecting of the area post procedure.

2.5 Record keeping
Complete a Euthanasia Form and a Disease Surveillance Form and send these to the local authorities. When Rapid Response is involved, also complete the Rabies Rapid Response and Sample Submission Form.
3. Management of controlled veterinary medicines

Reporting and recording of use of medicines must be done on a daily basis.

The practice of euthanasia uses veterinary medicines that are controlled to avoid any misuse in the field. Controlled medicines include:

- Pentobarbital (e.g. Nembutal, Lethobarb, Valabarb)
- Ketamine
- Xylazine (in some countries)

It is good practice for controlled drugs to be kept separate from other medicines.

All controlled veterinary drugs need to be under the management of a veterinary surgeon at all times as appropriate for the legal requirements of the country. They need to ensure that the drugs are kept in a locked container, which is constructed and maintained to prevent unauthorised access to the drugs and can only be opened by a veterinary surgeon or other persons authorised by her/him.

The veterinary surgeon must keep a Controlled Drug Register (as appropriate for the legal requirements for the country) which must include the following:

- a separate page for each veterinary drug
- entries made at the time of the transaction
- entries made in ink or in a computerised form in which every entry is capable of being audited
- no cancellations, obliterations or alterations; corrections must be made by a signed and dated entry in the margin or at the bottom of the page
- be kept at the premises to which it relates and be available for inspection at any time. A separate register must be kept for each set of premises
- not be used for any other purpose.

For each controlled drug purchased and received the following details as a minimum must be recorded in the Register:

- Date & quantity received
- Name and address of sender

For each controlled drug supplied/used the following details must be recorded in the Register:

- Date supplied and then used
- Name/address of person supplied
- Quantity supplied/used
- Reason for use of drug

When the Rapid Response teams take these drugs for dog euthanasia, they should be transported in a lockable bag, box or case which should be kept locked when not in use. Storing in a locked car alone does not meet regulations.

- It is good practice for the locked bag not to be left unattended in a vehicle for any length of time (or left in the sun for any period, to prevent deterioration).
- Each veterinary surgeon is responsible for the receipt and supply of controlled drugs from their own bag and a separate Controlled Drugs Register must be maintained.
- All controlled veterinary medicines should be signed in and out daily.
References


Annex: Criteria for euthanasia unrelated to rabies

Injured dogs, dogs with incurable illness, and dogs with prolonged suffering:

- Dogs suffering from broken vertebrae so that they cannot stand, cannot control urination, defecation or walk on all four limbs without significant pain and suffering.
- Roaming / outdoor dogs with bone injuries [legs or jaw]. If the owner is available, then the owner must guarantee responsibility for taking the dog to a competent veterinarian to be diagnosed, treated, or to have the infected limb amputated; if necessary. If the owner cannot guarantee responsibility, then euthanasia must be performed.
- Roaming / outdoor dogs missing one part of the body and the wound has attracted maggots etc. If the owner is available, then the owner must guarantee responsibility to provide proper treatments. If no guarantee can be made, then euthanasia must be performed.
- Roaming / outdoor dogs suffering from severe acute or chronic skin diseases [hemorrhage, major hair loss and itching]. If an owner is available, then the owner must guarantee responsibility to provide repeated treatments with ivermectin (if a parasitic infection) and to follow proper medication instruction from a veterinarian. If no guarantee can be made or if severe underlying disease is diagnosed, then euthanasia must be performed.

Animals suffering from infectious diseases:

- Parvovirus suspects
- Distemper suspects

Euthanasia of a healthy animal may be justified in circumstances where the animal presents a significant risk to human health and safety, or the safety of other animals and all alternative options have been considered (World Animal Protection, 2014).