Educational Division of Lap of Love

TIPS FOR A TECHNICALLY SMOOTH EUTHANASIA

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Learning Objectives:

- Effectively administer euthanasia solution using each technique
- Make better decisions towards technique selection
- Appreciate the complexities of the procedure

PRE-EUTHANASIA SEDATION OR ANESTHESIA

In 2013, the American Veterinary Medical Association (AVMA) stated that use of pre-euthanasia sedation or anesthesia should be provided whenever practicable, especially with companion animals, when those present for the death of their pet could have negative mental health impacts from watching their pet struggle in the final moments of life. While they advocate for its use, it is not required for euthanasia to be achieved. Thankfully, there is a growing constituent of veterinary professionals understanding sedation or anesthesia is an essential component for good death.

Inducing a sleep-like state should be considered when euthanizing companion animals in the presence of loved ones. Every veterinary team will have a preferred protocol to use, which should always be adjusted to meet the individual needs of the animal. A standardized, consistently delivered protocol means every pet receives some sedation or anesthesia before euthanasia.

As you can imagine, there are pros and cons to using pre-euthanasia sedation or anesthesia.

Pros: Minimizes fear and anxiety
Allows for closeness before death
Minimizes restraint during euthanasia itself
Relieves pain before death
Increases technique options
Can act as an introduction to death itself

Cons: May lead to physical distress in critical animals
Can slow down time to death
Greater expense

Common drugs to use for sedation or anesthesia include alpha2-agonists, tranquilizers, opiates, and dissociatives. The pharmacology of these drugs should be well understood, including side effects in the face of ongoing illness typical of the dying process.

Typically, pre-euthanasia sedatives and anesthetics are used in combination with each other in synergy to deliver the smoothest results. A sedative protocol only contains sedative drugs while an anesthetic protocol only needs one anesthetic drug to be considered an anesthesia protocol. Drugs can be administered via different routes including oral, transmucosal, subcutaneous, intramuscular, intravenous, and inhaled.

Injection pain may be reduced by using small needles, injecting slowly, diluting low pH drugs with saline, and rubbing the area beforehand to desensitize the area. It is also a good habit to distract with treats or items of interest.

FALLING ASLEEP

Depending on the pet patient's health status and signalment, it may be advisable to reach for an anesthetic protocol over a sedative. Patients that are high energy, nervous, dyspneic, aggressive, or in severe pain may resist sedation alone and require something stronger to induce unconsciousness. With enough stimulation, animals can awake from sedation, increasing risk of pain and further anxiety during the euthanasia procedure. Therefore, intraorgan euthanasia methods, such as intracardiac injections, require anesthesia.

During early stages of relaxation through sedation or anesthesia, pets can have a stuporous appearance, be ataxic, and lick their lips. Their eyes can and often do remain open. There is typically change to the respiratory rate and this varies from patient to patient. And we certainly expect and desire the pet to enter a state of unconsciousness or very deep sleep. Urination and defecation commonly occur during and after death, but if the pet is very deep in sleep, the body can begin to release fluids during sleep. This makes it necessary to be proactive rather than reactive and protect the pet's hind end with absorbent materials. Blood pressure changes are expected and acceptable but add to the complexity. It means venous access is more challenging and time to death may be slowed. Muscle fasciculations and/or twitching is acceptable but can alarm those in the room. We describe them as the body's way of releasing energy and that they are very normal in this state of sleep. It's our responsibility to avoid drugs and protocols that will lead to actual vomiting, especially in already critical patients.

CHOOSING THE RIGHT EUTHANASIA TECHNIQUE

When choosing a euthanasia technique, choose one that is appropriate for the situation and take all factors into consideration. The method of euthanasia you choose will depend on many things:

1. Comfort with the technique
2. Supplies
3. The presence of onlookers
4. Availability of euthanasia solution
5. The signalment and physical condition of the animal

With any of these techniques, take your time and be consistent. If you feel the method you start out with is not going to work, readily move on to another to ensure things continue smoothly for the client and the pet. You will have to decide just how fast to move onto another technique if the first is not working.

The following list of techniques are AVMA approved and are considered common techniques for dogs, cats, and some exotics. Remember that intraorgan injections in the US and Canada require patient unconsciousness which can be facilitated with anesthetic drugs. Euthanasia solution is assumed at a concentration of 390 mg/ml.

Intravenous Injection (85 mg/kg)

Pros	Cons
Fast and effective	Venous access necessary
Standard dosing of euthanasia solution	Blood pressure concerns
Sedation not required	Requires moderate skill

To perform an intravenous injection, you need to find a vein to work with. The accessory cephalic and cephalic veins in the front leg and the medial and lateral saphenous veins in the back leg are most common. Each has its pros and cons. Pick the one that is most appropriate under the circumstances.

Prepare your solution ahead of time if you can. IV injections using a barbiturate require dosing of 1ml per 4.5kg of body weight. If your euthanasia solution is extremely thick, you can dilute it with saline to ease its movement through the needle and catheter. The saline does not negatively affect cardiac arrest time or postmortem side effects. If you insert your euthanasia syringe with needle directly into the vein, make sure to draw back and check for blood, using a luer lock syringe. To be safe, you should draw back at least once during venous administration to make sure that your needle is still placed correctly.

Once you have your needle inserted directly into the vein or a catheter placed, inject slowly and steadily to avoid putting too much pressure on your setup. When all of the solution has been injected, and you are certain it all went into the vein, you can remove your needle. Apply pressure to your injection site to stop any bleeding. If you have a catheter placed, you can flush with saline to clear your catheter of the euthanasia solution. When performing an intravenous injection, remember that death occurs very quickly. You should start to see the effects of your injection within 30 seconds or so. Let the client know what they might see before you start injecting. Once death has occurred, remove the catheter and wipe your injection site with the hydrogen peroxide-soaked gauze.

**Note that catheter placement is not required for IV administration, but the AVMA advises their use when owners are present.

Intracardiac Injection (85 mg/kg)

Pros	Cons
Fast and effective	General perception as gruesome
Eliminates venous pressure concerns	Requires advanced skill
Works for all domesticated pets	Requires sedation

The easiest way to give an intracardiac injection is to have the pet lying in lateral recumbency on either their right or left side. A dog lying on its right side may be easier to auscultate from the left and the left ventricle is usually the easiest chamber to inject. The heart in most dogs and cats will reside from the 2nd or 3rd intercostal space (ICS) to the 5th or 6th ICS and from the sternum to about two-thirds of the way up the thorax. The heart may be more cranial and ventral than you think it will be. When auscultating the heart, you need to pinpoint the Point of Maximum Intensity (PMI). On the left side of the chest, this will likely be the point of the aortic valve (AV) located in the 4th intercostal space at the level of the shoulder. On the right side, the right AV will be the loudest and is also in the 4th intercostal space at the level of the olecranon/elbow. The olecranon is located near the 5th intercostal space so there will be little heart caudal to this point. Use your stethoscope or even your hand to find the Point of Maximum intensity (PMI) on the chest wall. Then, grasp the lower antebrachium and press the elbow up the chest wall to simulate where it would normally be if the pet were standing. A good place to insert your needle is usually just a bit cranial to the point of the elbow. Combining the location of the PMI with this landmark should help you find the heart.

Your patient must be fully sedated and unconscious. It should not react to your injection in any way. Make sure you draw up enough euthanasia solution to stop the heart. You don't want to have to inject a second time unless absolutely necessary. Use a larger syringe than is necessary to hold the solution. When injecting into the heart, you have to draw back blood to make sure you are within a chamber and therefore you need a little extra room in your syringe. If giving 6 mls of solution, use a 12 ml syringe. If there is pulmonary effusion present, you might miss the heart on your first stick and accidentally draw up some of the fluid. If you have extra room in the syringe, you can gently redirect and try again without having to draw up a new syringe full of euthanasia solution. If you find yourself within an airway, you will draw back air, and again it is nice to have a little extra space available in your syringe.

When performing an intracardiac injection in larger dogs, you will need to use a long needle. Consider using a 1.5" to 2" 18-gauge needles for dogs over 10kg. As you prepare to enter the chest wall, keep your needle perpendicular to the body. Angling the needle will increase the distance you need to travel before hitting the heart. If you contact a rib during penetration of the chest wall, either start over or gently walk your needle tip off the rib edge and keep going. When you think you are in the heart, draw back on the plunger. If you draw back and get negative pressure, your needle tip is within something solid (e.g., the myocardium, a tumor, etc.). Push the needle in farther if you can and try to draw back again. If you still do not aspirate blood, gently redirect and try again, without removing the needle completely from the chest. Remember that if you let go of a syringe that is inserted into the heart, it may move along with the contractions. Once you see blood in your syringe, you are free to administer your solution.

Intraperitoneal Injection (255 mg/kg)

Pros	Cons
Easy to perform	Longer time to absorb
Works in all domesticated pets	More solution needed
No sedation required*	Possible to accidentally inject organs

While not technically an intraorgan injection, we include it here for completion. An intraperitoneal injection means

that the euthanasia solution is given into the peritoneal space, i.e. the abdomen. The solution must therefore miss neighboring organs or the administration would be considered intraorgan, and without sedation, is considered painful. Even though pre-sedation is not required for this technique, consider giving it.

**Pre-sedation is advised if using a class III euthanasia solution.

Two areas of injection are the ventral midline caudal to the xiphoid process and low on the right lateral abdomen. The needle should be inserted at an angle slightly toward the head and the syringe plunger pulled to aspirate for negative pressure or air. If no blood or fluid is seen in the syringe, you are free to inject. Because the euthanasia solution is moving into the bloodstream through absorption across abdominal organ membranes and serosal linings, it may take longer to achieve cardiac death. Three times the IV dose is required for this technique. If your pet is not pre-sedated and is still conscious after 20-30 minutes, you will need to give more solution. When necessary, massage the abdomen to help the solution absorb.

Intrahepatic Injection (170 mg/kg)

Pros	Cons
Simple technique	Requires deep sedation or anesthesia
Works well when other techniques fail	More solution needed
Works in all companion pets	

The liver is large, highly vascular, and is usually easy to palpate. Choose intrahepatic injections over intra-abdominal injections because of the improved uptake of the euthanasia solution. When an intravenous injection is not viable, an intrahepatic injection can be a great alternative. Like intracardiac injections, intrahepatic injections need to be done under deep sedation or anesthesia.

Choose a needle length that is sufficient for reaching the liver. With small pets, a 1-inch needle should be adequate, but in larger pets, a 1.5” or 2” needle may be necessary. Give more euthanasia solution than you would use for an intravenous euthanasia, doubling the dose because the rate of absorption can be delayed based on how well you place your injection. If you miss the liver, the death may not occur in a reasonable amount of time so having more solution present will help speed things along.

To inject the liver, place your needle in the notch on either side of the xiphoid process and aim cranially about 45 degrees, up under the last rib of your laterally recumbent pet. You can even apply some inward pressure with the syringe or with your free hand to allow the needle to move deeper. There is no need to draw back and check for blood. Keep the needle in the ventral half of the abdomen to avoid the stomach, which is located more dorsally. Intrahepatic injections work well from either the left or right side. Death should occur within about two minutes or so with a well-performed intrahepatic injection. Explain to families that their pet may pass immediately or it may take a few minutes.

Intrarenal Injections (255 mg/kg)

Pros	Cons
Great for cats and small mammals	Requires deep sedation or anesthesia
Fast and effective	Requires moderate skill

This method is a great choice if venous access is difficult or when preparing a catheter site is too obtrusive. As with intrahepatic injections, the kidneys will speed the rate of absorption over standard intra-abdominal injections. Like with cardiac and hepatic injections, deep sedation or anesthesia is required.

When choosing which kidney to inject, pick the one that you can feel and isolate the best. This is almost always the left one. You should be able to grasp it easily and curl your fingers around it. If a cat is in renal failure, the kidneys may be smaller, have a nodular feeling, or even be impossible to locate. If you have doubts about one kidney,

consider using the other. Also make sure that you are not palpating a fecal ball in the colon. If you are using the right kidney, you may have to use your forefinger to manipulate it into reach. Gently push your finger up under the last rib to find it and move it caudally. It will only shift by a centimeter or two.

Once your feline patient is deeply asleep, you can let the owner hold the cat on his or her lap or you can place the cat on any flat surface. Gently run your hands along the abdomen to find the kidney and feel for any abdominal muscle tensing. If the cat tenses, it is not sedated enough for you to proceed. If necessary, give more sedation until no response is noted. When you are ready to inject, use the hand you will use to inject to push the kidney upward, from the cat's downside, into your holding hand and cup the kidney under your fingertips raising it up parallel with the spine. Should you have a hard time doing this, just hold it firmly in a position and don't let it slip out of your grasp. You want to keep hold of the kidney through your entire injection. If you accidentally let go mid-injection, try to hold it in place within the abdomen using your fingers and finish the injection. If you cannot find the kidney again, gently advance the syringe toward the liver and finish your injection.

As is the case with intrahepatic injections, you need to give more solution than an intravenous injection would require. Standard injection amount is three times the IV dose, 6 mls per renal injection in a cat of any size. This helps ensure euthanasia takes place quickly and standardizes your record keeping.

Upon injection, you should feel the kidney swell in your fingers. This is a good indication that you are positioned properly. Continue to inject all of your solution. If you are certain you are positioned correctly and the kidney does not swell, you might be injecting into the renal pelvis, which may slow absorption. Kidney swelling does not guarantee immediate death, but it does increase the odds that death will occur faster. Either way, watch the cat for cessation of breathing. Most of the time, your feline patient will stop breathing even before you finish the injection. As with intrahepatic injections, let the client know ahead of time that their cat may pass immediately or within just a few minutes.

SUMMARY

Euthanasia, quality euthanasia, is an art form all its own. We need to fully understand the nuances of each available method to know how best to utilize it when the time comes. It's common to have a preferred technique based on the species and even breed of pet. Pre-euthanasia sedation and anesthesia is now commonplace in many countries, especially for those hospitals and mobile services specializing in enhanced end-of-life experiences. Intraorgan injections are rapidly becoming as common as intravenous injections. Veterinary teams are encouraged to learn more about the techniques discussed here and bolster confidence in their ability to reach for another, less familiar technique should the need arise. Please consider learning more with the Companion Animal Euthanasia Training Academy (CAETA) and other dedicated euthanasia organizations.

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