

A Guide to Technique for Intracardiac Injection

Introduction

Intracardiac injection (IC) of euthanasia solution can be a useful alternative technique for performing humane euthanasia in pets. When properly prepared, the IC route is quick, easy, and can be done in such a way that it is not objectionable to family who may be present. I have been using this procedure, primarily in dogs, for over 15 years with well over 5,000 patients. Below, I have described the techniques that I have adapted to make this method successful in my practice.

Caveat

It is absolutely essential that prior to attempting IC injection, you must ensure that the pet is at a surgical level of anesthesia. This is not only required by the AVMA Guidelines on Euthanasia, but by adherence to good veterinary practice. Sedation, alone, is **NOT** sufficient for using this technique. A wide variety of medications can be used to induce anesthesia, and good discussions of this can be found elsewhere.

Materials

While not all of these materials are necessary to perform IC injection, over the years, I have found this particular set-up to be most useful.

1. **Euthanasia solution** (pre-drawn into appropriate sized syringe, along with at least one back-up). Standard dose recommended for IV injection is sufficient, but I tend to add 1-2 cc additional, just in case of problems.
2. **Appropriate sized needle.** Longer is better. Although it is possible to use a shorter needle, by using a long needle, you have margin for error, should your angle or entry site be off, or if the pet is larger than expected. For cats or small dogs, I generally use a standard 1.5" 22G needle, but prefer to use a 4" 18G needle for anything larger. You can find these at your veterinary supplier – they are made by Jorgensen and are available in a 12 pack, non-sterile for under US\$10 (See below). If you can't find these, a spinal needle will work, but they are much more expensive.
3. **IV Extension Set.** The one I prefer is made by Baxter and is called: *7" Microbore Luer Lock IV Extension*. This provides some flexibility at the end of the syringe without excess tubing. I usually cut the clamp off the tubing prior to use, as it isn't needed. If desired, the extension set can be rinsed and re-used a number of times.
4. **Blanket (Optional).** Some people prefer to cover the pet and area of injection with a nice blanket to help hide the injection.

18G, 4" Needle



Pack of 12 - 4" Needle



Microbore IV Extension Set



Preparing the Family

It is very important to prepare the family for the entire process of euthanasia, describing what they can expect to happen. As part of this, we need to let them know how we will be giving the final injection. This is especially critical when preparing them for the IC injection, as many people will not be used to this injection technique. In general, I avoid using phrases that indicate that I will be giving the injection into the heart, unless people specifically ask. Use whatever phrasing you find most comfortable, but here are some phrases that I find helpful in explaining what I am doing, without raising an emotional response. Feel free to combine/edit as you see fit.

- a. When I give the final injection [Pet Name] will be completely asleep and will not feel anything whatsoever. It will be completely painless.
- b. I will be giving the final injection **here** (while holding my hand over the pet's chest, or pointing to the side of my own chest).
- c. I usually give the final injection here (pointing), but some people prefer that I use a vein in the leg. Do you have any concerns about that?
- d. The final injection is given as an infusion directly into the bloodstream. It takes about 30 seconds to give, but is very fast acting – usually taking less than about 1 minute for [Pet] to pass.
- e. Do you have any questions or concerns about anything?

Patient Preparation

One advantage to this technique is that it can be used with a pet in just about any position. The pet can be resting in a family member's lap or arms, on the ground, on a bed, lying sternally, laterally, etc. I typically will do the injection in whatever position the pet happens to end up without repositioning him/her. However, I do find that having the pet in Left Lateral Recumbency makes the technique the simplest. So, you may want to use that positioning when you are first learning the technique.

Other than the pet being at a surgical plane of anesthesia, there are no other preparation requirements (i.e. no shaving, clipping, wetting of fur, etc.). I find the simplest, most reliably accurate test for sufficient anesthetic depth is using a strong toe pinch. If there is no response, the pet is probably deep enough for the procedure (assuming that the pet had normal sensation in the toe prior).

Injection Technique

You can find an excellent description of the technique in Dr. Kathleen Cooney's Book, *Veterinary Euthanasia Techniques, a Practical Guide*, including a nice illustration. I highly recommend that reference. Here is a brief description of my process:

1. **Locate the injection site.** Typically, I locate the point of maximal heart beat intensity, either via palpation using my hand on the side of the chest (preferred), or by auscultation. This is most commonly at about the level of the 5th rib, near the costochondral junction. Aim between the ribs, in the center, or toward the cranial aspect of a rib (to avoid nerves and small vessels). See Figures 1 & 2 (*Courtesy of Dr. Kathleen Cooney*).

Fig. 1: Left Side Approach

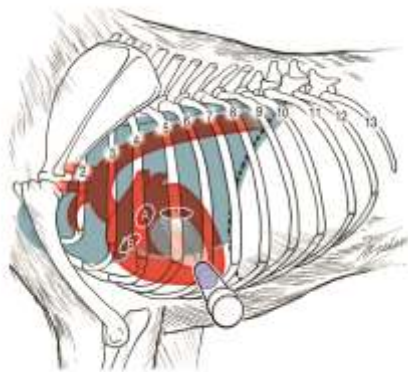
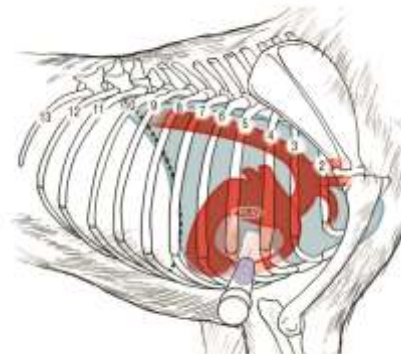


Fig.2: Right Side Approach



2. **Prepare the syringe/needle/tubing combination.** I like to prepare the whole thing ahead of the appointment, so as to avoid people seeing all of the equipment. I then set the combination inside my bag (protected using a 12 cc syringe case over the needle to prevent accidental injury). When it's time for the injection, I will take out the combination, holding it in my fist loosely, so that the entire thing is hidden (or most of it, if you have small hands).
3. **Prepare/Distract the family.** Once everyone is ready, invite the family to continue to pet and talk to the pet while you are giving the injection. You may also place a blanket over the pet, if desired.
4. **Injection.** This part is hard to describe, and just takes some practice...While hiding the needle with the left hand, insert the needle slowly with the right hand. Now, use the index finger and thumb of the left hand to slowly advance the needle, while gently aspirating on the syringe with the right hand. Once you get a flash of blood (it will be a HUGE flash), stop advancing, and continue to shield the needle from the family view. You will likely be able to feel the heart beating against the needle. (If you are using a blanket, there is less need for the "shielding" that I mention.)
5. **Troubleshooting.** If you haven't gotten a blood flash, try backing out part way and redirecting at a slightly different angle. If you aren't in the cavity of the ventricle (or atrium), you will get sort of a "meaty" feeling as you advance the needle. Although needle clogging is almost never a problem, you may try injecting a small amount, just to clear any potential obstruction. Continue to redirect, or locate a different injection site, if necessary.
6. **Solution Injection.** Once you are in the lumen, SLOWLY (over about 5-10 seconds), start injecting the first 1-2 ml of euthanasia solution using your right hand, continuing to shield and stabilize the needle with the left hand. Typically, after about 10 seconds, the pet will stop breathing, and you can feel the heart start to slow down. Continue injecting the euthanasia solution until gone (you can usually speed up, once the breathing has stopped). If you are injecting too quickly, the pet may begin to breathe rapidly. Simply slow down and assure that family that a change in breathing is normal, and that the pet is not in any discomfort. If the heart has not stopped (or slowed considerably) by the time you have injected your complete dose, you can simply detach the extension tubing from the syringe (while keeping the needle in place), and add another syringe full of euthanasia solution to give additional volume.
7. **Removing the needle.** Once you feel the heart stop (or slow considerably), remove the needle, again continuing to shield from family view and place the whole combo back in the medical bag. If using a blanket, cover the pet (most people prefer to continue to leave the head exposed).
8. **Confirm death.** Now you can confirm that the pet has passed. If the heart continues to beat for more than a few minutes, you may need to repeat the injection. However, when everything is done correctly, this is a very, very rare occurrence.

Advantages

The IC injection technique is useful in many situations, and for some people, it may even be a primary technique. It can be particularly useful as an option in pets where IV access is difficult or limited, e.g. with generalized edema, blown veins, extreme dehydration, low blood pressure, etc. Other advantages include the lack of a need for clipping/shaving of fur, ability to position the pet/family however desired, and lack of visible blood from a leaking vein after the injection.

Limitations

In pets with thoracic diseases such as pleural effusion, chylothorax, bleeding into the chest cavity, massive pulmonary metastatic cancer, etc., the technique can be more difficult (though not impossible) to perform. Some families may have an emotional response to the idea of an injection into the heart. However, in my experience, when explained properly, only a very small percentage of families object in any way to the use of this technique.

Feel free to contact me with any questions, comments, or concerns. I hope that you found this guide useful. Thank you for the work that you do!