

How to Administer Subcutaneous Fluids

BACKGROUND

When a dog or cat is dehydrated or at risk of dehydration, there are several ways to maintain or recover normal hydration. These methods include oral fluid administration (drinking or syringe-feeding), intravenous fluid administration (fluids that flow through an IV into the vein), or subcutaneous fluid administration. Subcutaneous fluids are given with a needle and deposited under the skin (the skin is the cutis, and subcutaneous means under the skin). When given in this way, fluids are absorbed slowly over several hours. This can be done in both cats and dogs and may be recommended by your veterinarian as a form of treatment to be done at home.

GETTING STARTED

In order to give subcutaneous fluids at home, you will need the following supplies provided to you by your veterinary hospital:

- Sterile needles
- A sterile fluid line
- A sterile bag of fluids
- A receptacle for used needles. You can dispose of used needles in a thick plastic container with a lid, such as an empty laundry detergent bottle, that can be taken to your veterinarian for disposal.
- A way to keep the fluid bag high, either by hanging or having an assistant hold the bag. The higher the bag of fluids compared to the pet, the faster the fluids will flow by gravity.
- Something to distract your pet can be helpful. Canned cheese works well for many pets. Once the fluid is flowing, a pea-sized dab of cheese that the pet can lick off your finger every few minutes can make for a pleasant distraction.

Setting Up

Your pet need not be present for the setup. First, wash your hands before you assemble the fluid bag, fluid line, and needle. Fluid bags come in a wrapper, so at first use of a bag you will need to remove the wrapper. Next, identify the bottom of the bag, which usually has two ports (short tubes) protruding from the end. One of these has a removable cover, which is typically a plastic tab or sleeve that can be peeled back and off the bag. You should do this, revealing a tube that is the entry port for the fluid line connector. **NOTE:** the inside of this tube (the entry port) is sterile, so be sure you only touch the outside of it, and don't reach inside it with anything.

Remove the fluid line from its wrapper. This is the coiled clear plastic tubing. One or more flat plastic tabs—often blue or green—will be entrapped in the tubing of the fluid line. These are sliding clamps, and they have keyhole-shaped slits that allow you to close off the flow in the tubing. You should slide one of these clamps (any one) into the closed position now: a firm slide such that the tubing moves from the wide to the narrow slot in the clamp's keyhole, and the tubing is pinched shut. The whole line of tubing is likely coiled and secured by a paper tie that you can easily tear off. Both ends of the tubing are capped; the end you are interested in is the large end, with the clear plastic tubular chamber. Remove the cap from this end, revealing a plastic spike-shaped tip. *Do not touch it*, as it is sterile, and contact from your skin to the spike could allow bacteria from your fingers to wind up in your pet's tissues. Insert this spiked end into the entry port of the fluid bag. Using a moderate amount of pressure and a twisting back-and-forth motion, advance the spike until it is fully seated into the port: for right-handed people, the transparent chamber of the spike end of the tubing is held in

the right hand, and the port of the fluid bag is held in the left. The spike will puncture a membrane in the port; when the bag is held with the fluid line at the bottom, fluid will drip into the chamber.

Now, hang the bag of fluids at a level higher than where your pet will be receiving them. For example, the bag can be hung by its loop (at the top of the bag) off the handle of a kitchen cabinet door. Or, you can slip the loop over a coat hanger that you then hang up on a coat rack (or anything else!). If you have a helper, the helper can even hold the bag up high when it is time to start rather than hanging the bag. You will know the top from the bottom of the fluid bag because the print on the bag should be upright when the bag is positioned properly. Remember that the higher the fluid bag compared to the pet, the faster the flow.

With the open end of the tubing over a sink or bowl, remove the cap and set it aside. Be sure to avoid touching the open end of the tubing with your finger or anything else. Only the cap or a new needle should ever contact the tip; this preserves its sterility. Open all clamps on the fluid line, including a roller valve (small wheel in a rectangular plastic box) if one is present, and allow fluid to run out the line. Be sure to allow the flow to continue for several seconds to remove the air, including large bubbles, throughout the length of the tubing, then close one clamp to stop flow. A few small (rice grain-size) bubbles are not a problem, but air that fills more than an inch or two (few centimeters) of the tubing should be purged by reopening the clamp and allowing more fluid to flow.

Attach a covered needle to the fluid line on the opposite end from the chamber that is now stuck in the fluid bag. Examine the clear plastic cylinder again, near the fluid bag. It should be approximately half filled with fluid and half with air. This way, you will be able to see dripping of fluid from the bag into the cylinder when the fluids are being administered. If this cylinder is completely filled with fluid, turn it and the bag upside down and squeeze the cylinder, forcing some fluid back into the bag and some air back into the cylinder.

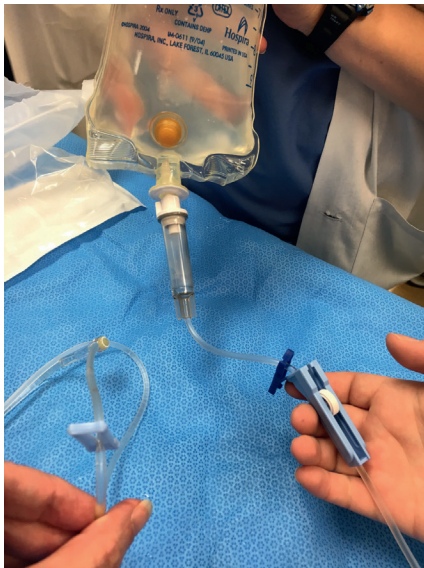
The system is now ready to deliver fluids. The process of assembling the setup that you just performed only has to be done once for each new bag of fluids, not with every treatment. Depending on the size of the bag and the dose of fluids you will give, one bag might last for several days.



The fluids (right) for subcutaneous administration come in a plastic wrapper, as does the fluid line (left) that will be connected to the bag. This same bag and line can be used multiple times, until empty, but the needle must be changed after every use.



The fluid line is inserted into the fluid bag through a port at the bottom of the bag. The port should be uncovered immediately before insertion of the fluid line. The spike end of the fluid line (opposite the end where the needle will be placed) is uncapped, and firmly inserted into the port until fully seated. At this point, fluid will be able to flow from the bag.



Once the fluid line is connected to the fluid bag, the roller clamp and any squeeze clamps are opened to allow flow of fluid to remove air bubbles. The clamps are then closed again while the bag is hung in place prior to fluid administration.

It is helpful to set up one area in your house for administering fluids. This way, the fluid bag can be hung up, and materials will be within easy reach, leaving both your hands free to handle the pet and the fluid line. An assistant is nice, but often unnecessary.

TROUBLESHOOTING BEFOREHAND

- Remember that the fluids and the fluid line must remain absolutely sterile on their inside surfaces. This means not touching the end of the fluid line or leaving it uncapped. When not in use, the fluid line should be clamped and the end capped with a new needle.
- Do not use fluids that are cloudy. This is most commonly a sign that the fluids have been contaminated; a new fluid bag is necessary.



The fluid bag should be held or hung above the pet so that gravity allows for fluid flow. A simple coat hanger can be used to hang the bag on any taller purchase, such as the cat climbing toy in this picture. The pet can rest on a lap or in another comfortable position during fluid administration. Most animals will require a hand to keep them from leaving, but some will simply lie still, as did this dog.

- There are different sizes of needles. Most commonly, a 20- or 22-gauge needle is provided. The 22-gauge needle has a smaller diameter than the 20-gauge. This means it isn't felt as much by the pet when being pushed into the skin, but because it is smaller, the 22-gauge needle delivers fluids more slowly than a larger-diameter needle like the 20-gauge.
- Expect to use the same bag of fluids over and over until it is empty, the same fluid line until the bag is empty, but a *new needle* every time you administer fluids. The needle must be both clean and sharp, so must be replaced each time.
- Although fluids may be safely stored at room temperature, they may be too cold to be comfortable for a pet. Handle the bag, and place it against your bare arm. If the bag feels cool, consider warming it slightly before administration. *Never* microwave fluids that are meant to be injected. A good option is to hold the bag against your body for 20-30 minutes to bring the fluids up to your body temperature.

PROCEDURE FOR ADMINISTERING FLUIDS

Start by bringing the pet into the prepared area. Petting and/or treats are a good idea to help him or her relax. A cat or small dog may be comfortable on your lap or on a table in front of you. A larger dog will do well sitting or standing on the floor. Note the amount of fluid in the bag as the starting point, and note your veterinarian's directions about how much to give. Bags will have a volume marker on the outside, but they are a rough guide. The fluid dose does not have to be exact.

Place yourself and your pet in a comfortable position near the fluid bag with the needle end of the fluid line in easy reach. Then, practice "tenting" the skin on the back of the neck between the shoulder blades. This means pulling up some skin between your thumb and index finger and creating a triangular tent shape in the skin that lies behind the neck at the topmost part of the shoulders (where the front legs are). The skin in this area is strong and insensitive, so it is the preferred location for administering the fluids. Practice handling the needle with your dominant hand (for example, your right hand if you are right-handed), and handle the pet with the other hand.

Now, to give the fluids, uncapped the needle that is on the end of the fluid line, and hold the needle in your dominant (e.g., right) hand the same way you would hold a pen or pencil. The needle will be directed into the empty space under the skin created by the tent (the "inside" or base of the tent). In the process, be sure to

avoid stabbing your own fingers holding the skin tent, or any of the pet's underlying muscles or bones. Prepare the skin tent, elevating the skin between the shoulders using your left hand. Advance the needle through the skin, in a direction that is parallel to the pet's spine or back. Insert quickly and smoothly but without jabbing. Normally you will likely feel a small amount of resistance at the skin surface and then a soft release as the needle passes through the skin. Be sure not to stick the needle all the way through and out the other side of the skin. Once the needle is placed, the skin tent can be released. Holding the needle in place may be necessary if the pet moves at all. At first this takes time, but with practice, the time from uncapping the needle to having it in place is typically less than 10 seconds.

Next, unclamp the fluid line, and allow the fluids to flow. You should be able to see the fluid dripping into the cylinder just below the bag hanging above you, but you won't see the fluid move in the line. You should start to see the skin begin to bulge up as the fluid accumulates underneath. This is not painful for the pet,

but petting and comforting them can help keep them still during the time necessary to deliver the amount of fluids recommended by your veterinarian. When the desired amount has been given (monitoring the level on the bag itself), reclamp the fluid line and remove the needle from the skin. Replace the needle cover, and immediately change to a new covered needle to protect the end of the fluid line until the next time fluids are delivered. Dispose of the old needle in a purpose-made sharps receptacle or another rigid container such as the laundry detergent bottle.

AFTERWARDS

For larger amounts of fluids or in smaller pets, it may be necessary to divide the total amount of fluid into two different areas. These areas can be side by side or one in front of the other, and your veterinarian will instruct you on this if it is necessary.

Be sure to keep used needles in a safe place away from misuse or accidents and to dispose of them in accordance with local laws governing medical waste.

FREQUENTLY ASKED QUESTIONS

What if my pet runs off in the middle of the fluid administration?

If this happens, calmly clamp off the fluid line and change the needle to a new one. Simply stopping midway through the process is not harmful, but it means the full amount of fluid was not received. It may be helpful to have someone help you (especially by petting, talking to, or otherwise distracting the pet) when you administer the fluids again. If it is a recurrent problem, or if you are concerned that your pet is intolerant to the point of aggression (biting, scratching), contact your veterinarian to discuss alternatives.

Does it hurt?

No. The area of skin between the shoulder blades is very insensitive on a dog or cat's body. With rare exceptions, such as when there is skin disease or another disorder of that area of the body, the vast majority of dogs and cats show no discomfort at all with this approach.

There is fluid leaking out of the hole in my pet's skin where the needle just came out. Is this a problem?

A small amount of fluid leakage is common after withdrawing the needle. This can be prevented by gently rubbing the area where

the needle was removed for a few seconds afterward. If leakage is occurring *during* the fluid administration, the needle is likely not far enough in (has slipped back out the skin) or is too far in (has emerged through the other side of the skin tent). In such cases, you should withdraw the needle and reinsert it in order to finish giving the right amount of fluids.

Fluid isn't flowing. What is wrong?

If the bag is new, be sure the spike of the fluid line is completely inserted into the bag. Then check all the clamps. There may be several. Be sure all clamps of all types are in the open position. Examine the tubing of the fluid line. Sometimes the tube can be kinked or twisted. Pinching or untwisting a kinked section should restore the normal uniform shape of the tube. Examine the cylinder up near the end of the fluid line that is inserted into the bag. If fluid is dripping into this cylinder, then fluid is flowing. If fluid is still not flowing, you may adjust the needle position by withdrawing it half an inch (1 cm) in case the needle tip was abutting against something that was blocking it. Finally, you can raise the fluid bag higher compared to your pet's position.



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