

# Safer C-Sections for Scotties

*Lets Get 'Em Out Alive!*

Marcia Dawson, DVM

There you are, pacing anxiously by the whelping box, watching, waiting, peeking over the side to see what your Scottie mom-to-be is doing. Nothing yet. She is still resting, or scratching in the bedding a little, or looking balefully up at you as if to ask “Why me?” Her temp dropped a full degree overnight, and she has eaten nothing all day. She has gone outside frequently throughout the day and has passed odd looking, soft stool. Maybe she has even vomited a time or two. This is it! Stage 1 labor. And this is the litter you have been waiting for. Your anticipation is intense, and right now you are as nervous as a cat. But you are ready!

When things go well, whelping a litter of Scottie pups is a pleasure and a source of deep satisfaction. Watching a Scottie bitch labor hard to pass a pup, and then seeing her instinct come immediately into play as she cares for her newborn is a beautiful experience. When all goes well, the squirming pup is so vigorous that he is hard to hang onto as you dry him with a towel. When returned to the box, he scoots unerringly to the nipple for his first meal shortly after birth. As he suckles, more oxytocin is released in the dam, and the uterine contractions start up again, heralding the imminent arrival of the next pup. The message to us is clear: Get out of the way! Mother Nature is at work.

Sadly, things don't always go so smoothly. Many Scottie litters are delivered by c-section for multiple reasons, including dystocia (stuck puppy) and uterine inertia (uterus not contracting).<sup>1,2</sup> We all accept the fact that our breed carries a higher than normal risk of whelping problems due to the structure and size of the dam and pups, and in many cases, a c-section is absolutely essential to save both dam and litter. In some cases, the surgery is an elective procedure, planned ahead for the safety and well being of the bitch and her pups (ex: one huge puppy). Thankfully, most of the time, things go well. But not always.

How can we maximize the chances for a happy outcome when our Scotties are facing a c-section? Surgery is always a risk, but there are ways we can reduce the risk as much as possible. This article will address some of the important factors to keep in mind when planning ahead. It is challenging enough to get those Scottie pups going after a *normal* whelping. Let's at least make sure we don't add needless anesthetic death to the picture!

## **When to make the decision to go for a c-section**

In a planned c-section, the timing is relatively straightforward:

- You know the due date. (You did ovulation timing with progesterone tests, right?)
- You know when the temperature dropped in your bitch. (You are taking temps twice daily for a week before due date, right?)
- You can squeeze a few drops of colostrum from the nipples.
- You recognize the signs of Stage 1 labor.

If in doubt, you can do a progesterone test to check for the final pre-whelping drop, indicating that your bitch is hormonally ready, and you can schedule the surgery during the day to ensure the presence of a skilled, rested veterinary staff. This is the time to get going!

However, most c-sections (58%, all breeds) are emergency procedures<sup>2</sup> and the timing in these cases can be a harder call to make. Scotties don't all go by the book or follow the classic patterns. Sometimes things are just downright confusing, and many of us have wrestled with the decision,

ever hopeful for a normal delivery but not wanting to wait all night or risk disaster. The short answer in this case is, better sooner than later. *Don't wait too long!*

As the bitch labors long and hard to no effect, her condition and the pups' status become increasingly compromised. As labor is prolonged, the dam's blood pressure decreases; her oxygen level also decreases, in spite of constant panting; her electrolytes get out of balance; she becomes dehydrated, exhausted and dangerously stressed. As these physiologic changes develop in her, the effect on her pups is even more critical.<sup>4</sup> The following statistic says it all: Puppy mortality is 12.7% in puppies delivered in emergency c-sections, compared to 3.6% in elective c-sections in the US and Canada.<sup>1,2</sup> In other words, the risk of losing pups in an emergency c-section is 3 and 1/2 times that of an elective procedure.

The message to breeders is this: If things are not going like clockwork, get going to the vet's!

- Don't let your girl **labor hard** for more than 1 hour. Resting quietly, caring for her pups, is not laboring hard. A bitch may take a break from delivering pups for an hour or longer, and then start back up again. That is normal. But **Stage 2 hard labor** for an hour maximum, with no puppy presented in the birth canal, is bad news. Get going to the vet's! (The pup may pop out on the way, but that's OK. You will be prepared.)
- Even if the dam has already delivered pups, one may be stuck beyond your ability to get it out. You will probably lose that pup, but now you need to save the mom. Get going to the vet's!
- If she is just sitting there, doing nothing, no contractions at all, and her temp is back up to normal (102<sup>0</sup> or higher) 24 hours after it dropped, and now you are seeing a greenish vaginal discharge, **get going to the vet's!**

### **Where to go for a c-section**

Let's face the facts. The majority of veterinarians are not reproductive specialists, and the number of breeder clients in most general practices is small compared to pet owners. Few vets are breeders themselves, and some may even be a little annoyed by the insistence and tenacity of a serious breeder. But nearly all vets perform c-sections, and thanks to today's advances in medical technology and drugs, most deliveries have happy outcomes. Even so, I still hear about nightmare c-sections with our Scotties.

This is your assignment: Talk with other breeders in your area to get their input. Visit vet clinics and emergency hospitals, and talk with the vets on staff. Maybe your own vet is willing to work with you and is available in the middle of the night for emergency surgery. If so, consider yourself blessed! But many other vets will recommend an after-hours emergency clinic. Some ER clinics are superb, and some are far from it. You will have to do your homework thoroughly. But this is the key: Don't wait until 3 AM with frayed nerves to discuss anesthetic protocol. If your vet is not willing to discuss c-section protocols with you or listen to your concerns ahead of time, then find one who will. You need a skilled surgeon who has done plenty of c-sections, who is quick, and has a good track record. You need an experienced staff on hand to assist, especially if the litter is large. Most clinics will not allow you to be in the operating room, but many vets will welcome your presence close by to help resuscitate the pups. You need a vet who will let you stay with mom and babies in recovery. And you need a vet who will follow an accepted and safe protocol.

### **A safer anesthetic protocol**

Be glad we are living today with the benefit of modern anesthetic drugs, medical knowledge and technology. From the 1960's to the present, c-section puppy mortality rates have dropped from 36% to 8%, and the mortality rate for bitches is down from 13% to 1%.<sup>4</sup> That is good, but we can

do better. Safer anesthetic protocols for c-sections are now generally known and are well published. There is simply no reason to take needless risks with other drugs or procedures.

Many veterinary reproduction and anesthesia specialists recommend the following protocol:

- **Place an IV catheter and run fluids.** By the time you get to the clinic for an emergency c-section, the bitch is usually hypothermic, dehydrated, and her blood pressure is low. Warmed IV fluids will keep her core temperature normal and will keep her blood pressure up so that oxygen delivery to the pups is not compromised. A bitch can go into shock easily when the large volume of blood and puppy mass is removed from her body. The IV fluids will save her life. And yet, in a major study on 807 c-sections performed in the US and Canada from 1994-1997, only 53% of the bitches were put on IV fluids.<sup>2,4</sup>
- **Pre-oxygenate the bitch before she is anesthetized.** All pregnant bitches are anemic to a certain extent, which can compromise oxygen delivery to the pups, especially with a large litter<sup>4</sup>. When you add respiratory depression from anesthesia, the effect of hypoxia (low oxygen) on the pups can be critical. Pre-oxygenating the bitch for 3-5 minutes with a mask or a hose next to her face will get oxygen levels up to safer levels in her and her pups before anesthesia.
- **Prep before induction.** Get as much done as possible before the bitch is anesthetized. Clip her belly and do a first scrub while she is awake. Minimize anesthesia time.
- **Induce quickly with Propofol.** The goal is a smooth and rapid induction of anesthesia followed by quick intubation and maintenance with gas (Isoflurane or Sevoflurane). Although inducing anesthesia with an inhalant agent or “masking down” is a common practice, it is **not** a good idea for a c-section. Masking an animal is rarely smooth or quick, and the added stress, struggle and excitement can be detrimental to a pregnant bitch and her pups. It is safer to use short-acting Propofol, injected slowly IV just until loss of consciousness, and then intubate for the gas. The sooner the bitch is safely intubated the better, allowing oxygen delivery to her and her pups, as well as reducing the serious risk of aspiration from gastric reflux.
- **The following agents should not be used for a C-section: ketamine, valium, xylazine, barbiturates, or other sedatives.** All drugs cross the placentas to the pups, and there will always be some effect on the puppies from **any** agent that is used. But there is an increased risk of neonatal death associated with the use of xylazine,<sup>1,2</sup> and detrimental effects have been reported after the use of ketamine, valium and the short acting barbiturates<sup>4</sup>. On the other hand, puppy vigor at birth and survival are positively correlated with the use of Propofol and Isoflurane.<sup>2</sup>
- **Speed.** Techniques vary, but in the hands of a skilled surgeon, the entire procedure should not last long, and the maximum delivery time (anesthetic induction of the bitch to delivery of first puppy) should be no more than 10 minutes.<sup>2</sup> Clinics will vary with respect to the bells and whistles available for monitoring a patient during surgery. But at the minimum, heart rate and rhythm, blood pressure, oxygen saturation, and respirations should be closely watched. (To read about an interesting C-section technique using a Mobius retractor, see separate article by Kathi Brown.)

- **Analgesia for the dam.** Some vets will administer a pain medication before surgery (ex: Buprenex, an opioid). Other vets are concerned about the depressant effects on the pups and will use pain medications post-op only. Some use no analgesia at all. Studies show that there is no increased risk for puppy mortality using pain medications, and the benefits to the dam of reduced pain and anxiety and lower anesthetic requirements may far outweigh the transient effect on the neonates.<sup>4</sup> The decision to use analgesics is an important point to discuss with your vet.

### **Resuscitation of puppies**

Puppies have a greater chance of survival if they are vigorous at birth. Spontaneous respiration, vocalization and movement are the “Apgar” equivalent tests for puppies delivered by c-section, and they predict how well the pups will thrive 2 hours and 7 days after birth.<sup>3</sup> Respiration is the key. A bitch undergoing a c-section is maintained on as light an anesthetic plane as possible until all the pups are delivered. Even so, all inhalant anesthetic gases will depress respiration. These drugs are minimally metabolized by the liver, and the only way they are eliminated from the body is by exhaling. Very simply, ***the pups have to breathe to wake up***. This is where you come in!

Resuscitation requires quick, vigorous but gentle handling. Use towels right out of the dryer to warm the pup. Rub the back, chest and abdomen. Using a small ear bulb syringe, suction out fluids from the mouth first and then the nostrils. Listen for the squeal, and suction more if you hear gurgling. Hold the head down while supporting the pup and allow gravity to help remove the fluids. Roll the pup in your hands, as its mom would do in the whelping box. Change the towels frequently to keep the pup warm. Remove the surgical clamps from the umbilical cords, tie them if needed, and paint them with iodine. Administer oxygen by facemask as needed. Try CPR using small puffs of air to help expand lungs. And if necessary, the vet or assistant may intubate the unresponsive puppy for oxygen delivery.

**Do not swing or shake the puppies.** They are too slippery, too easy to drop, and you don’t want shaken baby syndrome.

**Do not use Dopram.** Doxapram HCL is a central nervous system respiratory stimulant that has been used in the past on c-section puppies. But we now understand that this drug may in fact do more harm than good by over-stimulating the hypoxic brain of a newborn to begin the hard work of breathing, thereby using up what little oxygen is available.<sup>3,4</sup> It is safer to use oxygen, tactile stimulation, and CPR as needed for resuscitation and forget the Dopram.

Don’t give up! If there is a heartbeat, and if the puppy does not have any obvious birth defects incompatible with life, keep trying. If all else fails, some vets will resort to acupuncture, using a 25-gauge needle into the nasal philtrum (the dividing line under the nose in the upper lip) to stimulate respiration.<sup>5,6</sup> What do you have to lose at this point?

### **Post op care for mom and pups**

If you have done your homework well, you found a vet who will allow you to be with your bitch and her babies in recovery. Now is the time to stay close! Talk to the bitch, keep her warm and pat her gently. As she wakes up, she will hear your voice, reassuring her that all is well. Keep the puppy-warming box close by, and as soon as they are ready, put the puppies to the nipple to nurse. Many c-section pups are vigorous, strong and ready to nurse very shortly after birth, and there is no reason on earth to keep them in an incubator, away from their mom. For the pup that is just a little slow to start nursing, two drops of a glucose solution on the tongue and more warmth will give the needed energy boost. Stimulate each puppy to urinate on mom’s nose. This way, she will know their smell, even before she is fully awake. I have seen very groggy Scottie moms begin to lick in slow motion with this stimulus. Your presence, your voice and touch, and the smells, the squeals and suckling of her puppies all serve to reduce the risk of a new mom

rejecting her pups. As soon as your vet is satisfied that there is no excessive bleeding and that the dam is waking normally, take the new family home. Do not leave them at the clinic for the rest of the day for observation. No one can observe better than you!

In an ideal world, all of our Scottie bitches would whelp freely and produce vigorous litters as nature has intended. But our world is not ideal, and we have to be prepared for the “what-if” scenarios. Our goal as breeders is to produce healthy, beautiful Scottie babies, and a safer c-section is just another tool to help us get ‘em out alive!

Marcia Dawson, DVM ©2006

### References

1. Moon PF, Erb HN, Ludders JW, Gleed RD, Pascoe PJ. Perioperative management and mortality of dogs undergoing cesarean section in the United States and Canada. *J Am Vet Med Assoc* 1998;213:365–369.
2. Moon PF, Erb HN, Ludders JW, Gleed RD, Pascoe PJ. Perioperative risk factors for puppies delivered by cesarean section in the United States and Canada. *J Am Anim Hosp Assoc* 2000;36:359–368.
3. Moon-Massat, PF; Erb, HN. Perioperative factors associated with puppy vigor after delivery by cesarean section. *JAAHA* 38 (1):90-96;2002.
4. Robertson SA, Moon PF. Anesthetic management for cesarean section in bitches. *Veterinary Medicine* Vol 98:675-694;August2003.
5. Skarda RT: Anesthesia case of the month. *JAVMA* 1999;214[1]:37-39.
6. Skarda RT: Acupuncture resuscitation in animals: review and update. *Advances in Complementary and Alternative Medicine, Waltham/OSU Symposium*. October 28-29, 2000:37-38.