



## THE PET HEALTH LIBRARY

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### Splenic Masses in Dogs

#### What Is The Spleen For?

- The spleen is an oblong organ (some would say it is tongue-shaped) seated just below the stomach. Its consistency is similar to that of the liver. While one can live perfectly well without a spleen, the spleen does provide some helpful services to the body.
- The spleen contains lots of long winding narrow blood vessels full of hair-pin turns that circulating red blood cells make. This means that there are a lot of red blood cells working their way gradually through the spleen at any given time, effectively making the spleen a storage area for blood. If a dog has a severe hemorrhage and needs extra blood, the involuntary muscles of the spleen contract, squirting forth a fresh supply of blood. The spleen provides nature's blood transfusion, if you will.
- Older red blood cells become more brittle than their younger counterparts. As they attempt the tortuous route through the spleen, many older red cells do not make it out the other side. These cells rupture trying to make the tight turns, and their iron is captured and recycled by the spleen. The spleen thus helps remove old red blood cells from the circulation, sort of a clean-up function.
- The spleen also performs a function called pitting in which it is able to bite off sections of the red blood cells passing through. The sections to bite or pit are marked by the immune system. In this way the spleen can remove red blood cell parasites from the circulating red blood cells, helping keep cells functioning that otherwise might become damaged if their infection is allowed to persist. Sometimes entire red cells are removed from the circulation in this way, thus preventing the spread of the red cell parasite inside. This sounds like a good thing but it can get out of hand. For example, in feline infectious anemia, the spleen commonly removes so many red blood cell portions that the infection is difficult to detect plus the patient becomes dangerously anemic (not from the actual parasite but from the spleen removing large numbers of infected red blood cells).
- The above functions are part of what is called the red pulp of the spleen. The spleen also contains what is called white pulp. The white pulp is essentially part of the lymphatic system, sort of like a lymph node. It serves the same functions as a lymph node but is connected through the circulatory system. Lymph nodes are centers of activity for the immune system, especially antibody producing lymphocytes. Material from the local area of the body drains to the lymph node via the lymph vessels and the lymphocytes may or may not become stimulated into reacting depending on what sort of material is present. A reactive lymph node enlarges (the obvious example is the submandibular nodes that swell when one has a sore throat). The white of the spleen sees material from the circulatory system rather than material from the local lymphatics. Lymphocytes circulate through the splenic white pulp just as they do through the lymphatic vessels, carrying messages involved in the war against body invaders (bacteria, viruses, etc.)



#### Why Are Splenic Masses Bad?

Occasionally spleens grow masses. These are generally either benign tumors (hemangiomas) or malignant tumors (hemangiosarcomas grow from the red pulp, mast cell tumors and lymphosarcoma arise from the white pulp). In dogs, most splenic masses are either hemangiomas or hemangiosarcomas, while in cats they are usually either mast cell tumors or lymphosarcomas.

Since we are concerning ourselves here with dogs, we'll review the hemangioma and hemangiosarcoma. Both these tumors arise from the blood vessels of the red pulp and amount to a bunch of wildly proliferating abnormal blood vessels. Eventually the growth ruptures and the spleen bleeds. When a vascular organ like the spleen bleeds, a life-threatening blood loss can result.

- Usually the patient is suddenly weak.
- The patient may be obviously cold.
- If one looks at the color of the gums, the patient will be pale in color.
- If the bleed stops on its own, the patient will dramatically improve by the next day or even a few hours later.

Unfortunately, the splenic mass is certain to bleed again and if the spleen is not removed, eventually the patient will bleed to death.

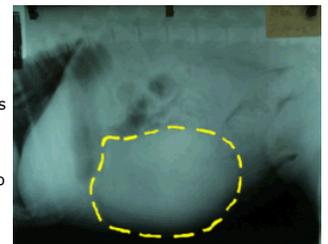
If the splenic tumor is benign, removing the spleen is curative provided that the patient has not lost too much blood to survive the surgery. Ideally, a splenic mass is detected before it has ever bled and the spleen is removed when the mass is not actively bleeding. Of course, if the splenic mass is actively bleeding, removing the spleen becomes an emergency surgery; it is not appropriate to try to wait until the bleeding has stopped.

If the splenic tumor is a malignant hemangiosarcoma, the spleen can still be removed to control the bleeding, but the problem is that hemangiosarcoma is an aggressive cancer. With the removal of the spleen and primary tumor, the patient is probably spared death by bleeding to death only to eventually succumb to cancer.

#### Detecting Splenic Masses

There are several ways to determine if a dog has a splenic mass. The first way is by physical examination. A large firm mass in the area of the spleen may be palpable during a routine physical examination. From there, radiographs are taken of the belly to see if the mass appears to be on the spleen, and radiographs of the chest are taken to see if there is evidence of cancer spread. Based on these findings (plus basic blood work) a decision for or against spleen removal can be made. Unfortunately, many large dogs are simply too well muscled for splenic masses to be detected in this way.

Another method of detecting a splenic tumor comes on the basic blood panel. An unexplained "responsive anemia" is discovered. A responsive anemia is one typical of bleeding (as opposed to an anemia of chronic disease where red blood cells simply are inadequately produced). An older large-breed dog with an unexplained bleed is highly suggestive of a splenic tumor. The next step would be radiographs to see if a mass is apparent, followed by chest radiographs for tumor spread as mentioned above. These findings on the blood panel are especially suggestive of a splenic mass if there has been a history of sudden weakness or collapse typical of a recent bleed. Splenic tumors tend to bleed chronically and slowly (and usually insignificantly) prior to a large bleed that produced obvious symptoms. These smaller bleeds are generally enough to alter the blood panel.



#### Is it Benign or Malignant?

This is not always clear prior to surgery. If there is evidence of tumor spread on a chest radiograph, then one can be quite sure that the tumor is malignant. In this case it is likely too late to effect meaningful treatment.

If no evidence of tumor spread is present, the mass may be benign, or it may simply have produced tumor spread too small to see. In this case, one may simply proceed with splenectomy, understanding that tumor spread may be obvious in the abdomen once the belly has been opened. Alternatively, one can have ultrasound performed on the belly to get a better idea of whether or not there is evidence of tumor spread.

If the spleen can be removed and minimal spread has occurred, then chemotherapy is a reasonable treatment option for maximizing quality life span.

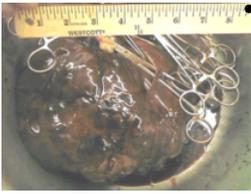
#### Splenectomy

When a dog with a splenic mass is going to have its spleen removed (splenectomy) there are some issues to understand.

- The spleen may begin bleeding at any time up until it is actually removed. If this occurs, blood transfusion is likely going to be needed (either with artificial blood or whole blood, depending on what is available). It is possible that multiple transfusions will be needed. A parameter called the packed cell volume (PCV) will be monitored to make sure the amount of circulating red blood cells does not fall dangerously low. If one is lucky, the spleen will not be bleeding at any time during surgery.
- It may not be known prior to surgery if the tumor is benign or malignant. There is a good chance this will become immediately obvious once the belly is opened. If the tumor is obviously malignant, will you want your dog euthanized at that point? Will you want the spleen removed so that you can consider chemotherapy? Will you want the incision simply closed and your dog awakened? These questions should be answered prior to surgery so that your veterinarian will know what to do should this situation arise.
- The spleen and its large blood clots are likely to weigh 5 to 10 lbs in a large dog. The dog will appear substantially thinner after surgery. There will be a long incision to accommodate this very large organ and perhaps a bandage to control any leaking of blood from the



incision.



- Most dogs go home a day or two after surgery. An iron supplement may be needed to help the body recover from any blood loss. Antibiotics will likely be prescribed as will some sort of analgesia (pain relief) for the recovery period.

#### **If You Choose Not to Remove the Spleen**

Unfortunately, eventually the dog will have a bleed from which he cannot recover. If you think your dog is having a bleed at home, you can apply an ace bandage around the belly in a snug manner to essentially apply pressure to the bleed. This is surprisingly effective and may stave off the inevitable.

Chemotherapy is not an option if the primary splenic tumor is left behind; however, since a large percentage of splenic tumors are benign and splenectomy is curative in this situation, I recommend reconsidering surgery.

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