THE PET HEALTH LIBRARY
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Vaccine Associated Fibrosarcoma

(Also called vaxosarcomas)

What is a Fibrosarcoma and Why do we Think Vaccination Might Cause it?

Fibrosarcomas have been recognized as difficult, deeply rooted tumors of the cat for a very long time. The fibrosarcoma is a tumor that does not usually spread throughout the body in the way we usually think of cancer; instead, it digs in deeply and widely in a localized area. After surgical removal, it is notorious for recurring even more aggressively than before.

These tumors can result spontaneously in either dogs or cats, as can any cancer, or they can be virally induced in cats via the feline sarcoma virus. While spontaneous and viral fibrosarcomas have been described for decades, the potential for vaccination to lead to the formation of these tumors is a relatively new concern. There are still many unanswered questions about how this is actually happening, the role of vaccination, which vaccinations have been implicated, and how serious the risks actually are. What we do know is:

- When local laws change to require rabies vaccination for cats, the incidence of fibrosarcomas increases in that area.
- The most common sites for fibrosarcomas are the area between the shoulder, the lower back and hind limb (areas commonly used for vaccination in the past).
- Hawaiian cats have a reduced incidence of fibrosarcoma (rabies vaccination is not generally performed in Hawaii as the islands have successfully eradicated rabies). Hawaiian cats DO still get fibrosarcomas. At this time, killed virus vaccines such as rabies and feline leukemia virus vaccines have been primarily implicated.
- Fibrosarcomas in areas commonly used for vaccination seem to be more aggressive or malignant than fibrosarcomas in other areas. We think this means that vaccine-induced fibrosarcomas are more malignant than viral or spontaneously occurring fibrosarcomas.
- Fibrosarcoma incidence is extremely rare with different studies reporting an incidence between one in 1000 to one in 10,000 vaccines administered. To put this in perspective, using the traditional vaccination guidelines a cat would receive three vaccines annually during his or her 15-year lifespan for a total of 45 vaccines, not including the initial kitten series.
- Dogs are so rarely affected by this phenomenon that it is considered of no realistic significance. Vaccine-induced fibrosarcomas seem to be a feline problem only.

Despite the extremely low incidence of this problem, the problem is still serious and the veterinary profession has responded with numerous studies on how vaccines might be related to tumor formation, why the incidence is so low given how many vaccines are given to cats annually, and what can be done for prevention.

How Might Vaccination Cause Cancer?

Killed virus does not stimulate the immune system as well as modified live virus but there are exceptions to this rule. To facilitate immune stimulation with a killed virus, a substance called an "adjuvant" is often used. This material holds the virus in the area of the vaccination for a couple of weeks so it can be released slowly, allowing immune stimulation to take place over a longer time period. This kind of stimulation can lead to local inflammation in the area of vaccination and one theory is that this inflammation is what leads to precancerous changes in the local cells. Indeed, some fibrosarcomas have been found to have vaccine adjuvant embedded within them.

Still, adjuvants are different between manufacturers and a particular brand of vaccine has not been singled out as the culprit. The critical aspects of tumor development appear to be a chronic, low grade inflammatory process (as might be caused by an adjuvanated vaccine) and a genetic predisposition to form tumors in response to such inflammation. If a cat's genetics are right for it, the offending injection need not be a vaccination; other injectable products may generate enough inflammation to generate a sarcoma though certainly no injectable medication generates a comparable amount of inflammation to an adjuvanted vaccine.

It can take as short a time as two months and as long as 10 years to develop a vaccine site tumor. While most tumors are fibrosarcomas, other types of tumors that can develop through this phenomenon include:

- the malignant fibrous histiocytoma
- the osteosarcoma
- the rhabdomyosarcoma
- the liposarcoma
- the chondrosarcoma
- the undifferentiated sarcoma

All are tumors of muscle, bone, cartilage, or fat.

Should I still Vaccinate my Cat?

The answer is still an unequivocal yes. The incidence of these tumors is exceedingly rare relative to the incidence of the diseases that we vaccinate against. Vaccination remains one of the most important aspects of preventive care for cats but now that the vaccine-associated sarcoma has been recognized, some changes have been made in the way cats are vaccinated. For example, vaccinations are made differently now. Instead of the simple modified live versus killed option, we now have recombinant vaccinations, which allow a live non-adjuvanted approach to vaccination against diseases like rabies and feline leukemia virus. These are preferentially used over the adjuvanted killed vaccines that have been heavily implicated in sarcoma formation. Some vaccines are administered in a needle-free manner (either nasally or with a spray gun) to avoid creating a depot of vaccine in the muscle and skin tissues. Vaccines are divided into core vaccines, which all cats should have regardless of their indoor/outdoor lifestyle (rabies and FVRCP distemper vaccines are considered core), while other vaccines are given depending on the cat's realistic risk of exposure.

For general information on recombinant vaccines see: http://purevax.us.merial.com/benefits.asp

See the 2006 vaccination guidelines for cats from the American Association of Feline Practitioners.

Guidelines for Vaccine-Associated Sarcoma Prevention

- *Avoid unnecessary vaccination*
  Be wary of vaccination recommendations that encourage you to vaccinate for every possible disease. Recommendations are highly regional and individualized according to the philosophy of the animal hospital you are visiting, and every veterinarian may have a different philosophy. However, the guidelines developed by the American Veterinary Medical Association, American Association of Feline Practitioners, American Animal Hospital Association, and Vaccine Associated Sarcoma Task Force are a good place to start (see link above).
- *Vaccinations should go in standardized areas*
  This not only helps researchers track which vaccines are associated with which tumors but also moves vaccination away from the area between the shoulder blades where a cat is likely to have had many vaccines administered in the past. Accepted vaccination guidelines recommend giving vaccines in the areas shown, using the lower limbs. Cats generally do not appreciate this and sometimes it is not possible. The lower legs are selected because if a fibrosarcoma erupts on a leg, the leg can be amputated and the tumor permanently removed. This sounds like a radical surgery and it is; however, the fibrosarcoma is a very aggressive and malignant tumor and extreme measures are generally needed to control it.
- Detailed records should be kept by the veterinarian indicating the vaccine lot number and type as well as the site of vaccination. This also helps researchers determine what is occurring with regard to tumor development.
- Be aware of lumps forming after vaccination. Lumps commonly form in the weeks following vaccination due to the immune stimulation and inflammation centered on this area. These lumps are usually normal and do not represent fibrosarcomas (which generally take years to develop, not weeks). If your cat develops one of these lumps under the skin (they are usually noticed by owners 3-4 weeks after vaccination), the lump may be left alone to resolve naturally. If the lump is still present 3 months from the time of vaccination, it should be removed and biopsied. Any lumps greater than 2 cm in diameter (approximately one inch) should be removed no matter how long a time has past since vaccination. Also, any lump should be removed if it is felt to be getting larger rather than smaller one month after its discovery.

Sometimes one such lump will break open. This usually means there is an infection and must be treated rather than that a fibrosarcoma has developed. Your veterinarian should be informed of this occurrence and the pet should return for therapy.

Treatment for Vaccine Associated Fibrosarcomas

Fibrosarcomas associated with vaccinations are felt to be even more resistant to treatment than spontaneously forming fibrosarcomas. Surgery is the chief method of treatment and generally involves broad excision in an attempt to remove the entire tumor. Radiation and/or chemotherapy are often used as supplemental treatments. As study of the vaccine sarcoma has evolved over the last decade, it has been found that very aggressive surgery is necessary to prevent recurrence. Your veterinarian may not feel comfortable treating them, and you and your vet should discuss whether referral to a specialist is best for your pet.

A web site reviewing recent treatment protocols and research has been set up at:
www.geocities.com/~kremersark/protocol.html

See the

VAFSTF Vaccine Associated Feline Sarcoma Task Force

Vaccine Associated Feline Sarcoma Task Force.

Our goal here is to create awareness of an emerging problem in veterinary medicine, not to elicit panic. We believe that intelligent decisions about pet ownership require information and education. We take the prevention guidelines very seriously and hope that all veterinarians will.

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