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Case Report

Vaccine-associated Feline Sarcoma (VAFS) with Multiple Recurrences in a Turkish Van Cat

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Abstract: Vaccine-associated feline sarcoma (VAFS) with multiple recurrences was diagnosed in the specimens at the injection site of a Turkish Van cat that had been vaccinated four months previously. The original tumor consisted of two compartments each 2.5 cm and 3.5 cm in diameter. It recurred five times following surgery and local recurrences necessitated five more radical resections within two years. Euthanasia was performed when pleural effusion developed, but evidence of metastatic disease was not observed.

This article reports the first case of a vaccine-associated feline sarcoma in a Turkish Van cat clinically diagnosed as prominent evidence of postvaccinal sarcoma from Turkey with the biological aggressive features comparable with cases overseas.

Key Words: Vaccine-associated sarcoma, multiple recurrences, Van cat

Bir Van Kedisinin Aşı Enjeksiyon Yerinde Gelişen Multiple Rekurrensli Sarkom Olgusu

Özet: Bu çalışmada, dört ay önce aşılanmış bir Van kedisinin aşı enjeksiyon yerinde gelişen multiple rekurrensli sarkom olgusu tanımlandı. Orijinal tümör biri 2.5 ve diğeri 3,5 cm çaplı olmak üzere iki ayrı lobluydu; iki yıl içinde beş kez nüks etti ve radikal rezeksiyonlarla sağaltılmaya çalışıldı. İkinci yıl içinde gelişen plöyral efüzyon sonucu hayvan ötenazi edildi, ancak metastazlara rastlanmadı.

Hayvan sahibinin verdiği anamnez bilgileri, klinik ve patolojik bulgular ile çeşitli ülkelerde tanımlananlara büyük benzerliğinden hareketle, Türkiye'de bir Van kedisinde aşılamaya bağlı yangısal granulomun fibrosarkoma gelişmiş olabileceği düşünüldü.

Anahtar Sözcükler: Aşı ilişkili sarkom, multiple rekurrens, Van kedisi

Introduction

Since it was first indicated that injection site reactions induce fibrosarcoma in cats by Hendrick and Goldschmidt in 1991 (1), an increased incidence of soft tissue sarcomas in areas routinely used by veterinarians for vaccination in cats has been found in the United States of America (2-7).

Most studies have been focused on the issue of sarcoma formation associated with vaccination, its epidemiology, risk factors, pathogenesis, etiology, and treatment of the disease in cats (2-5,8,9). In response to concerns about this emerging health issue of cats, the Vaccine-Associated Feline Sarcoma Task Force (VAFSTF) was formed in 1996 in the USA (10).

Some cases have also been recently reported in Canada (11), Australia (12), and England (13) following the report issued in the United States of America. However, we are not aware of any reports that have identified vaccination-associated feline sarcoma in our country, although injection-site reactions after vaccination are very well known by our veterinarians (observations of the second author).

This article reports the first case of a vaccine-associated feline sarcoma seen in a Turkish Van cat from

Turkey with a temporal association between vaccination and sarcoma formation.

Case History

A four-year-old female Turkish Van cat was brought to the Department of Surgery, Faculty of Veterinary Medicine, University of Ankara, due to an ovoid subcutaneous mass, measuring approximately 5 cm, on the right dorsothoracal region.

According to the owner, the cat had been brought for routine annual vaccinations 4 months prior to the appearance of the mass. The vaccination had been performed simultaneously in this area by combining modified live feline viral rhinotracheitis / calicivirus / panleukopenia virus (FVRCP) and inactivated adjuvanted rabies vaccine. One month later, the animal was developing a small, firm, nodulary mass at the site of vaccination, and it had been returned with the diagnosis of inflammatory granuloma. As a result, this granuloma had begun increasing in size within the last month, with a very large amount of growth during the last 15 days.

Results and Discussion

The conclusion of the physical examination of the cat was negative except for the mass. Diagnostic biopsy was performed and a diagnosis of fibrosarcoma was made histologically. The tumor was later totally removed, dissected from the surrounding tissue with elliptical incision.

The tumor was macroscopically 4 x 6 x 3 cm, sharply demarcated, round to ovoid, located within subcutis, and consisted of adjoining two major lobulated masses (Figure 1). Both masses were relatively well demarcated, somewhat elastic in consistency, and had a few small protuberances on their outer surface. The larger mass also fluctuated in palpation. On the cut surface, the larger mass (3 x 4 cm) appeared to have a central cavitation containing a peripherally located white tumor tissue with multifocal variably sized dark hemorrhagic areas. The central cavitation was filled with viscous/gelatinous grayish fluid. In contrast, the smaller mass (2.5 cm) did not have a central cavitation and was thin lobulary and separated by thin white and gray septa with small dark colored areas. The appearances of the masses cut surfaces, which were glistening grayish-white in color, were principally very similar to each other, except for the central cavitation (Figure 2). However, the larger mass had a more uniform glistening white appearance with hard woven areas whereas the smaller mass, which was loosely woven, had a more mixed color appearance with dull/gray and glistening/white areas as to be lined randomly circular. Moreover, it was clearly observed that the masses were partly separated both from one another and from surrounding tissues with a peripheral boundary.

Histologically, the tumor tissues were consistent with fibrosarcoma (larger mass) and malignant fibrous histiocytoma of the giant-cell type (smaller mass). The

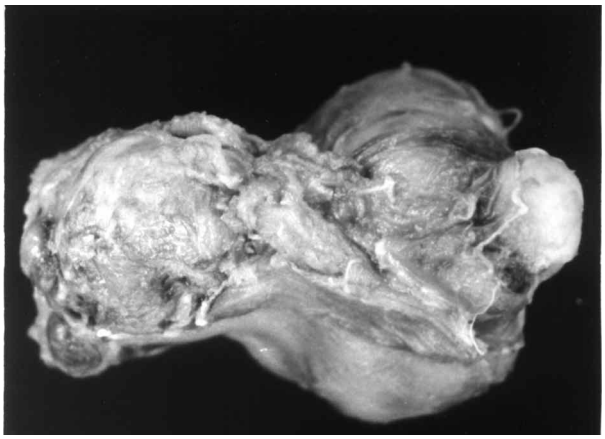

Figure 1. Macroscopic appearance of the tumor consisted of adjoining two major lobulated masses with a few small protuberances on their outer surface.

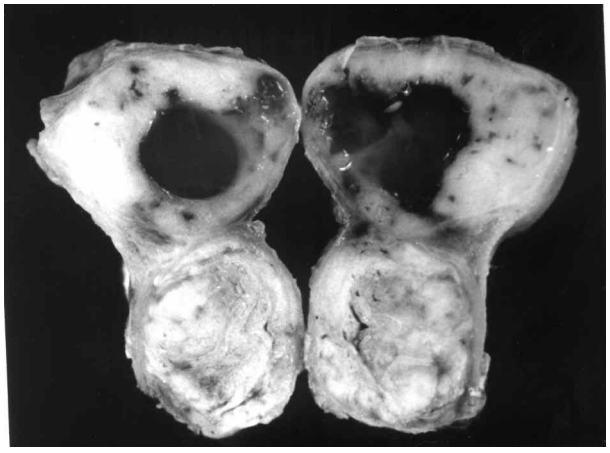

Figure 2. The appearance of the cut surface of the tumor. Two major masses are partly separated both from one another and from surrounding tissues with a peripheral boundary. Note the larger mass with a peripherally located white tumor tissue containing a central cavitation (above) and the smaller mass with thin lobulary and separated by thin white and gray septa (bottom).

larger mass had numerous spindle cells with marked nuclear and cellular pleomorphism, high mitotic activity, large central zone of necrosis, and peripheral inflammatory infiltrate (Figure 3). In addition to these findings, the smaller mass had numerous multinucleated giant cells and variable numbers of pleomorphic poligonal to histiocytoid cells with mild to marked atypia (Figure 4).

The majority of cells of the tumor tissue were immunoreactive for both vimentin and alpha-smooth muscle actin antibodies.

Two months later, the tumor recurred in the same area and a larger excision of the first surgical excision was performed. Results of the histopathologic examination were similar to the findings of the first biopsy material. As a result, it was presumed that this case was typical of vaccination associated feline sarcoma, along with its findings and aggressive biological features, such as anaplasia, rapid growth and recurrency, extensive central necrosis and prominent tumor giant cells, peripheral inflammatory infiltrate, location and histologic appearance in addition to known vaccination history.

Results of thoracic radiography were negative for tumor metastasis at that time.

After the first recurrence, the cat continued to be observed in an effort to perform for early intervention. Thus, the following four recurrences were treated surgically as they occurred, in a special veterinary clinic by the second author. As a result of inconvenience and with the agreement of the owner, the cat was euthanized when pleural effusion developed within the second year of the first surgery. However, complete necropsy was not performed as the owner refused.

Over the past decade, there have been various reports of soft tissue tumors in cats at typical vaccination sites, referred to as vaccine-associated feline fibrosarcomas (VAFSs) in the United States of America (3,4,14). It has been suggested that the vaccine industry has shifted from production of modified-live virus vaccines to killed-virus vaccines and that the vaccination site has shifted from intramuscular to subcutaneous routes of injection, previously an uncommon form of injection (1). Also, it has been found that the risk of the development of VAFS increases with the number of vaccines given at the same time (3).

The cat of the present study was vaccinated subcutaneously by inactivated adjuvanted rabies and modified live FVRCP vaccines on same date, into the same

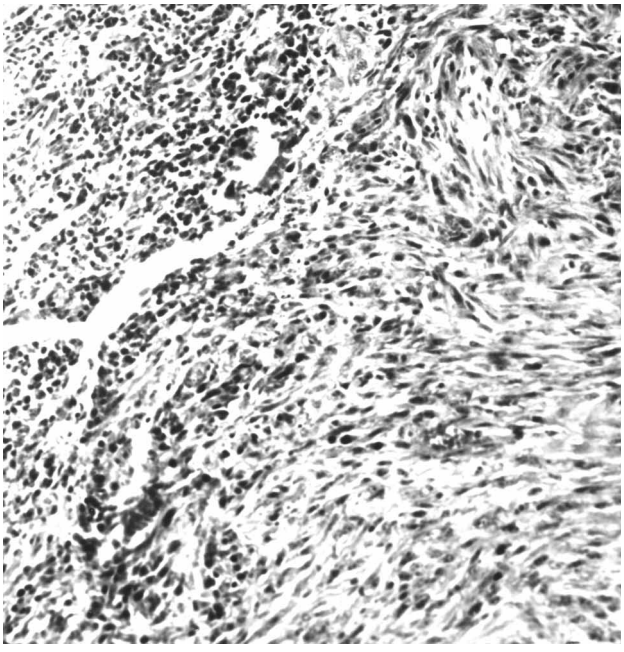

Figure 3. Microscopic appearance of the larger tumor nodule. Note large aggregates of lymphocytes along the periphery of the tumor tissue. HE x200.

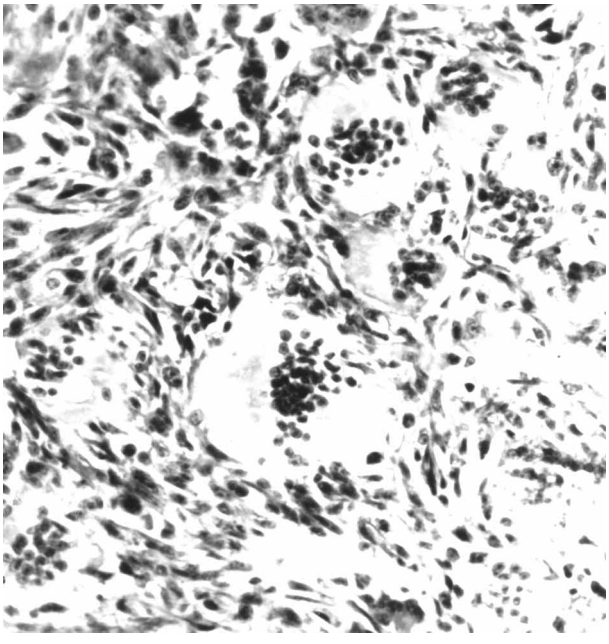

Figure 4. Microscopic appearance of the smaller tumor nodule. Numerous multi-nucleated giant cells are interspersed with spindle cells showing marked nuclear and cellular pleomorphism. HE x400.

area with injection sites in close proximity. It may be speculated that VAFS was produced within a few months via subcutaneous injection of both vaccines or one of them. With the most optimistic consideration, this animal could also be genetically predisposed to tumor development after trauma due to injection, regardless of differences in vaccine types.

It has been considered that vaccination-associated feline sarcomas, which are often larger and more aggressive in their biological behavior, differ from classical fibrosarcoma in younger animals, are highly invasive and rapidly recur following attempted excisions with margins that would be considered curative for most normal fibrosarcomas (4,10,13). There is also a broad spectrum of histologic types and unique histologic characteristics when compared with classical fibrosarcomas unassociated with vaccination. Histopathological assessment of the vaccine-associated feline fibrosarcomas were often fibrosarcomas but many other types of sarcomas also have been reported such as rhabdomyosarcoma, chondrosarcoma, osteosarcoma, myofibroblastic sarcoma, and malignant fibrous histiocytoma by different pathologists (5-7,12,15). Also, histopathological features of three tumor types have been reported at the same injection site of a single patient (16). However, there is not difference in prognosis to the varying morphological forms of postvaccinal sarcomas. The present case described is in accordance with above findings.

In veterinary practice it is well known that injection of some vaccines results in focal necrotizing granulomatous panniculitis which progresses to sarcoma, sometimes in cats (17). Likewise, clinical veterinarians in our country have recognized for several years the development of inflammatory granulomatous reactions at some vaccination sites and have interpreted these inflammatory nodules to represent adverse vaccination reactions (observations of the second author). In the last three to five years, soft tissue sarcomas were also more commonly found by our clinics in the Ankara district in Turkey (observations of the authors) in the thoracal/interscapular regions of cats than in the extremities or head. It is now also possible to see various cats referred to small animal clinics in our country with vaccination-associated feline sarcomas similar to oversea clinics. A general awareness must be made that the injection of some vaccines may result in inflammatory granulomas in some cats. It is well known, but not considered prominent, that some of these inflammatory reactions progress to sarcomas. In the future, real causal, prognostic and risk factors, pathogenesis and pathological findings, etiology and epidemiology, and treatment options relating to this disorder must be determined.

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