Repeated physical and cytologic characterizations of subcutaneous postvaccinal reactions in cats

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Objective—To examine local reactions and short-term cytologic responses of cats to administration of rabies virus (RV); FeLV; and combined feline rhinotracheitis, calcivirus, and panleukopenia virus (FRCPV) vaccines.

Animals—Nine healthy 6- to 7-month-old specific-pathogen-free cats.

Procedure—One milliliter doses of the aforementioned vaccines were administered SC (at different sites) to healthy, specific-pathogen-free cats. Each cat also received 1 ml of sterile saline solution SC as a control. Injection sites were visually examined and palpated daily for 4 weeks. Palpable lesions were measured by use of calipers. Temperature of the vaccination sites was measured weekly by use of a thermocouple. Aspirates were taken from vaccination sites weekly, and smears were submitted for cytologic analysis.

Results—There were no significant differences in lesion surface area among injection sites at any time. Injections of saline solution and FeLV vaccine resulted in no palpable lesions. The FRCPV vaccine elicited a minor reaction in 1 of the 9 cats. The RV vaccine caused palpable lesions in all cats. Smears of the aspirates from the sites of saline injection were poorly cellular. Cellularity of aspirates from the sites of FRCPV and FeLV vaccinations was moderate at week 1, and decreased with time. Inflammatory infiltrates were composed principally of lymphocytes, with fewer neutrophils and macrophages. In contrast, cellularity of aspirates from RV vaccinations sites increased for 21 days and was characterized by increased numbers of lymphocytes and macrophages.

Conclusions—RV vaccine used in this study induced palpable lesions in many cats. In contrast, FRCPV and FeLV vaccines elicited less severe lesions.

Clinical Relevance—Subcutaneous administration of killed virus vaccines in cats may result in palpable lesions that are detected by clients or clinicians. Aspiration cytologic examination may reveal a different characteristic pattern of cells that is dependent on the individual vaccine and time elapsed from vaccination. (Am J Vet Res 1997;58:719-724)

In recent years, much investigation has centered on the development of sarcomas at sites of SC or IM vaccination in cats. The mechanisms of tumor development have not been elucidated completely; however, chronic inflammation associated with vaccine adjuvants has been suggested as a probable cause of tumorigenesis. These lesions are believed to require weeks to months to develop.

Little information is available regarding the short-term cytologic changes that occur at subcutaneous vaccination sites in cats. Recently, clinicians in our locale encountered cats with firm, raised nodules within the subcutis at sites of vaccination. Aspiration cytologic examination revealed eosinophilic inflammation without evidence of sepsis or neoplasia. These cases prompted us to investigate the normal reactions of cats to 3 vaccines given SC in routine manner. The objectives of the study reported here were to examine the local, short-term physical, and cytologic responses of cats to administration of rabies virus (RV), FeLV, and combined feline rhinotracheitis virus, calcivirus, and panleukopenia virus (FRCPV) vaccines over a 4-week period.

Materials and Methods

Cats—Nine specific-pathogen-free healthy 6- to 7-month-old purpose-bred research cats (4 sexually intact females and 5 sexually intact males) that had been raised in isolation were used. The cats weighed between 3.0 and 6.5 kg; none had been immunized previously. All cats were given complete physical examinations prior to start of the study, and no abnormalities were detected. Results of CBC, serum biochemical analysis, and urinalysis were within reference intervals. All cats tested seronegative for FeLV and feline immunodeficiency virus. Each cat was housed individually under controlled temperature (20 to 23 C), humidity (65%), and light cycle (light:dark, 12:12). They were allowed food and tap water at libitum. Cats were housed in facilities at the University of Tennessee that were approved by the American Association of Laboratory Animal Care, and all protocols were approved by the University Animal Care and Use Committee.

Vaccination protocol—Prior to vaccination, the fur at each injection site was clipped in a 5-cm² area and the skin was prepared aseptically, using alternating chlorhexidine and alcohol scrubs. All injections were given by the same individual (LAF) by use of a 1-inch 25-gauge needle that was inserted subcutaneously to the base of the hub (Fig 1). One milliliter of 0.9% sterile saline solution was administered in the right dorsal scapular region, approximately 4 cm lateral to the fourth thoracic vertebra. One milliliter of FRCPV vaccine was administered in the left dorsal scapular region, approximately 4 cm lateral to the fourth thoracic vertebra. One milliliter of FeLV vaccine was administered

Figure 1—Line drawing of the locations of all injections given to test cats. Six- to 7-month-old specific-pathogen-free cats were given 1 ml each of rhinotracheitis-calcivirus-panleukopenia virus (FRCPV), FeLV, and rabies virus (RV) vaccines SC at different sites. In addition, each cat received a subcutaneous injection of 1 ml of sterile saline solution as a control.