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Immunization Programs for Dogs and Cats

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When attempting to stereotype such a controversial subject as that of vaccination programs for the dog and cat, one soon finds that there are about as many ideas on the subject as there are practicing veterinarians. However, I do believe that at least the basic concepts of the antigen-antibody reaction can be accepted by all. With this in mind I will attempt to outline a number of programs which are broad enough in scope so that those who favor other programs will find them flexible enough to encompass their own ideas. I have reference to such variances as: (1) Age to vaccinate (2) Type of vaccine to use (3) Frequency and (4) Duration of immunity.

Canine Distemper

This disease has been recognized for years. It has been described in the oldest veterinary texts, yet it wasn't until the early part of this century that the causative agent was discovered and then an inactivated vaccine produced as the first immunizing agent for this disease. Today, the practitioner is confronted with an array of vaccines of such variety so that nowhere else in the field of immunizing biological products is there such a choice. Basically, the vaccines can be broken down into the following categories:

- A. Attenuated Live Virus
 - 1. Those attenuated by passage through a different host
 - a. Ferret Modified
 - b. Chicken embryo-adapted strains

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- 2. Attenuated strains adapted to cell culture systems
 - a. Ferret kidney cell strain
 - b. Chicken fibroblast cell-adapted strains
 - c. Canine kidney cell-adapted strains
 - d. Continuous dog kidney cell line
- B. Inactivated Canine Distemper Virus Vaccine
- C. Heterotypic Virus Vaccines—a live virus agent, which when injected, fails to clinically infect the animal yet confers a resistance to a distinctly different but closely related pathogenic virus.
 - 1. Measles Vaccine (Modified live virus)
- D. Combined Viral and Bacterial Antigens
 - 1. Combining Infectious Canine Distemper virus with Infectious Canine Hepatitis virus and *Leptospira* organisms.

Judging from the variety, one can either assume that there is no single type of vaccine which is absolutely satisfactory or else competition is keen enough to result in newer and better vaccines.

Before venturing on a vaccination program I believe that there are two basic questions which one must answer: (1) At what age should pups be vaccinated against distemper? (2) What is the duration of immunity following a vaccination? There will be some variances as to the answers to these questions. Your answer will determine the type of program you will suggest to your client. The basis of your decision might be the result of previous experience, information from scientific journals, opinion of a colleague or information furnished by a biological

manufacturer. As an example, in a recent publication⁹ a number of practitioners expressed their lack of confidence in distemper serum or globulin concentrate. Since the advent of measles vaccine there appears to be a tendency to use this product for the very young puppies (3 weeks of age or older) rather than globulin every two weeks until they are three months old as has been a common practice. This product is being used at the ISU Veterinary Clinic on a limited basis. Time will tell whether this regimen is a sound one. Serum globulin concentrate may be given in conjunction with the measles vaccine so as to afford temporary protection against infectious hepatitis if desired. When the dog is about four months old an attenuated live virus is given. At this time it can be assumed that all of the passively transmitted distemper antibodies have disappeared. Others may want to start with a vaccine (attenuated live virus) at an early age (7-8 weeks) and then repeat the procedure every two weeks until the pup is 12-13 weeks old. Special considerations will have to be given to the undernourished, the parasitized, exposed puppies, or those from animal shelters.

Studies⁸ have shown that in the absence of restimulation, distemper antibodies fall from a peak reached in two months after vaccination until they are no longer demonstrable. This may not in all cases indicate a clear cut susceptibility to clinical distemper but in the light of these findings the practicing veterinarian is forced to seriously consider the advisability of revaccination. At one time many clinicians were reluctant to admit to their clients that the vaccine they were using did not produce a life time immunity for fear that it would discourage people from having their dogs vaccinated. Probably the idea of "boosters" to stimulate immunity has become more common place due to the poliomyelitis vaccination program in the human. Until an inexpensive test can be performed to determine which animals have satisfactory immunity, it appears that the yearly booster is probably the safest and least expensive route to follow.

Infectious Canine Hepatitis

As in Canine Distemper, dogs which acquire a fully virulent virus of Canine Infectious Hepatitis by nature develop a long lasting immunity. In the case of I.C.H. persistence of virus in the kidneys may serve as a continuing antigenic stimulus for production of neutralizing antibodies and thereby cause immunity of long duration.¹

Two types of vaccine have been developed in an attempt to duplicate this immunity: (1) Inactivated tissue culture vaccine prepared from tissue laden with virulent virus and then chemically treated to inactivate the virus (2) A live virus vaccine attenuated in virulence by cultivation in canine or porcine renal cells by the tissue culture method.

Interference from colostrum, which is so important in distemper vaccinations, is not a factor in Infectious Canine Hepatitis. Since most of the hepatitis vaccines are given in conjunction with canine distemper, then the age of vaccination is controlled by the distemper component. Some practitioners feel this is a disease of just the young dog and hence need not be considered after the dog is 2-3 years old. They agree to giving the booster for the canine distemper and yet disregard the hepatitis protection. Dogs of all ages are susceptible to this disease so I think it behooves us as practitioners to provide this protection since polyvalent distemper vaccines can be purchased for just a few cents more than the monovalent vaccine. For the slight increase in cost I think we are doing the client an added service by including this type of vaccine in our booster program.

Rabies

With the enactment of Chapter 351 of the 1966 Code of Iowa pertaining to the control and prevention of rabies in the dog, there is little room for discussion of methods which can be used. Pursuant to authority of Chapter 351, 1962, Code of Iowa and amended by House File 566 (Chapter 311) of the Sixty-first General Assembly, Section 3 thereof, the following rules were adopted:

1.132 (351) Control and Prevention of Rabies

1.32 (1) Anti-Rabies Vaccine

- a. Modified live virus chick embryo rabies vaccine is a designated vaccine approved by the Iowa Department of Agriculture and will be recognized for a period of two years.
- b. The intramuscular method is recommended in the injection of the anti-rabies vaccine.

The law also mentions that all dogs (except kennel dogs) 3 months of age and over shall be vaccinated against rabies. Most biological companies recommend that the dog be preferably 5 months of age. However, some authorities⁷ are now recommending the earlier age. For those dogs which are allergic to chick embryo vaccine, the Executive Board of the I.V.-M.A. at its January 18, 1967 meeting recommended that the following addition be made to the rules of the Iowa Department of Agriculture pertaining to vaccination of dogs against rabies: "In the event that professional judgment of the veterinarian indicates the use of modified live virus chick embryo vaccine in a particular animal is contra-indicated, inactivated nervous tissue vaccine may be used on an annual basis." This rule has been adopted and is now effective in the state of Iowa.

For those who are not located in Iowa and who do not have laws to the contrary, three other types of vaccine may be considered in the dog.

1. Phenolized Cord Suspension (Ovine or Caprine)
2. Modified Live Virus (Hamster Tissue Culture Origin)
3. Inactivated Rabies Vaccine (Hamster TCO)

Leptospirosis

Two species are pathogenic for the dog, *Leptospira icterohemorrhagiae* and *Leptospira canicola*. Commercial bacterins are available which appear to be of sufficient value to warrant their use. Two doses of the bacterin are administered usually allowing an interval of two weeks between doses. Recent information indicated that such a program is about 70% effective even though a short immunity is produced. The immunization may provide sufficient resistance to permit survival, but

it does not prevent urinary shedding of the organisms. Booster vaccinations should be given at six month intervals in those areas where this is a serious problem.⁶

The bacterin is also available in a polyvalent vaccine in combination with Canine Distemper and Infectious Canine Hepatitis. This bacterin may either be included with the desiccated viruses or may be incorporated into the diluent which is then added to the vacuum dried vaccines to reconstitute the preparation.

If the polyvalent vaccine is used as a booster for distemper prophylaxis then the dog would also be moderately protected against Leptospirosis. In areas where the disease is prevalent, vaccinations with the bacterin may have to be repeated at 6 month intervals for maximum protection.

FELINE VACCINES

Infectious Feline Enteritis (Panleukopenia)

Excellent protection is afforded cats who have been vaccinated for this disease. However, due to conflicts in terminology and diagnosis it can be assumed that some cats assumed lost from panleukopenia probably are infected with one of the respiratory viruses instead. It is unfortunate that the erroneous name of "Feline Distemper" has to appear on all feline enteritis vaccines by edict of the federal government. This is misleading to those not familiar with the disease as the term should be reserved for Canine Distemper. Several types of vaccines may be used for this protection:

1. Inactivated Feline Tissue Culture Origin
2. Inactivated Vaccine from virus bearing tissues (Tissue Origin)
3. Inactivated Vaccine (Tissue Origin) blended in an oil emulsion
4. Vaccines of Mink Tissue Origin in aqueous suspension given in 1-2 doses

The vaccine which is blended in an oil results in a slow release of antigen into the animal's blood stream stimulating effective levels of immunity over a period of several months. The salient feature of this preparation is that only one injection is necessary whereas with the other two products two injections are given at 7-10 day intervals. For maximum protection

yearly boosters are advisable. The vaccine may be given to cats as early as 8–10 weeks of age. However, if given too early the antibodies acquired by the kittens through nursing negate those produced by the vaccination. Thus, the kitten would remain susceptible to the disease if the vaccine is used at this time.

The use of Mink Virus Enteritis vaccine has been reported in field trials as giving good results on experimental cats when challenged with the feline enteritis virus.² A single injection of 1 ml of vaccine was used for this immunization. More recently, another author⁵ suggests the use of this vaccine as one of the routine methods for immunizing cats against panleukopenia.

At the ISU Veterinary Clinic we prefer to use the tissue culture origin vaccine since there is no burning sensation when injected as in contrast to the formalin inactivated products. Personally, I do not have any objection to the use of the one-injection method.

Infectious Feline Pneumonitis

Respiratory viral diseases in the cat are very common and are a never-ending problem to the clinician. Among these viruses is that of feline pneumonitis which produces much milder symptoms than that of rhinotracheitis. A modified live virus vaccine of chick embryo origin is commercially available. The dose is 1 ml given subcutaneously or intramuscularly. It should be repeated in 8–12 months. Since this disease responds quite well to treatment and the fact that immunity following vaccination is of short duration, it has very limited value in combating the overall complications of viral respiratory diseases. Actually, rhinotracheitis is probably more frequently incriminated and for this there is no satisfactory vaccine due to its poor antibody producing ability. As a consequence, the best treatment is antibiotics, cage rest, and supportive medications as indicated.

Rabies in the Cat

Pre-exposure vaccination of cats is recommended even though they are not mentioned in many state or local rabies laws.

The importance of rabies in cats has been aptly stated in a recent U.S. Communicable Disease Center publication.¹⁰ In the U.S. it has been reported⁴ that a sizable number of cats that develop rabies manifest the furious form of the disease. A cat with furious rabies can be a real threat to both man and animals.

Four types of rabies vaccine are available:

1. Simple type, nervous tissue vaccine containing inactivated virus.
2. Modified Live Virus (Chick Embryo) low egg passage
3. Modified Live Virus (Chick Embryo) high egg passage
4. Inactivated Rabies Vaccine (Hamster TCO)

Nervous tissue vaccine containing inactivated virus is the preferred vaccine.³ The recommended minimum dose is 3 ml of a 20% tissue suspension injected subcutaneously in a single site in the cervical or thoracic regions when 3–4 months of age and repeated yearly. The L.E.P. modified live virus is not recommended unless it is used in cats over 6 months old and then at the risk of an occasional death due to the vaccine. The H.E.P. modified live virus is safe when a 1.5 ml of a 33 $\frac{1}{3}$ % suspension or its equivalent is given intramuscularly. Within recent years an inactivated vaccine (Hamster TCO) has become available. This is the first ARS-licensed cell culture rabies vaccine developed for the veterinarian. The vaccine consists of a suspension of chemically inactivated viral fluids propagated on hamster kidney cells artificially infected with strains of a fixed virus known to have high antigenic ability. Yearly vaccinations are necessary for this product. Hamster-tissue vaccine may be given subcutaneously or intramuscularly in 3 ml doses. This vaccine should lessen the existence of post-vaccinal reactions feared with vaccines of nervous tissue origin.

Care and Handling of Biologicals

A paper of this type would not be complete without making a few comments regarding the care and handling of biologicals since this can be a key link in the chain of events leading to a successful

vaccination program. Biologicals can not accomplish their intended purpose if not used at the proper time. Selection of the right product to use depends on many different and complex factors. A few broad generalizations may be made which could lessen the chance of vaccination failures resulting from improper care of the vaccines.

1. Maintain biological products at refrigeration temperatures until used.
2. Avoid chemical sterilization of syringes and needles when using attenuated live viruses. Heat sterilization is the best although sterile disposable syringes and needles may be used. Occasionally these are provided by the manufacturer.
3. Dessicated products should be handled according to the enclosed instructions. Changing to another diluent may adversely affect the stability of the product. After reconstitution the product should be used within one hour even if refrigerated. Do not use outdated vaccines.
4. Do not mix different vaccines in combinations so as to reduce the number of injections unless specified. This may interfere with the antigenicity of the vaccine.
5. Adequate dosage is important. Do not try to reduce the volume thinking that you are saving a few cents. The recommended dose has been backed by valid research.
6. Considering all of the variables involved in a vaccination program, it behooves us as veterinarians not to complicate the issue by adding other pitfalls which can so easily be prevented.

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