

Vaccination Revisited - Serum Parvovirus and Distemper virus antibody titres taken in practice reveal a need to reconsider current vaccination programmes.

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Summary

The aim of this study was to investigate the validity of the current policy of vaccinating dogs annually for Canine Distemper virus and Canine Parvovirus. The study, involving 75 dogs from 3 practices showed that Parvovirus vaccine produces antibody titres sufficient to maintain immunity for longer than 1 year and that Distemper vaccine produced similar results, but raised questions over its efficacy. The study suggests that current policies need to be reviewed, and that a less frequent interval may now be appropriate.

Introduction

90% of puppies and kittens receive primary vaccinations, yet less than 50% continue to receive annual boosters (Bonner 1999). Despite this outbreaks of the major diseases vaccinated against are now, thankfully, comparatively rare. This calls into question the current practice of annual vaccination. An understanding of the true duration of vaccine-derived immunity will enable a more logical policy to be implemented

Various pressure groups have been campaigning to completely stop the current policy of annual vaccination of animals, and there have been a number of articles in the UK veterinary media discussing this (Sutton 1999, Wells 1999) as well as overseas (Smith 1995, Carmichael 1999). This mirrors concerns in the human field where there are, quite literally, thousands of articles demonstrating links between vaccination and many childhood illnesses, including Cot Death, and its failure as an overall concept, despite some apparent benefits (Scheibner 1993). Much of the pressure on the profession is based on the fact that vaccines may cause harm; NOAH has set up a vaccine survey to attempt to identify such problems. However, there is no reliable method of proof after the event. It is known however, that giving combination vaccines can suppress lymphocyte responsiveness (Philips 1989), that following manufacturer guidelines does not guarantee immunity, nor are all vaccines equally effective (Smith 1995), also that Feline Leukaemia and also Rabies vaccine are associated with tumour development (Wells 1999). Considering all this, the authors set out to determine whether or not animals presented to their practices needed vaccination by

looking at antibody titres as evidence of current active immunity. It is accepted that this is not a perfect technique as cell-mediated immunity can be hard to assess, and laboratory variation makes interpretation difficult to standardise (Wells 1999). However, aside from challenge studies, it is the only method of investigation easily and affordably available in practice.

Materials and methods

Cases were selected at random when presented for booster vaccination. In total 75 cases were blood tested over a period of 6 months. Length of time after previous vaccination was known in all but 6 cases, and ranged from 1 to 5 years.

Blood samples were taken and submitted to the Canine Infectious Disease Research Unit at the University of Glasgow where serology was performed using haemagglutination inhibition techniques for Canine Parvovirus, and serum neutralisation techniques for Canine Distemper virus. Analysis was performed for Distemper and Parvovirus titres only. This policy was decided upon as it is generally accepted that immunity to Canine Adenovirus is lifelong, as stated in manufacturer data sheets, while antibodies to Leptospirosis are only measurable for 1 to 3 months post-vaccination. Interestingly it is also the leptospirosis vaccine that is most commonly linked with anaphylaxis (Carmichael 1999).

A level of 32 for Distemper, and 32 or above for Parvovirus, was deemed an adequate titre to protect adult animals for the purpose of this study. These acceptable levels were based on unpublished challenge studies. An adequate Titre level shows that there is active immunity, a negative titre does not mean immunity has not been conferred by the vaccine. The only way to ascertain this would be challenge studies which are not a practical, or ethical, proposition in practice.

The length of time after vaccination, and numbers in each group were: 1 year – 57 dogs, 2 years – 9 dogs, 3 years – one dog, 4 years – 1 dog, 5 years – 1 dog, unknown time – 6 dogs.

Results

Only one dog in the study failed to show levels of antibody titres deemed sufficient to protect against Canine Parvovirus, and the previous vaccination history of that patient was unknown. Even the case 5 years from last vaccination was found to be immune.

8 dogs failed to show humoral immunity to Canine Distemper virus, and interestingly all these (excepting the above case with no known history) were amongst those tested 1 year after previous vaccination, suggesting a failure of the Distemper vaccine to produce measurable protection at all in those animals. 67 dogs had antibody titres deemed adequate for protection.

Of the 8 dogs who failed on the Distemper test, 2 were vaccinated and retested 6 months later, neither produced a significant change in titre level.

Discussion

The results suggest that the need for annual vaccination for canine parvovirus may not be strictly necessary. This contrasts with current guidelines from manufacturers. The results also suggest that vaccination may be unnecessary for some considerable time after the last vaccine, although further work is needed monitoring the selected group. A parallel study in the United States, as yet unpublished, on a much larger cohort of 1138 dogs showed that 94.4% of dogs had adequate titre levels to parvovirus when brought for routine revaccination (Twark 1999). This figure would be more than adequate for achieving that much vaunted aim of herd immunity and destroys the argument that manufacturers have to allow for worst case individuals (Sutton 1999).

Results for Distemper virus antibodies were a surprise as guidelines have always been that immunity lasts for longer than parvovirus. This may well be the case as this study was not a challenge based one. However, the results do suggest that the vaccine may well be failing the dog population with 10.6% not producing adequate immunity to last a year according to the studies parameters. If it were argued that 32 is not an adequate titre result for immunity then this figure would increase to 24%. This could mirror the human model where we know that even in the US, with 98% immunisation status due to enforced vaccination, epidemics of measles still occur at 3 to 4 year intervals (Scheibner 1993). Further evidence that this vaccine may be failing is the outbreak in Finland in 1990 where some 5000 vaccinated dogs suffered the disease, yet it had not been present in Finland for some 16 years (Kommonen 1997). One point which seemed overlooked was the source of this outbreak, was it the vaccine? The study of Twark and Dodds 1999 produced a better result for the Distemper vaccines with a 97.3% adequate protection rate.

The cases vaccinated and re-tested for Distemper antibody titre showed no significant change. Although this needs further investigation it does raise the question – do booster vaccines for Distemper work on adult dogs? This would have to be looked at on a much larger scale, and different vaccines should be compared to have validity as an idea, but these cases are cause for concern.

The difference between this, and the study of Twark and Dodds 1999, raises questions about individual vaccine efficacy. One study by Larson and Schultz 1997 showed that testing by vaccine manufacturers was inadequate as recently as 1994 when a comparison of 6 commercially available vaccines showed that only 2 were able to induce antibody production in pups with maternal derived CPV antibody (MDA). Another study suggests that puppies need vaccinating to 20 weeks of age if they are to produce adequate antibody titres as measured by serum neutralisation (O'Brien 1994). This is particularly of concern when MDA can be present up to 15 weeks of age, leaving many puppies exposed for their first year of life under current vaccination regimes (McCluggage 1995), and raises questions over early finish regimes which are gaining in popularity. Manufacturers should be questioned as to the efficacy of their vaccines before selecting which one to use in practice.

In conclusion, this study suggests there may be a need for an overhaul of the long accepted practice of annual vaccination. Annual titre tests for Canine Distemper virus and Canine parvovirus may be needed initially for owner and kennel/ insurance company reassurance, and to ensure animals receive boosters if their immunity is falling year by year, but with time and collation of data it may well be the case that booster vaccines are only needed every 3 to 5 years, if at all. The data studied as part of this work questions why we vaccinate for Canine Adenovirus at all after the first year, and that it may well be harmful to do so (Philips 1989), and also raises serious questions about the validity of the current policy on Leptospirosis vaccination where further development work and updating is needed if it is to be continued.

Reviewed literature also suggests vaccination of puppies should be carried out later, not earlier as is the current vogue, than at present if immunisation is to be effective.

A considerable amount of information is now available in the public domain on this subject, easily accessible to the general public via media such as the internet. The veterinary profession and more importantly the manufacturers from whom “current” advice is obtained must take the lead in resolving this issue if they are to maintain credibility in the face of controversy.

(The authors would like to note that this study is ongoing - the cases shown are only those between October 1998 and February 1999 - and the cohort analysed is growing in number by the day. They would ask any Vets with data on their own patients which could be submitted, if they could send the results in to add to the survey.)

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