

FREQUENTLY ASKED QUESTION SERIES

Center for Companion Animal Studies

Updated, April 2, 2013

ARE VACCINES A PRIMARY CAUSE OF HEMOLYTIC ANEMIA OR IMMUNE MEDIATED THROMBOCYTOPENIA IN DOGS?

Immune mediated hemolytic anemia (IMHA) and immune mediated thrombocytopenia (IMTP) are common hematologic disorders in dogs resulting in red blood cell or platelet destruction which can lead to anemia or bleeding with corresponding clinical manifestations. Magnitude of clinical illness ranges from mild to severe; mortality rates as high as 80% and 50% have been reported in the veterinary literature with regards to IMHA and IMTP, respectively.

IMHA and IMTP can be classified into primary versus secondary disease processes. Primary autoimmune disease lacks an identifiable cause for cell destruction whereas secondary conditions identify specific triggers including infectious agents, cancer, drugs, and/or toxins. Vaccines have only rarely been associated with IMHA or IMTP in humans.^{1,2} However, clinical impressions and anecdotal reports by some veterinary clinicians have suggested recent vaccination as a cause for secondary IMHA and IMTP in dogs which led to development of this Frequently Asked Question.

Vaccines are a crucial part of the preventative health care offered to veterinary patients and can benefit dogs by lessening the morbidity and mortality associated with the infectious agents the vaccines were designed to prevent. For example, canine distemper virus and canine parvovirus are common killers of puppies. In addition, vaccines for dogs can also impact human health as many of the infectious agents for which canine vaccines are available for also can infect humans. Notable examples include rabies, Leptospire, and *Borrelia burgdorferi*. While vaccine associated side effects can occur, side effects are much less common than the infectious diseases the vaccines were developed to prevent.^{3,4} Readers are directed to national and international guidelines committee reports for complete discussions of vaccine recommendations. The guidelines from the American Animal Hospital Association and the World Small Animal Association are excellent sources of information concerning vaccine needs for dogs.^{a,b}

A PubMed search was performed on April 2, 2013 using the key words dog AND/OR, canine, hemolytic, anemia, immune, thrombocytopenia. Multiple manuscripts on IMHA (n = 175) and IMTP (n = 155) were found. In review of the manuscripts, very few provided information assessing the potential association between canine vaccines and these important clinical problems.

The following is a brief discussion of the notable IMHA and IMTP literature that evaluated for associations among vaccines and these clinical problems in dogs.

- Duval et al is the only case control study we found that reported that the proportion of dogs administered vaccines within one month prior to presentation was significantly different between the study group (15 of 58 dogs; 25.9%) and the control group (7%).⁵ However, blood work from dogs in the IMHA group was not collected prior to vaccination; therefore, presence of pre-existing disease could not be evaluated. This study also showed the vaccine IMHA group to have a slightly higher mortality rate (60%) compared to the non-vaccine IMHA group (44%) but the difference was not statistically significant.
- Several other published manuscripts have failed to associate vaccines with IMHA in dogs.⁶⁻¹⁰ For example, Carr et al assessed the prognostic and risk factors associated with mortality in dogs with IMHA including whether there was a time-based relationship between recent vaccination and the development of this condition.⁶ Vaccination data from 72 dogs with IMHA was available to be compared to 29 dogs in the vaccine control group. There were no statistically significant differences detected when the time of vaccination to the onset of IMHA was compared to the time of vaccination and onset of disease in the control group. In that study, approximately 10% of affected dogs were vaccinated within one month of the onset of clinical signs.
- An abstract from the Journal of Veterinary Emergency and Critical Care Society published in 2004 assessed risk factors for the development of IMHA. In that study, the proportion of dogs administered vaccines within 2 months prior to presentation was not significantly different between the study group (5 of 31 dogs; 16.1%) and the control group (4 of 9 dogs; 44.4%).⁷
- Reimer et al studied 70 dogs with IMHA dogs; 3 had been administered vaccines within 2 weeks of developing clinical signs (4%).⁸ Similarly, Klag et al evaluated 42 dogs with IMHA and reported that one dog (2.4%) developed the syndrome within 2 weeks of being administered a modified live distemper-parainfluenza-leptospirosis-adenovirus-parvovirus vaccine.⁹
- In humans, the measles-mumps-rubella (MMR) vaccine has been associated with the development of IMTP and recent distemper vaccination in dogs has been linked to transient thrombocytopenia.¹¹ Thus, Huang et al sought to evaluate for the association between vaccination and IMTP in dogs.¹² In that study, 4 of 48 dogs (8%) with suspected ITP were vaccinated in the 42 days prior to hospital presentation compared to 13 of the 96 (14%) control dogs, which was not statistically different. The study also found no significant difference between the survival times of those recently vaccinated IMTP dogs compared to those that were not recently vaccinated.
- Bertuola et al. evaluated for associations between recent drug and vaccine use and acute IMTP in children. IMTP was a rare occurrence occurring in only 1 in 21,000 to 40,000 inoculations.¹³ As most veterinary studies have smaller number of test subjects, it is possible that the failure to associate vaccination with acute IMHA or IMTP may only reflect sample size. However, in one veterinary study, IMHA or IMTP were not recognized in a cohort study of 1,226,159 dogs vaccinated at 360 veterinary hospitals that had adverse events reported within 3 days of vaccination.³

In summary, multiple things are considered prior to vaccinating canine patients including infectious disease risk, legal issues (rabies), the immune status of the patient, and the potential for vaccine reactions. In our opinion, the benefits of vaccinating against appropriate infectious disease agents likely outweigh the risks of developing IMHA and IMTP in the majority of the cases. However, larger prospective veterinary studies with appropriate control groups are needed to more thoroughly evaluate this potential relationship.

References

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FOOTNOTES

^a<https://www.aahanet.org/PublicDocuments/CanineVaccineGuidelines.pdf>

^b<http://www.wsava.org/sites/default/files/VaccinationGuidelines2010.pdf>