Disease patterns and incidence of immune-mediated disease in insured Swedish Nova Scotia duck tolling retrievers

H. D. Bremer, Á. Vilson, B. N. Bonnett, H. Hansson-Hamlin

Context
Nova Scotia duck tolling retriever (NSDTR) dogs can be affected by several immune-mediated disorders, in particular immune-mediated rheumatic disease (IMRD) and steroid-responsive meningitis-arteritis (SRMA). The clinical signs of IMRD resemble those seen in the chronic autoimmune disease systemic lupus erythematosus (SLE), or SLE-related disorders, diseases well described in both people and dogs. Human SLE patients are known to have an increased risk of lymphoma, but whether this is the case in dogs is not known; however, the similarities in the disorders between dogs and people raise the question of whether a similar association can be found in dogs. In Sweden, most dogs are insured and insurance data have proved to be a valuable tool for epidemiological studies. This study assessed morbidity in NSDTRs using insurance data and aimed to describe the disease pattern in NSDTRs and test the hypothesis that NSDTRs are predisposed to IMRD, SRMA and lymphoma, compared to other breeds.

Main conclusion
The study described morbidity in NSDTRs and identified several disorders to which the breed is predisposed. The results showed that NSDTRs are at similar risk of disease to other retriever breeds and are at a slightly higher risk of disease compared to all other breeds combined. Furthermore, it showed that NSDTRs are predisposed to autoimmune and neurological disorders in general, and particularly to IMRD and SRMA. NSDTRs also have an increased risk of lymphoma.

Approach
A retrospective cohort from the years 1995 to 2006 was assembled from information held by the Agria insurance company. The study population included 445,336 dogs, of which 2890 were NSDTRs. Diagnostic codes, describing the cause of the veterinary visits, were used to assess morbidity. Incidence rates (IRs) of various health problems were calculated using the number of veterinary visits as the numerator and the exact time at risk as the denominator. IRs in NSDTRs were compared with two comparison groups – all other dog breeds combined and all other retriever breeds and were at a slightly higher risk of disease compared to all other breeds combined. Furthermore, it showed that NSDTRs are predisposed to autoimmune and neurological disorders in general, and particularly to IMRD and SRMA. NSDTRs also have an increased risk of lymphoma.

Results
The IR for veterinary visits in NSDTRs was 1300 cases per 10,000 dog years at risk, significantly higher than in all other breeds combined, but similar to other retrievers. The most common general causes of veterinary visits in NSDTRs were injuries, gastrointestinal disease and locomotor disorders, with an increased risk of having these problems compared with other breeds. The IR for immunological disorders overall was approximately the same as in other breeds and retrievers, but subdivision of immunological disorders into allergies, autoimmune disorders and remaining immunological disorders showed that autoimmune disorders and remaining immunological disorders were significantly more common in NSDTRs than in other breeds and retrievers. The IR for IMRD was 18 times higher in NSDTRs compared with other breeds (95 per cent confidence interval [CI] 8.5 to 36) and 30 times higher compared with other retriever breeds (95 per cent CI 9.9 to 100). The IR for neurological disorders overall was higher in NSDTRs than in other breeds and retrievers. Neurological infections and/or inflammations were the most common subgroup of neurological disorders in NSDTRs, being nine times more common in NSDTRs than in other breeds. The IR for SRMA in NSDTRs was 12 times higher than in other breeds (95 per cent CI 7.6 to 17) and 21 times higher than in other retriever breeds (95 per cent CI 12 to 37). NSDTRs also had a significantly increased risk for lymphoma compared to all other breeds (RR 2.8, 95 per cent CI 1.8 to 4.3) as well as to other retrievers (RR 2.8, 95 per cent CI 1.2 to 3.1). None of the NSDTR dogs with a lymphoma diagnosis had an IMRD or SRMA diagnosis.

Interpretation
The Agria insurance database is validated for epidemiological studies; however, it was not developed to study morbidity primarily for research purposes and limitations have to be recognised. One is that the diagnostic codes used to assess morbidity are assigned by the attending veterinarian and no information about the diagnostic accuracy is available. Furthermore, no single or specific diagnostic code for either IMRD or SRMA was available in the database, and the choice of diagnostic codes to be included to represent IMRD and SRMA was challenging. The IRs for IMRD, SRMA and lymphoma, being significantly higher in NSDTRs than in other breeds and other retrievers, show that these disorders are more common in NSDTRs, indicating a breed predisposition. However, exact point estimates for IR and RR should be extrapolated cautiously, given that the CIs may be rather wide.

Significance of findings
The description of disease pattern presented in this study provides unique information about morbidity in NSDTRs. Not only high-risk disorders were identified but also the most common disorders in the breed. The information gained is of value to breeders, dog owners and veterinarians and can be used for preventive measures as well as in disease investigations.
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