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PAPER

Cumulative incidence and risk factors for limber tail in the Dogslife labrador retriever cohort

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Context

Limber tail (unexplained tail flaccidity in large dog breeds) has been associated with vigorous exercise and/or swimming in cold water. The condition is thought to be painful but typically resolves without intervention within two weeks. Investigations have identified myositis in affected dogs but the aetiology of the condition remains poorly characterised. To the authors' knowledge, there is a limited understanding of the burden of the condition or the impact of potential risk factors. This study aimed to address these knowledge gaps and better understand risks associated with limber tail.

Main conclusion

The cumulative incidence of limber tail in this study of labrador retrievers (LRs) was 9.7 per cent and there was evidence that dogs with the condition were not routinely presented to veterinarians. Increasing geographic latitude ($P=0.008$) was identified as a risk factor and swimming ($P=0.03$) was confirmed. Affected dogs were disproportionately related to each other, indicating a potential genetic aetiology for the condition.

Approach

Potentially affected dogs (cases) were identified by routine owner reporting of tail-related illness signs to Dogslife, a longitudinal cohort study of canine health. Potentially unaffected dogs (controls) spent the same amount of time in Dogslife as the cases but with no reports of tail-related signs of illness. Case-control status was confirmed through questionnaires that addressed tail health (including perceived impact of incidents), swimming behaviour and other potential risk factors. The duration

and perceived impact of incidents, precursor behaviours and the signs associated with limber tail were detailed. A case-control study was performed using 38 cases and 86 controls (Fig 1).

The analyses included assessments of association with dog height, weight, average daily time spent exercising, sex, neuter status, coat colour, postcode location, swimming behaviour, dog purpose and permutation testing of the relatedness of the cases and controls.

Results

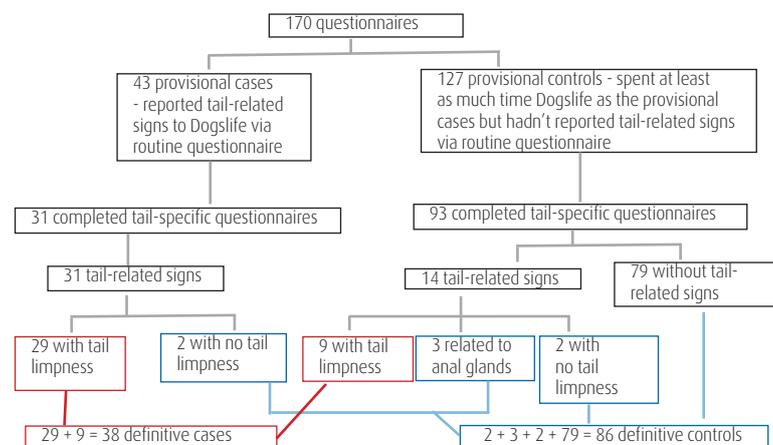
The cumulative incidence of limber tail was 9.7 per cent. Only 26 per cent of incidents prompted a veterinary visit. The mean duration of an incident was 3.5 days and owners assessed the mean pain score (increasing pain scale 0 to 10) to be 6.0, with a mean impact on quality of life of 4.1 (increasing impact scale 0 to 10). Swimming was the most frequently reported precursor to the onset of limber tail. It was confirmed as a risk factor (odds ratio [OR]=4.7, $P=0.03$). However, one quarter of affected dogs had not been swimming before onset. Working dogs were disproportionately affected (OR=5.1, $P=0.02$) and cases were disproportionately from higher latitudes (for each degree increase in latitude OR=1.5, $P=0.008$). The cases were disproportionately related to each other when compared to random repeated selections of the same number of dogs from the cohort ($P=0.0002$).

Interpretation

This study relates to a condition that has no definitive diagnosis. It also relies on owner reporting of tail-related signs and, as such, there is a degree of diagnostic uncertainty throughout. However, owners do not always present to a veterinarian when the dog suffers with these signs and owner reporting has yielded more affected animals than would have been found with practice-based data. In combination with contemporaneously collected lifestyle data, the relatively high numbers of cases and controls gave this study a high power to detect associations. The extent of the disease burden has also been quantified in this group of pedigree LRs and it is relatively high. This evidence-based study complements anecdotal information available to owners and veterinarians about causes and management of limber tail.

Significance of findings

Limber tail has largely been overlooked epidemiologically and this knowledge gap has been filled by individual experience and anecdote. This oversight may be due to the fact that dogs spontaneously recover without intervention or, more simply, the condition may have been underestimated because dogs were not presented to veterinarians. The study describes relatively high levels of perceived pain for the affected dogs and indicates that nearly 10 per cent of pedigree LRs will develop the condition. As such, the findings of the study not only address a knowledge gap but should also provide a baseline for future studies of this distressing condition.



Provisional case: tail-related sign reported to Dogslife via routine questionnaire.
 Provisional control: spent as much time in Dogslife as provisional case without report of tail-related sign to Dogslife via routine questionnaire.
 Definitive case: some degree of tail flaccidity but no report of tail injury or other cause reported via tail-specific questionnaire.
 Definitive control: no tail flaccidity reported to Dogslife via tail-specific questionnaire or report accompanied by other explanation such as impacted anal gland.

FIG 1: Description of provisional and definitive case and control status of the participating dogs