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ORIGINAL RESEARCH

Assessment of glucocorticoid and antibiotic exposure as risk factors for diabetes mellitus in selected dog breeds attending UK primary care clinics

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Introduction

Diabetes mellitus (DM) is an important endocrine disorder in dogs. The pathogenesis of the disease involves complex interactions between both non-environmental and environmental factors, and is not fully understood. In recent decades there has been increasing interest in the role of the microbiome in the development of type 1 DM in people, and how medications such as antibiotics may be implicated in this process.

Although not identical, some cases of canine DM share similarities with human type 1 DM, and it is not illogical to consider that they may share environmental risk factors. However, associations between medications and DM have not yet been directly explored in dogs. This study aimed to explore associations between the prescription of glucocorticoids and antibiotics in first-opinion veterinary practice and the odds of developing DM in dogs.

Approach

A breed frequency matched case-control study nested in a cohort of dogs (n=480,469) aged three years or older and attending UK-wide primary care clinics participating in VetCompass in 2016 was used to explore associations between prior glucocorticoid and antibiotic exposure and the diagnosis of DM.

Electronic patient records (EPRs) were examined to extract demographic and medication data, and analysis was performed using mixed effects multivariable logistic regression.

Results

A total of 565 cases and 2179 controls were included in the analysis. The two-year period prevalence of DM within this study population was 0.38 per cent (95 per cent confidence interval [CI]: 0.36–0.39) and the two-year incidence risk was 0.14 per cent (95 per cent CI: 0.13–0.15).

Dogs with DM had over four times the odds of exposure to glucocorticoids within the six weeks before diagnosis (odds ratio [OR]: 4.07; 95 per cent CI: 2.41–6.89; P<0.001) compared to controls.

Dogs that had only one unique antibiotic course documented in their available clinical history had a decreased odds of developing DM (OR: 0.65; 95 per cent CI: 0.46–0.91; P=0.012) compared to dogs that had no documented courses of antibiotics.

Other factors associated with increased odds for DM included dogs in all age categories seven years or older compared to dogs aged four to less than seven years; female entire dogs (OR: 5.50; 95 per cent CI: 2.56–11.82; P<0.001) compared to male entire dogs; and insured dogs (OR: 3.64; 95 per cent CI: 2.75–4.80; P<0.001) compared to uninsured dogs.

Interpretation

A major finding of this study is that, for the breeds under analysis, dogs exposed to glucocorticoids in the six weeks before the index date had over four times the odds of developing DM. After adjusting for other variables in the final model, risk factors for DM also included being aged seven years or older, being an entire female and being insured. There was some evidence that dogs prescribed one unique course of antibiotics had a lower odds of developing DM.

The use of retrospective EPR entries in this study meant there were limitations regarding the completeness of the data, and this may have affected the results obtained. In addition, this study focused on only 14 breeds, and therefore may not be generalisable to the UK dog population.

Significance of findings

This study reports a strong association between glucocorticoid exposure and DM diagnosis in some of the breeds contained in this analysis. Therefore, caution is needed when prescribing glucocorticoids to entire females, and older (seven years old or older) dogs in these breeds.

Further work is also required to explore the association between antibiotic therapy and DM to understand if the protective effect of a single course of antibiotics is a true or chance association.

KEY FINDINGS

- For the breeds under analysis, dogs exposed to glucocorticoids in the six weeks before the index date had over four times the odds of developing diabetes mellitus.
- Risk factors for diabetes mellitus also included being aged seven years or older, being an entire female and being insured.

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