Measurement of urine NTx excretion as a surrogate marker of bone resorption in dogs receiving glucocorticoid therapy

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BACKGROUND

Glucocorticoid induced osteoporosis (GIP) is the most common form of secondary osteoporosis in humans, occurring in 30–50% of patients receiving long-term therapy. This has led to the development of guidelines for monitoring and managing GIP. Urine biomarkers form part of the monitoring process. Urine N-terminal telopeptide (NTx), a marker of bone resorption, has been shown to increase in humans receiving glucocorticoid therapy. Despite the frequent use of steroids in veterinary medicine and the recognised adverse consequences of glucocorticoids on human bone metabolism, glucocorticoid-induced bone metabolic changes have not been thoroughly investigated in dogs. Urine NTx has been validated as marker of bone resorption in dogs but has yet to be evaluated in dogs receiving glucocorticoid therapy.

ANIMALS

Thirty-two dogs receiving oral glucocorticoid therapy and 23 age-matched healthy control dogs.

METHODS

Prospective, case-control clinical study. The concentration of urine NTx, was measured using a commercially available immunoassay previously validated in dogs. To correct for alterations in urine concentration and glomerular filtration rate, urine NTx excretion was expressed as a ratio with the urinary creatinine concentration. Dogs receiving glucocorticoids were divided into 4 subgroups based on glucocorticoid dose (mg/kg/day) and 5 subgroups based on duration of glucocorticoid administration. The urine NTx excretion was then compared between groups to determine the effect of duration and dose of glucocorticoids on bone resorption.

RESULTS

Urine NTx excretion was significantly higher in dogs receiving high doses of glucocorticoids (1.1–2.5mg/kg) when compared with control dogs ($P<0.041$). A significant difference was not identified between groups receiving lower doses of glucocorticoids and control dogs. Dogs in the early stages of their glucocorticoid therapy (2 days–1 month) had significantly higher urine NTx excretion compared with all other time groups ($P<0.039$).

CONCLUSIONS

Urine NTx excretion was significantly higher in dogs receiving high dose glucocorticoids as well as in dogs in the early stages of their therapy. These results indicate that as in humans, dogs receiving glucocorticoid therapy have changes in bone metabolism that may lead to secondary osteoporosis. Those dogs receiving glucocorticoid therapy may benefit from ongoing monitoring and ultimately therapy for osteoporosis, including calcium supplementation and bisphosphonates.

Prevalence and risk factors for urinary incontinence in dogs attending primary-care veterinary practices in the UK

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BACKGROUND

Urinary incontinence (UI) is a condition that can have significant welfare implications for both dogs and their owners and often requires long-term treatment, with associated costs. Despite its importance, contemporary, generalisable and reliable prevalence and risk factor data are lacking. These data are needed to identify at-risk animals and to improve preventative and/or treatment strategies for susceptible groups/individuals.

METHODS

A cohort of dogs with UI was identified from the VetCompass

Programme by searching electronic patient records collected between September 2009 and September 2014, encompassing 120 participating primary-care veterinary practices. Prevalence and demographic data were extracted. Risk factors for presence of UI were investigated in a case-control study, applying univariable logistic regression ($p<0.05$).

RESULTS

Overall prevalence of UI in dogs presenting to enrolled practices was approximately 1.9% (95% CI: 1.8–2.0%; total cohort 210,824 dogs). Logistic regression analysis was performed on 1,502 UI and 4,506 non-UI cases. Females had higher odds of UI (OR 3.2, $p<0.001$) compared with males (1.0%). Neutered dogs had higher odds of UI than entire dogs (OR 4.1, $p<0.001$). Breeds at greater odds compared with crossbreeds included the Boxer (OR 2.5, $p<0.001$), Border collie (OR 2.1, $p<0.001$), West Highland white terrier (OR 2.0, $p<0.001$), German shepherd (OR 1.9, $p<0.001$), English springer spaniel (OR 1.8, $p<0.001$) and golden retriever (OR 1.6, $p<0.05$). Reduced odds were identified in the Chihuahua (OR 0.3, $p<0.001$), shih-tzu (OR 0.3, $p<0.01$), Jack Russell terrier (OR 0.6, $p<0.01$) and Staffordshire bull terrier (OR 0.7, $p<0.05$). Heavier dogs (dogs weighing 20–29Kg [OR 2.0, $p<0.001$] and 30–39Kg [OR 2.2, $p<0.001$] versus dogs <10 Kg) and older dogs (≥ 12 years versus <3 years [OR 22.4,