Generalized vertebral abnormalities in a Rhodesian Ridgeback with a lysosomal storage disease

Georgina Harris, Samuel Beck, Birgit Parzefall, Stephen Cahalan, Ken Smith, Steven De Decker

The Royal Veterinary College, London, UK

BACKGROUND

Although experimental canine models are commonly used to investigate bone pathology associated with specific lysosomal storage disorders, only a few reports have described such changes in naturally affected dogs. These disorders are mostly typically caused by homogenous recessive genetic abnormalities, resulting in enzyme deficiencies an subsequent accumulation of storage material within the cell. Animals will be born normal and clinical signs will become apparent as they age. Although many body systems are involved, affected animals typically present with clinical signs of central nervous system dysfunction.

CASE PRESENTATION

A 3-year-11-month male neutered Rhodesian ridgeback was presented for evaluation of cervical hyperaesthesia and right thoracic limb lameness. Neurological examination identified generalised ataxia, right thoracic limb lameness, proprioceptive deficits in both pelvic limbs and marked cervical hyperaesthesia. A lesion affecting the C1-C5 spinal cord segments was considered likely. MRI of the neck identified an irregularly shaped and shortened vertebral body of C6, a mild subluxation between C5 and C6, multiple hypertrophic and abnormally shaped articular processes, and multiple dorsal lamina abnormalities. CT identified generalised vertebral abnormalities, which were most pronounced in the cervical vertebral column. Multiple cervical vertebrae were abnormally shaped, consisting of hypertrophic and abnormally shaped articular processes, dorsal lamina, irregularly shaped vertebral bodies, and multiple visible fractures lines. The axial and appendicular skeleton were characterised by abnormally hypoattenuating cancellous bone and a thin cortical cortex. The dog was euthanised and a post-mortem examination confirmed generalized osteoporosis, vertebral malformations and identified distended and swollen neurons in the cerebrum, hippocampus, cerebellum and brainstem, containing intracytoplasmic, granular, PAS-positive inclusions. These findings were considered consistent with a lysosomal storage disease, with a presumptive diagnosis of mucopolysacharidosis being most likely.

CONCLUSION

This report describes vertebral MRI and CT abnormalities in a dog with a lysosomal storage disease and illustrates that this type of disorders should be considered in dogs of any breed and age with generalized vertebral abnormalities and osteoporosis.

Transthyretin and clusterin as potential urinary biomarkers of spinal cord injury

Celine S. L. Toh1, T. James Anderson1, Intan N. F. Shafie2, Rodrigo Gutierrez-Quintana1, Mark McLaughlin1

1 School of Veterinary Medicine, University of Glasgow, Glasgow, UK
2 Faculty of Veterinary Medicine, Universiti Putra Malaysia, Selangor, Malaysia

Biomarkers have the potential to facilitate assessment of spinal cord injuries, assist clinical decision-making, and further improve understanding of the pathophysiology of spinal cord injury (SCI). Urine is an attractive source of potential biomarkers due to its relative ease of collection and potentially high protein content. A pilot study suggested that transthyretin (TTR) is present in urine of dogs with SCI, while clusterin in cerebrospinal fluid has been proposed as a biomarker of chronic spinal cord disease in the dog and it is also detectable in urine. This project investigated the potential of urinary TTR and clusterin as biomarkers of SCI. Random spot urine samples were collected from clinically healthy dogs, as well as dogs with spinal cord injury (n = 12) and a variety of non-neurological conditions (7 healthy dogs, 2 dogs with imaging and laboratory abnormalities were reported.

The Octreotide administration was interrupted one month later by the end of the pleural collection and each patient was re-evaluated one year after surgery.

Cat one: (DSH, 5 years old, neutered male) presented pleural effusion from day one to day 146 of therapy. Octreotide was interrupted at day 176.

Cat two: (DSH, 6 years old, neutered male) presented pleural effusion from day one to day 143 of therapy. Octreotide was interrupted at day 173. Both cats were discharged without clinical symptoms and they were rechecked six month later without any clinical problems, except the diffuse pleural thickening observed at the ultrasonographic examination.

Cat three: (DSH, 9 years old, neutered male) presented pleural effusion from day one to day 182 of octreotide therapy. At day 182 the cat was euthanised according to the owners due to respiratory insufficiency. Necropsy confirmed a severe constrictive pleuritis. In all the subject thoracenteresis were performed during controls if necessary.

No adverse effects were observed even considering that this drug was used for 6 months therapy. In our experience on three cats the use of Octreotide turned out useful and safe as complementary therapy of the idiopathic chylothorax.
Hyperadrenocorticism and 3 dogs with other diseases not known to cause significant proteinuria. A comparison of TTR and clusterin levels between the SCI and control groups was performed by Western blotting. Based on Fisher’s exact test, the presence of TTR and clusterin was found to be significantly associated with SCI (p = 0.0033 for TTR monomer, p = 0.0046 for TTR dimer and p = 0.0123 for clusterin). The TTR dimer had 100% sensitivity for SCI, but only 58.3% specificity. The TTR monomer had 83% sensitivity and 83% specificity, while clusterin had 83.3% sensitivity and 75% specificity. It was, however, not possible to distinguish between SCI cases and hyperadrenocorticism cases. Albumin depletion of samples was performed to facilitate the detection of low-abundance proteins and to standardise the levels of low-abundance proteins that were loaded onto the gel and analysed by western blotting. However, although the albumin content was reduced and TTR was still detectable by Western blotting in 3 SCI samples, there was generally a concomitant reduction of low-abundance proteins, which is not ideal. In conclusion, TTR and clusterin are promising biomarkers of spinal cord injury. However, as urinary concentrations of these proteins can also increase in dogs with compromised kidney function, further validation studies are required to establish if there are threshold levels of these proteins that are specific for SCI.

Palatability in dogs of Nutri-Plus Gel®, a highly energetic complementary feed indicated to cover the additional energy needs of dogs and cats

Gwendoline Chaix, Fanny Lloret
Virbac, Carros, France

Athletic dogs have high energy requirements. A sufficient energy intake is necessary to maintain ideal body weight and muscle condition scores, as well as a good performance levels. A common mistake is to increase the volume of the regular diet, which may lead to digestive problems that can interfere with the activity of the dog, such as diarrhoea, flatulence or frequent defecation. There are few well-balanced complete diets on the market that are adapted to athletic dogs. Adding a highly energetic complementary feed to the usual complete diet during periods of increased activity can be an interesting alternative.

Nutri-Plus Gel® is a complementary feed that contains high-energy ingredients, animal proteins, vitamins and trace elements. It is typically recommended to cover energy needs during intense physical efforts (e.g. hunting dogs) or as recovery nutrition after intense exercise, when only small volumes can be accepted by the animal. Spontaneous intake is considered to be an essential criterion for a complementary feed that is supposed to be given on a regular basis by the dog owner. The objective of this study was to assess the palatability of Nutri-Plus Gel® in dogs.

Two sub-studies (A and B) were conducted in an independent research centre highly experienced in performing palatability trials. 36 and 34 healthy adult dogs of various breeds, both males and females, were included in trials A and B, respectively. Two criteria were used to assess palatability: prehension and total consumption. Prehension was defined as the act of taking the product spontaneously into the mouth, independently of whether it was then consumed. Total consumption was defined as the act of swallowing more than 95% of the quantity of product offered. Each dog received a teaspoon (5.5 grams) of the product per 5kg of body weight.

Prehension was noted in 89% (32/36) and 94% (32/34) of dogs, in trials A and B respectively. Total consumption was recorded in most of the animals in which prehension had been observed (84%, 27/32 and 72%, 23/32 in trials A and B, respectively).

The excellent prehension rate and the high level of consumption observed in these studies indicate that Nutri-Plus Gel® is highly palatable for dogs, most often leading to a spontaneous intake of the product. These results are consistent with observations previously made on the field.

Nasal melanoma in a 14 year old cross-breed dog

Owen Davies, Emma Holmes, Sam Beck, Angela Taylor, Ana Lara-Garcia
Royal Veterinary College, London, UK

A 14-year-old, neutered male crossbred border collie was presented for investigation of a 5 month history of sneezing and mucous-haemorrhagic right-sided nasal discharge.

Physical examination revealed reduced airflow through the right nares but was otherwise unremarkable. Haematology was unremarkable and biochemistry revealed only a mild elevation in amylase at 1367 U/L (<1245 U/L). A CT scan revealed a soft tissue mass effect in the dog’s right nasal cavity, with significant turbinate lysis and focal destruction of the right nasomaxillary suture. No lesions were compatible with metastatic disease were identified on CT of the dog’s head, neck, thorax and abdomen. Rhinoscopy confirmed the presence of a nasal mass, and biopsies and cytology samples were procured. No evidence of metastatic disease was found by fine needle aspirate cytology of both mandibular lymph nodes.

Cytology of the nasal mass demonstrated a population of plumpolymphoid spindle cells among sheets of columnar ciliated epithelium. Nuclei were centrally placed and round with stippled chromatin and one or multiple prominent nucleoli; occasional macronuclei or multinucleate cells were observed. A number of cells contained green pigment, and in conjunction with the cellular pleomorphism were considered suggestive of melanoma. Histopathology described a neoplasm consisting of pleomorphic round to polygonal cells containing varying numbers of nuclei (1-9), abundant eosinophilic cytoplasm with light-brown intracellular granules, and less than 1 mitosis in 10 x400 fields, on a