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CASE REPORT
Use of bisphosphonates to treat severe idiopathic hypercalcaemia in a young Ragdoll cat

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A 3-year-old Ragdoll cat was referred for investigation of polyuria, polydipsia, vomiting, weight loss and hypercalcaemia. Serum biochemical abnormalities included total and ionised hypercalcaemia and hypophosphataemia. Following clinical investigations a diagnosis of idiopathic hypercalcaemia was made. Because of the severity of the hypercalcaemia and the associated clinical signs, treatment for hypercalcaemia was commenced with pamidronate. Major electrolyte abnormalities were detected but, remarkably, were accompanied by minimal clinical signs. The cat was subsequently treated with oral alendronate and is clinically normal 15 months later. Reports of the use of bisphosphonates in cats are limited and close monitoring of patients is recommended.

A 3-year-old spayed female Ragdoll was presented to the referring veterinarian with a 3-day history of polyuria, polydipsia and vomiting. The cat had been losing weight over a 3-week period. The diet was a mixture of tinned and dry commercial foods. Physical examination by the referring veterinarian was unremarkable. Serum biochemistry (day −2) revealed total hypercalcaemia, mild hypophosphataemia and mild renal azotaemia (Table 1). The cat was seropositive for feline immunodeficiency (FIV) antibody and seronegative for feline leukaemia virus (FeLV) antigen (Snap FIV FeLV Combo, Idexx Laboratories). The cat had been vaccinated against FIV (Fel-O-Vax FIV, Boehringer Ingelheim).

On physical examination at referral (day 0) the cat weighed 3.19 kg with a body condition score of 2/5. Repeat serum biochemistry demonstrated persistent total hypercalcaemia and hypophosphataemia and ionised calcium was elevated. Ionised calcium was measured using an i-Stat point-of-care analyser (Abbott Laboratories) on blood collected in pre-filled heparinised syringes. Urine specific gravity was 1.040 with normal urea and creatinine (Table 1). Mild elevations in alanine aminotransferase and total bilirubin were noted. A commercial real-time polymerase chain reaction (PCR) targeting two regions of the GAG gene of FIV returned a negative result (Gribbles Veterinary Pathology, Victoria Australia). On microscopic examination of the urine, occasional calcium oxalate crystals were identified. Idiopathic hypercalcaemia or humoral hypercalcaemia of malignancy was considered to be the most likely differential diagnosis. Other causes of hypercalcaemia including primary hyperparathyroidism, granulomatous disease, intoxication with cholecalciferol or its analogues, bony lesions and hypoadrenocorticism were considered less likely based on the signalment, history and physical examination findings. The cat was admitted for further investigation.

Thoracic radiographs and abdominal ultrasound examination were unremarkable. Parathyroid glands could not be identified on cervical ultrasound examination. Serum intact parathyroid hormone (iPTH) was consistent with a parathyroid-independent process (iPTH < 12 pg/ml; reference interval (RI) 22.0–122.0 pg/ml) using a commercially available assay (Vetnostics, Australia). Briefly, a solid-phase, two-site, chemiluminescent immunoassay directed against human iPTH (1-84), (Immulite PTH assay, Siemens Medical Solutions Diagnostics, Vic, Australia, previously DPC, Los Angeles, CA, USA) was modified to

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Table 1. Summary of clincopathological findings and treatment.

Day	Weight (kg)	Ionised Ca (mmol/l) RI 1.2–1.32	Total Ca (mmol/l) RI 1.75–2.6	Phosphate (mmol/l) RI 1.3–2.3	Urea (mmol/l) RI 7.2–10.7	Creatinine (ummol/l) RI 90–180	PCV (l/l) RI 30–45	USG	Clinical signs	Treatment
−2			3.8* (RI <2.8)	1.8* (RI 2.1–2.8)		210* (RI < 200)		1.025	Vomiting, PU/PD	
0	3.19	1.8	3.74	1.04	9.59	177		1.040	Quiet	
8	3.11									Prednisolone
14	3.06	1.73	3.7		12.03	200		1.048	Quiet	↑ Prednisolone
27	2.98	1.87	3.94	1.13	8.58	123		1.028	Depressed, inappetent	Pamidronate
28	3.13		3.12	1.14	8.53	122	0.33		Dysuria, soft stools	
29	3.12	1.29	2.77	0.9	8.82	89	0.32			
32	3.04	0.94	1.99	0.14	7.85	107	0.35		Quiet	KH_2PO_4 CRI, IVFs
33	3.11	0.61		Undetectable			0.33		Bright, haemolysis	Ca gluconate CRI
34	3.11		2.36	0.99			0.28		Bright	
35	3.2		2.82	1.56	7.36	106	0.31			
36	3.07									Alendronate
53	3.11		3.85	1.56	12.13	171	0.44	>1.050	Bright	↑ Alendronate
64	3.08	1.77						1.028	Bright	↑ Alendronate
88	3.55	1.49	3.06	1.71	13.87	191	0.32		Bright	
167	4.08	1.32	2.62	0.83	10.08	158	0.39	>1.050	Bright	

*Note different reference interval.