

CASE REPORT # XX

APPLICANT NAME AND CREDENTIALS

Durango XXXX (patient # XXXX) was a 2-year-old DSH female spayed cat, who presented to XXXXX Veterinary Services on October XX, 20XX, with owner concerns of the cat slowly losing weight, a lack of appetite, and showing signs of food aversion. Durango had been seen drinking but due to being a in multi-pet (10 cats and 6 dogs) household, the owner was unsure of the amount she was eating, drinking, urinating or defecating. While Durango was spayed, she had no vaccine history. A CBC and chemistry were completed two months prior to this complaint; all parameters were within normal limits with the exception of a mildly high glucose 170mg/dl (70-150mg/dl). The interpretation at that time was simply a stress hyperglycemia. Durango had been eating small amounts periodically, but was particular and her tastes would change frequently. Currently, she was eating chicken and some dry commercial cat food.

Physical exam was fairly unremarkable, with the exception of a 4/9 body condition score (BCS), and mild dehydration (slow to return to normal skin tent). In house CBC and a comprehensive blood panel were completed with results of lymphopenia $0.82 \times 10^9/L$ ($1.5-7 \times 10^9/L$), high alanine aminotransferase (ALT) 221U/L (20-100U/L) and glucose 215mg/dl (70-150mg/dl). Glucose results were confirmed by glucometer at 12mmol/L (3.5-5.5mmol/L) or 216mg/dl (70-150mg/dl). The high ALT may reflect hepatocyte damage related to decreased blood flow from dehydration or, the start of hepatic lipidosis – excess lipid mobilization by the liver – due to her failure to meet her resting energy requirements (RER).

Diagnostic differentials were hepatic lipidosis and diabetes mellitus. Hepatic lipidosis could be diagnosed with a triglyceride and liver panel, then resolved by feeding the patient nutrition either parenterally and/or enterally, additional IV fluid support and required medications. With a previous

history of high blood sugar and other GI signs, the veterinarian decided initially that diabetes was the more likely diagnosis.

Diabetes is an endocrine disorder where a change in cellular metabolism of glucose, and an inability to transport to tissues results in a high blood glucose level. Many nutritional factors play a role in controlling diabetes mellitus. Water is needed to compensate for excess water losses due to osmotic diuresis. Fiber in both soluble and insoluble forms show benefit in reducing postprandial hyperglycemia. Better glycemic control means fewer calories needing to be consumed. Some animals may experience amino acid loss in their urine and muscle loss due to protein catabolism. Sufficient calories from proteins rather than carbohydrates results in better overall glycemic control. Diabetic ketoacidosis, hypophosphatemia, hypocalcemia, and hypovitaminosis D are only a few of the problems that can result when minerals and vitamins are not balanced or the disease process is not controlled.

The technician discussed monitoring blood glucose at home, care of insulin, administration, disposal of needles, the importance of strict feeding regime and signs with possible treatments of hypo and hyperglycemia. Durango was discharged with a new dietary plan, prescribed insulin and asked to monitor dietary intake, water intake and urinary output.

Purina® Pro Plan® Veterinary Diets DM Dietetic Management® Feline Formula was chosen for its high protein, low carbohydrate ingredients, high palatability and proven nutritional ability to aid in diabetic remission (% ME of the canned pate formula – Protein 42.8%, Fat 51.5%, carbohydrate 5.1%). Meeting RER is the minimal expectation for Durango since she has not been achieving her requirements consistently. To meet RER ($3.2\text{kg}^{0.75} \times 70 = 167.5\text{kcal/day}$) Durango needs to eat 7/8 or 136g of a 156g can of Purina® Pro Plan® Veterinary Diets DM Dietetic Management® Feline Formula ($167.5\text{ kcal} / 191\text{kcal per can} = 0.87$ of a can. $156\text{g} \times 0.87 = 136\text{g}$), with a goal of slowly, increasing to (DER of $1.5 \times \text{RER} = 251.25\text{kcal/day}$. Then $251.25/191 = 1.3$ can per day $\times 156\text{g} = 205\text{g}$) 1 ¼ can (205g) per day over a two-week period of time. The diet should be offered at least 2 times daily prior to insulin administration.

New studies show that cats, being obligate carnivores, should receive calories from protein over carbohydrates.

Concurrent complications of not only the disease: 1) urinary tract infections 2) pancreatitis 3) infection 4) hyperthyroidism, along with stress and dietary changes can affect blood glucose levels. Insulin is very fragile and can easily be destroyed, thus altering the affect it may have on a patients' blood glucose. This must be conveyed to owners along with the importance of proper insulin handling and administration. Caninsulin®, a porcine insulin zinc injection 40IU/ml, was sent home with a prescribed dose of 2 units every 12 hours. Insulin must be kept cool (refrigerated), and handled carefully. Gently rolling the bottle in the palm of the hand rather than shaking the bottle is recommended prior to any withdrawal from the bottle and the insulin bottle should be kept in an upright position when stored due to the fragile nature of the product. Mirtazapine 3.5mg was to be given every 48 hours for 4 treatments. Mirtazapine is a tetracyclic antidepressant commonly used as an appetite stimulant in dogs and cats. It can also be used for the long-term treatment of nausea, and anorexia. Fortiflora® is very palatable and can induce an appetite, but it was not offered at this appointment.

At the next appointment, seven days later Durango's appetite was improved, she was more active and her coat appeared brighter according to the owner. On physical exam, she was well hydrated but had still lost 0.1kg, a 3.1% body weight loss. Blood glucose from the glucometer was 6.9mmol/L (3.5-5.5 mmol/L) or 124mg/dl (70-150mg/dl). The owner was advised of the importance of a blood glucose curve and another appointment was booked for 7 days later. The owner would continue the prescribed diet and insulin treatments as no signs of low blood sugar - lethargy to loss of consciousness, loss of appetite or increase hunger, weakness or disorientation - were observed.

Thirteen days after the initial presentation, Durango was brought into the clinic for an emergency appointment. She now weighed 2.5kg, a very significant 19% body weight loss, had an increased heart and respiratory rate. Her coat was dull, unkempt. Liquid, brown feces was noted on the thermometer. Her core temperature was normal. She had severe cachexia, and a body score of 1/9. The owner stated she

stopped the insulin treatments the day following the previous examination, as she felt they were no longer helping. The cat has stopped eating and she was syringe feeding the Purina® Pro Plan® Veterinary Diets DM Dietetic Management® Feline Formula canned only 3ml per day (one can DM = 5.5oz. 1oz=28.41ml. $3\text{ml} \times 1\text{oz} / 28.41\text{ml} = 0.1\text{oz}$ was fed per day. The cat required 7/8 of a can = 4.8oz and therefore was getting only 2% of it's RER)

CBC and comprehensive chemistry panel results were a mild neutropenia, low end normal range hematocrit, moderate elevated ALT and hyperbilirubin. An in-house feline leukemia (FeLV) Snap® test was negative. Radiographs, bilateral and dorsal-ventral views, of Durango's abdomen and thorax showed gas in the stomach and colon with decreased serosal detail. Diagnostic differentials of corona virus - feline infectious peritonitis (FIP), endocrine disorder (hyperthyroidism), dilated cardiomyopathy or neoplasia were considered. Due to her age, neoplasia and hyperthyroidism were less likely. From the radiographs, one could argue that mild abdominal perfusion might be evident leading to a diagnosis of FIP, but it could also be the dry form of the virus. The veterinarian discussed with the owner the most likely diagnosis being FIP.

FIP is a coronavirus that acts differently than most viruses. The patient does not usually show signs of illness until weeks, months or years after the initial exposure. FIP is classified into two forms, wet and dry. These quickly progressing forms have similar symptoms of lethargy, chronic weight loss, depression, mild upper respiratory disease, such as ocular discharge and lesions, nasal discharge, intestinal disease such as inappetence and diarrhea, seizures. and a pot belly appearance as fluids accumulate in the abdomen in the wet form. There is currently no accurate test to confirm a dry form FIP diagnosis. One vaccine is available but administration is not recommended.

Further, in depth diagnostics and treatments could be done at an internal medicine referral clinic, but again, due to limited funds the owner wished to keep Durango with the attending veterinarian. While prognosis of FIP is grave, the owner decided to have an nasoesophageal (NE) tube placed to see if any improvements on her health could extend her life expectancy.

A 24G IV catheter was placed and Lactated ringers were administered at an initial rate of 28ml/hour (10ml/kg/hour). One drop of proparacaine hydrochloride was placed in each nostril. A 5Fr feeding tube was passed in the right nostril. The tube was directed medial and ventral and passed to the marker on the NG tube which was premeasured to the last rib. A radiograph was taken to confirm placement. The tube was secured with 2 sutures, and extended over the skull and taped to the buster collar.

Due to its ability to be made into a slurry, Hill's® Prescription Diet® a/d® Canine/ Feline can was utilized as the appropriate diet. The RER for Durango was 143kcal/day. Only 25% of the RER (36kcal) should be administered the first day divided into multiple feedings. 30ml water was added to 30g (1/5 can) of a/d and blended until it was smooth and warmed to body temperature. The tube was flushed with 5ml body temp water, 10ml a/d mixture and then flushed with 10ml water. The feeding was administered very slowly, over 30 minutes. While no signs of nausea (drooling, licking lips) were seen, Durango was mildly vocal during feeding. This treatment was repeated at 2 hours, 7 hours, and 9 hours from the initial feeding.

The following day Durango continued to decline. She was hypothermic with a body temp of 36.1C despite being adequately bedded and warming tools (heated bean bags, and heater) utilized. She had bradycardia, was dyspneic, jaundiced and extremely lethargic. The owner was brought in for a consult as she was still insisting on taking Durango home to continue therapy. Homecare instructions including diet preparation, pre/post flushing of the tube, timing for administration of the fluids, keeping the patient warm, checking for urine output and bladder palpation along with monitoring bowel movements were given orally and in writing. Charting progress every 2 hours was recommended and a take home hospitalization chart was given to the owner. The veterinarian continued to talk with the owner as Durango was declining quickly. She had not urinated or defecated yet today and the nutrients would not be properly digested while Durango was hypothermic. The owner decided to humanely euthanize Durango. 270mg pentobarbital sodium 240mg/ml was given IV via the cephalic catheter.