SAMPLE

AVTCP-Feline Case Report # 1
Case Log# 45
Hyperthyroidism with Concurrent Chronic Kidney Disease (CKD)
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Signalment: Maya was a 3 kg, 15-year-old, spayed female, Domestic Shorthair.

Presenting Complaint: Maya presented to the hospital for weight loss despite a ravenous appetite. The owner reported pollakiuria/polyuria, increased vocalization, and agitation, particularly at night.

History: Maya was a primarily indoor cat with occasional trips to the backyard that were supervised by her owners. She was the only cat in a two-dog household. Her diet consisted of a commercial feline adult dry food fed free choice with canned food offered three to four times weekly. Previous records indicated that Maya had not had any veterinary care in 3 years. She was not current on vaccinations or on any flea control or heartworm prevention. Medical records from her previous veterinary hospital had noted that she was difficult to handle.

Physical Examination Findings/Observations: Maya was weighed while she was still in her carrier. The carrier was taken apart by removing the bolts and lifting the top off while she was still in it, and a feline facial pheromone sprayed towel was place over the cat prior to beginning the PE to minimize stress. Her PE was conducted with minimal restraint. The towel covered patient was gently removed from the bottom of the carrier. The carrier was reassembled and weighed. The body weight was then calculated by subtracting the carrier weight from the original weight. Her body weight was 3 kg. She had lost 0.8 kg since her last recorded body weight 3 years prior. Upon PE, her body condition score (BCS) was 3/9 with a World Small Animal Veterinary Association (WSAVA) muscle condition score of C (moderate muscle loss) [(1)]. Her temperature was 101.2°F, heart rate 200 bpm and respiratory rate was 40 breaths per minute. On PE it was determined she was 5% dehydrated due to the increased skin turgor and semi-dry oral mucous membranes. Capillary Refill Time (CRT) was 2 seconds and her oral mucous membranes were slightly pale. Her oral exam revealed moderate dental tartar with marked gingivitis. No other abnormalities were found on PE. Maya was tense but approachable during her PE and her pain score was 3/20 using the WSAVA

Glasgow Feline Composite Measure Pain Scale (CMPS-Feline). Her score was evaluated to be on the low end of the scale and was attributed to be stress induced. Maya's owner was surprised at how well she had accepted the examination process. She stated that Maya had never been this calm previously.

Problem List/Differential Diagnosis: CKD, diabetes mellitus, hyperthyroidism, hypertension, feline lower urinary tract disease (FLUTD), stage 3 periodontal disease and cognitive dysfunction.

Diagnostic Approach: Maya's recommendations included the following; comprehensive chemistry profile with electrolytes, CBC, Total Thyroxine (Total T_4) and urinalysis submitted to an outside reference laboratory. An in-house thioglycollate broth urine culture and non-invasive blood pressure measurement (NIBP) were performed. The samples were collected in the exam room with the owner present to minimize stress to the patient. Maya's owner was relieved to be able to stay with her and stated that her previous veterinary hospital had never allowed that. Maya was gently placed in left lateral recumbency for NIBP via Doppler. A #3 pediatric cuff attached to a sphygmomanometer was placed on her right rear leg proximal to the hock. Transmission gel was put on the Doppler probe and was positioned distal to the cuff over the pedal artery. The pulse was located using headphones to ensure a calm, quiet environment for the patient. The cuff was inflated until the pulse was undetectable and then deflated slowly until it was audible again. Three separate readings were obtained and averaged to ensure accuracy. Her systolic blood pressure was 160 mm Hg (120-160mm Hg). Venipuncture was performed on the right medial saphenous vein via a 23 gauge butterfly catheter.

A urine sample was obtained via ultrasound guided cystocentesis. The patient was gently handled using a towel technique for all the procedures. Maya's CBC results revealed a non-regenerative anemia with RBC = 5.5 (7.12-11.46M/µL), Hct = 20 (28.2-52.7%), Hgb= 8.6(10.3 -16.2g/dL). Reticulocyte count = 5 (3-50 K/µL). All the WBC parameters were within normal limits. Chemistries revealed CKD International Renal Interest Society (IRIS) Stage 2 [(2)] with a BUN = 43 (16-37mg/dL) and a creatnine = 2.5 (< 1.6 mg/dL) IDEXX® Symmetric Dimethylarginine (SDMA) = 15 (0-14 µg/dL), phosphorous = 4.9 (2-9-6.3 mg/dL), Ca = 9.7 (8.2-11.2mg/dL), the calcium x phosphorus product = 47.53 (ideal is under 70). All other chemistry values were within normal limits. Urinalysis revealed mild hyposthenuria of 1.019 but was otherwise unremarkable. Total T_4 was elevated at 5.5 (0.8-4.7 µg/dL).

Urine culture was negative after 72 hours. A urine protein creatinine ratio was recommended to diagnose IRIS stage 2 sub-staging but was declined by the owner due to cost. Abdominal ultrasonography was recommended to rule out structural and architectural abnormalities of the urinary tract system but was declined by the owner as well..

Treatment Plan: Treatment recommendations for Maya included LRS 33mls/kg SC pending test results. Feline facial pheromone diffusers were recommended to decrease stress in her home environment. Upon review of the lab findings it was determined to start Maya on calcitriol at 2.5 ng/kg PO Q24H, and LRS 33 ml/kg SC every other day for treatment of IRIS stage 2 CKD based on creatinine and urine specific gravity results. Four treatment options were discussed regarding Maya's hyperthyroidism they included; daily methimazole at 0.83 mg/kg Q12H (oral or transdermal), dietary iodine restriction, radioactive iodine treatment or thyroidectomy. Maya's owner chose to start transdermal methimazole. Vitamin B12 injections at 83.3 mcg/kg SC weekly for 6 weeks, then every other week for 6 weeks, and then once monthly were recommended for her anemia. Maya's ideal body weight was determined to be 4 kg. Based on calculation of her daily Resting Energy Requirement (RER), 190 calories per day were recommended. Maya returned to the hospital every other day for SC fluid administration and weekly for Vitamin B12 injections because the owners were not able to administer these treatments at home.

Food distraction technique was used with Maya which allowed the treatments to be performed with minimal restraint. A progress PE and recheck lab work was performed 3 weeks after starting medications. At this time, Maya's body weight had increased by 0.2kg to 3.2 kg. Her heart rate had decreased to 160 bpm and her systolic blood pressure was rechecked using the Doppler, applying the same technique as in the previous visit; and was stable at 158 mm Hg.

Her owner stated that she seemed more comfortable and was less vocal at night. Repeated lab work showed improvement with a total T_4 of 2.2µg/dL, BUN 37 mg/dL, creatinine 2.2 mg/dL, calcium 9.8mg/dL, and phosphorous 4.7 mg/dL. Her Hct remained at 20%. The veterinarian recommended keeping Maya on the same dosage of methimazole (0.83 mg/kg Q12H) and calcitriol (2.5 ng/kg Q24H) and continue the previously prescribed SC fluid and Vitamin B12 administration. Professional dental cleaning and full mouth dental radiographs were recommended to address the periodontal disease as well as follow up exam and lab work in 3 months.

Final Diagnosis: Hyperthyroidism with concurrent IRIS stage 2 CKD and stage 3 periodontal disease.

Outcome: Maya's owners chose to delay the dental cleaning and radiographs. Her 3 months follow up continued to show improvement. Her lab values were stable, her Hct increased to 26%, and her body weight increased to 3.7 kg. Her BCS improved to 4/9 and muscle condition score was B (mild muscle loss).

Conclusion/Case Summary: Maya's quality of life improved by identifying and managing her risk factors. Hyperthyroidism is the most common endocrine disorder in middle aged and older cats. Classic symptoms of hyperthyroidism include weight loss, polyphagia, polyuria, agitation and increased vocalization. There are 4 different treatment modalities available for treatment of feline hyperthyroidism. Radioactive Iodine treatments have been reported to have a >95% cure rate and has the advantage of not having to administer daily medication for the life of the patient. Studies show surgical thyroidectomy has a 90% cure rate if both glands are removed. Dietary therapy consists of feeding a restricted–iodine diet and has a response rate of 82% while the cat is on the diet. The cat must be exclusively fed this diet for the rest of its life. The relapse rate is 100% when the diet is discontinued. Medical Management (methimazole) has a > 95% response rate while on medication for either oral or transdermal administration. [(4)] The treatment options for Maya were limited to medical management since a local facility that provided radioactive iodine was not available. All treatments for hyperthyroidism have the potential for worsening renal function due to hyperthyroidism increasing renal blood flow as a result of increased cardiac output. When a patient undergoes treatment for hyperthyroidism, increased cardiac output and renal blood flow is reversed which can result in worsening of renal function.

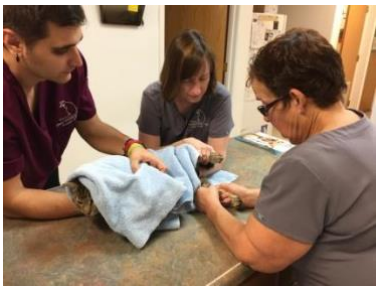
The choice of a transdermal delivery system of methimazole made it easier for Maya's owner to be compliant with medication as well as limiting the side effects of transient anorexia, vomiting and lethargy that can be seen with oral administration. The benefits of using methimazole in cats with concurrent CKD are the side effects of the medication are reversible. If renal function worsens while on methimazole it is recommended to decrease or discontinue administration. [(4)] It is common to see concurrent endocrine diseases especially in older patients. In Maya's case, it was important to start treatment for both her hyperthyroidism and CKD. Treatment of

hyperthyroidism only without treatment of concurrent disease can worsen azotemia because of decreased cardiac output and subsequent decreased renal blood flow. Treatment with oral calcitriol enhances gastrointestinal absorption of calcium, thereby reducing parathyroid hormone (PTH) secretion. Anemia is due to the natural progression of CKD. As the disease progresses, there will be a reduced production of erythropoietin (EPO) in the kidneys. EPO is produced specifically in the peritubular fibroblasts in the renal cortex. The decreased renal mass results in decreased numbers of EPO-producing cells.[3] Careful management to assess patient response to medication and to monitor for renal function deterioration, worsening anemia, or development of hypercalcemia is important to help increase survival time and maintain a good quality of life.

Discussion: Maya had a history of not responding favorably to her conventional veterinary visits. Using the Cat Friendly Practice handling and nursing care techniques during her hospital visits and treatments enhanced the experience for the patient, the client as well as the veterinary team. [5] Moving slowly, talking softly and letting the patient dictate the order of the exam is crucial. [6] Maya allowed PE and treatment with minimal restraint with the aid of towels, E-collar, and feline facial pheromone products. Allowing the client to stay with the patient during diagnostics and treatment if they choose builds trust. Cats are often less stressed when their owners are present. The technician's role as patient advocate and in overseeing feline friendly handling and nursing care techniques were provided by the entire veterinary team directly influenced a favorable outcome for this patient.

Supplemental Images:

Cat weighed in carrier



Feline friendly phlebotomy

Food distraction for sc fluids

References:

1. WSAVA Global Nutrition Committee Muscle Condition Score
2. International Renal Interest Society (2015) Staging of CKD
3. Little, S. (2012) The Cat Clinical Medicine and Management (pp 670, 1099-1101)
4. Carney, H.,Ward, C. Bailey, S. Bruuyette, D. Dennis, S. Ferguson, D. Hinc, A. Rucinsky, A. 2016 AAFP Guidelines for the Management of Feline Hyperthyroidism. Journal of Feline Medicine and Surgery Vol 18,(pp 400-416)
5. Carney, H. Little, S. Brownlee-Tomasso, D. Harvery, A, Mattox, E. Robertson, S. Rucinsky, A. Manley, D. (2012) AAFP and ISFM Feline Friendly Nursing Care Guidelines. Journal of Feline Medicine and Surgery Vol. 14 (pp 337-349)
6. Rodan, I. Sundahl, E. Carney, H. Gagnon, A. Heath, S. Landsberg, G. Seksel, K. Yin, S. (2011) AAFP and ISFM Feline Friendly Handling Guidelines Journal of Feline Medicine and Surgery Vol 13 (pp 364-375)