Oncology

Case log #8

11/18/2022

"Boots" #85620

Signalment

Feline Domestic Medium Hair 10 years Male Neutered

Patient History

The patient was referred by the rDVM for an abdominal ultrasound (AUS). He had been vomiting several times a week for 3-4 weeks and had a palpable abdominal mass. Abdominal radiographs performed by the rDVM confirmed a left cranial abdominal mass but could not determine an organ of origin. There was mild azotemia and anemia noted on the serum chemistry panel evaluated by the rDVM. All other values were within normal limits (WNL). Maropitant and lactulose were prescribed by the rDVM as he had not ruled out constipation or pancreatitis. A hydrolyzed protein diet was recommended as well. He was taking no other medications. The patient presented on 11/18/22 for the AUS. His vitals were as follows: weight = 6.17 kg, body condition score (BCS) = 4/9 on the World Small Animal Veterinary Association (WASAVA) chart, temp = 100.9°F, heart rate = 152 bpm, respiratory rate = 24 rpm with normal effort, mucous membrane color = pink, capillary refill time <2 seconds, and pain score = 0/4 on the Colorado State University feline pain scale. He was alert, responsive and normohydrated. There was a 1/6 heart murmur noted that may have been attributed to the underlying anemia. He had stage 2 periodontal disease.

Differential Diagnosis list

Pancreatitis vs neoplasia

Diagnostics

The AUS confirmed the mass effect in the abdomen. The pancreas or the left adrenal gland were the suspected organs of origin. Referral to a surgical diplomat was recommended and declined.

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The patient presented on 11/28/22 for abdominal exploratory surgery. A preoperative CBC, complete serum chemistry panel and prothrombin/activated partial thromboplastin (PT/aPTT) were evaluated. The previously reported anemia had resolved, the CBC was unremarkable, there was a slight improvement in the azotemia and the PT-17.8 secs, range 15-21 and aPTT-114.0 secs, range 86-137 were WNL. A 20-gauge indwelling IV catheter was aseptically placed in the right cephalic vein and the patient was placed on a balanced crystalloid solution 120 ml/kg/d, 6.17 kg, 30 ml/h preoperatively to ensure proper hydration and support blood pressure. This was continued throughout the surgery. He was given maropitant (10 mg/ml) 1 mg/kg, 6.10 kg, 6.10 mg, 0.60 ml IV to prevent vomiting and regurgitation. He was premedicated with a multimodal "cocktail" of hydromorphone (2 mg/ml) 0.10 mg/kg, 6.10 kg, 0.60 mg, 0.30 ml for pain control, dexmedetomidine (0.5 mg/ml) 0.015 mg/kg, 6.10 kg, 0.09 mg, 0.18 ml for sedation, and midazolam (5 mg/ml) 0.20 mg/kg, 6.10 kg, 1.20 mg, 0.20 ml for tranquilization IV. Pantoprazole (4 mg/ml) 0.53 mg/kg, 3.20 mg, 0.80 ml to reduce gastric acid production was also given IV. The patient was preoxygenated with blow by O2 for 3 minutes. Anesthesia was induced with propofol (10 mg/ml) 4 mg/kg, 6.10 kg, 2.40 ml IV titrated to effect. When loss of consciousness occurred, the patient was intubated with a 4 mm inner diameter endotracheal tube and the cuff was inflated. Anesthesia was maintained on 1% isoflurane and 2 L/min of O2 throughout the surgery. The surgical site was clipped and aseptically prepared with a diluted 2% chlorhexidine scrub and solution. He was moved into the operating room and attached to a rectal thermal probe, a pulse oximeter probe, ECG leads, a capnography monitor and a non-invasive Doppler blood pressure monitor. An assistant monitored the patient's vitals throughout the surgery. The surgical site was

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given a final chlorhexidine preparation. The surgeon identified the mass on the transverse limb of the pancreas. It was surgically removed and placed in a 10% formalin jar, labeled, sealed and submitted with a requisition form to a reference laboratory for histopathological review. An incisional block was performed for post operative pain control. A bupivacaine liposomal injectable suspension (13.3 mg/ml) 2.2 mg/kg, 6.1 kg, 1 ml was injected into the surgical site. A fentanyl transdermal patch 12 mcg/h, 2 mcg/kg was placed on the plantar surface of the right pelvic limb post operatively for pain control as well. The patient recovered in a heated cage until he reached a temperature above 99 °F. He was extubated when he had regained consciousness, had a positive swallow reflex and was able to retract his tongue. He was maintained on the balanced crystalloid IV solution at 30 ml/h until he was discharged.

The histopathology report indicated exocrine pancreatic adenocarcinoma with complete excision.

Treatment

To prevent recurrence of the tumor and metastasis, a single agent carboplatin protocol was prescribed for this patient. This treatment is usually given every 21 days for 4 treatments. Due to the pre-existing azotemia, the lower dose of 150 mg/m2 was used for this patient. The first treatment was administered on 12/20/23. Carboplatin 10 mg/ml, 6.17 kg, 0.33 m2, 49.5 mg, 4.9 ml IV. A CBC and complete serum chemistry panel were evaluated prior to administration. The CBC results were WNL. The BUN had increased from 32 to 44 mg/dL, range 10-30 mg/dL and the CREA was 2.1 mg/dL, range 0.3-2.1 mg/dL. After obtaining the blood sample the patient had reached his tolerance for being restrained. Gabapentin 50 mg/ml, 16.3 mg/kg, 6.17 kg, 100.5 mg,

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2 ml PO was administered. The carboplatin, the closed system transfer devices (CSTD), and a 3 ml syringe were taken to the class 2, laminar flow biological safety cabinet (BSC). The aerosolizer protector was attached to the new bottle of carboplatin, the luer lock injector was placed on the 3 ml syringe and the calculated dose of carboplatin was drawn into the syringe. The syringe was placed in a sealed transfer bag and taken to the administration room. An IV line with a y-port CSTD and extension set were inserted into a 500 ml bag of lactated ringers solution and the line was primed. Lactated ringers solution was used because of historically reported concerns of carboplatin conversion to cisplatin with the addition of chloride. The gabapentin did not have enough of an effect to be able to place a single "clean stick" IV catheter. Dexmedetomidine 0.5 mg.ml, 0.041 mg/kg, 6.17 kg, 0.5 ml was given IM for further sedation. The patient experienced an immediate nausea response and began retching. A reversal of atipamezole 5 mg/ml of an equal amount to the dexmedetomidine was given IM to avoid risk of aspiration. The patient was sedated long enough to aseptically place a 22-gauge indwelling IV catheter in the right cephalic vein while restrained by the trained assistant. It was secured with 1 inch porous tape. The extension line was attached to the IV catheter and 5 ml of the lactated ringers solution was flushed through it to ensure patency. The carboplatin syringe was attached to the y-port and slowly infused into the line while the fluids were running at about 100 drops/min. The total amount of carboplatin was delivered over 10 minutes. Another 10 ml of the lactated ringers solution was administered to ensure all of the drug was removed from the IV catheter before its removal. The patient was observed for 1 hour for any signs of an adverse reaction and to ensure full recovery from the sedation administered. The patient was discharged with a prescription of the gabapentin 50 mg/ml, 2 ml

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PO to be given the night before and the morning of chemotherapy treatments. When he returned on 01/10/23 for the next carboplatin treatment, the clients had been able to give the gabapentin the night before but not that morning. He was given this dose by the applicant. He was not quite sedated enough to place an IV catheter. Due to his response to dexmedetomidine at his last visit, butorphanol 10 mg/ml, 0.2 mg/kg, 6.2 kg, 0.12 ml was given IM. He was still fighting the catheter placement and dexmedetomidine had to be used. A lower dose of 0.033 mg/kg. 0.4ml was given IM. This had the desired effect and there was no adverse reaction. His renal values were stable and his CBC was WNL. The carboplatin was delivered in the same manner as the first dose. When he returned for his final administration, his BUN had increased to 56 mg/dL and his CREA to 2.6 mg/dL. He was now classified as stage 2 chronic kidney disease based on the International Renal Interest Society (IRIS) scale.[i] An AUS was performed to evaluate the kidneys and the pancreas. There was no sign of tumor recurrence or metastasis to the liver, spleen or lymph nodes. The final dose of carboplatin was administered. The plan going forward was to re-examine him in 1 month and evaluate his renal function at that time. After that he would be re-examined every 3 months. A change to a renal diet was recommended. The client skipped the 1 month exam but returned for the 3 month exam. The patient had been experiencing some intermittent vomiting and inappetence that was getting worse. An AUS revealed a small, irregular right kidney and a pelvic dilation of the left kidney. No signs of metastasis or tumor recurrence was seen. There was a concern for pyelonephritis or ureteral obstruction. A complete serum chemistry panel, CBC were evaluated in house. A urine sample was obtained via cystocentesis and sent to the reference laboratory for a urinalysis and culture. The BUN was 121 mg/dL, the CREA 6.8 mg/dL and the phosphorous was

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now 10.7 mg/dL, range 3.4-8.5 mg/dL. There was 1+ protein in the urine. This may have been blood contamination from the cystocentesis. No bacterial growth was seen on the culture. There was no sign of infection indicated on the CBC either. He was upgraded to stage 4 chronic kidney disease. Three view radiographs of the whole cat were taken to try to identify stones in the left ureter. No stones were identified and there was no sign of metastasis. The plan was to hospitalize the patient for 72 hours for supportive care. This included IV fluid therapy with a balanced crystalloid solution. He was given gabapentin 100 mg PO BID-TID as needed for pain control and sedation. He was given antibiotics prophylactically, cefovecin 80 mg/ml, 8 mg/kg, 5.35 kg, 42.8 mg, 0.54 ml SC. At the end of the third day his BUN was 96 mg/dL, CREA 6.8 mg/dL, the phosphorous had returned to normal 4.1 mg/dL, and he was eating. He was discharged with a veterinary renal diet to transition to slowly. The end goal was to have him eating ½-¾ cup a day to meet a maintenance energy requirement (MER) of 343.98 kcal/d. Resting energy requirement (RER) - 5.35 kg0.75 x 70 = 3.51 kg x 70 = 245.7 kcal/d. MER = 245.7 kcal/d x 1.4 = 343.98 kcal/d.[ii]

Outcome

The patient returned 7 weeks later with the same symptoms. His renal disease had decompensated. His BUN was now >180 mg/dL, CREA 16.8 mg/dL and phosphorous >20.0 mg/dL. The pancreas remained clear of any tumor recurrence and there was no sign of metastasis. The decision was made to humanely euthanize Boots with the clients present.

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Discussion

Pancreatic adenocarcinoma is rarely diagnosed in felines. These tumors are usually of epithelial origin. The symptoms associated with this neoplasia are common symptoms of multiple diseases. These include weight loss, anorexia, paraneoplastic alopecia, and vomiting.[iii] This prolongs the diagnosis as other diseases are ruled out. The cancer has normally metastasized by the time it is diagnosed. This is true in 80% of cases. Sites of metastasis include the liver, peritoneum, mesenteric lymph nodes, small intestines and lungs. Prognosis is usually grave. There is a mean survival time of 165 days with surgical resection and chemotherapy. [iv] This neoplasia is mostly diagnosed in felines 10-12 years old. Pancreatic masses are not detected radiographically until they are quite large. These masses are usually identified by abdominal palpation or during an abdominal ultrasound to evaluate the pancreas. Pancreatic neoplasia presents as discrete hypoechoic nodules that are usually greater than 2 cm in length. CT scanning is another tool that may be used for diagnosing these masses but can be financially limiting for many clients. Surgical evaluation of the pancreas is still considered the gold standard.[v] Fine needle aspirates of the mass and/or effusion or surgical excision usually provide the information needed for a diagnosis. In this patient's case, fine needle aspiration of the mass was not an option for several reasons. First, the origin of the mass was not clearly identified. Second, based on the small size of the mass, the clinician did not want to cause damage to the pancreas. Third, there was a risk of seeding the tumor through the needle tract. Surgery was the best option for a diagnosis. Removal of a mass from the pancreas is a very delicate procedure that ideally should be performed by a Diplomate of the American College of Veterinary Surgeons (DACVS). In this case, it was not feasible. Surgical

removal of the mass combined with chemotherapy improves the survival time for these patients. For this patient the mass was detected before metastasis had occurred and the mass was completely excised. Carboplatin was chosen to minimize metastasis and recurrence. This agent was one of the few drugs shown to have an effect on post-surgical metastasis. The side effects are dose limiting. It was used with caution given his comorbidity of stage 2 renal disease. It is unlikely that it contributed to the decompensation of his renal disease as this occurred 3 months after completion of treatment. Due to the rarity of this disease and its grave prognosis, there have not been many treatment choices researched. Recent studies have shown success with toceranib phosphate treatment for feline pancreatic adenocarcinomas. The use of toceranib phosphate in felines is off label. In one study an 11 year old female domestic shorthair cat survived over 700 days with this treatment. This drug is especially useful for inoperable tumors. [vi] Side effects of this drug can be easily reversed by taking a holiday from treatment. This is usually 1-2 weeks. After that the administration may resume at the original dose or be reduced. The success of this treatment option would give new hope to the patients diagnosed with this terrible disease. This protocol would be less stressful for the patient as well. This is an oral treatment that can be administered at home and can be given indefinitely. Visits to the clinic would be reduced to once a month after the first 4 weeks. Boots' case was unique. He did not have any signs of metastasis at diagnosis despite the duration of his symptoms and the time it took to reach the diagnosis. He remained in remission until the time of his death due to stage 4 renal disease.

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