The Ramblin' Cat with a Rumblin' Stomach

A Case Report of Feline Inflammatory Bowel Disease

Emily K. Lloyd

Mississippi State University

College of Veterinary Medicine

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Advisors: Christine Bryan, DVM

Juliana Frum, DVM, ABVP- Resident

Introduction

Inflammatory bowl disease (IBD) is considered the most common cause of chronic vomiting and diarrhea in the cat [1]. IBD is an umbrella term used for several different types of inflammation within the gastrointestinal tract. The most common type of inflammation seen is lymphoplasmacytic and the second most common is eosinophilic [3]. There is no sex or breed predilection for this disease. It is most common for middle aged to older cats be affected, but younger animals cannot be ruled out. Clinical signs typically include vomiting, diarrhea, and weight loss [2]. The stomach, small intestines, and colon can be affected and depending on which location is inflamed clinical signs will vary [1].

Inflammatory bowel disease is a diagnosis of exclusion. Endoscopic evaluation should be done only after completing other diagnostic tests, including CBC, serum chemistry, abdominal radiographs, and ultrasound [2]. After all testing is finished it is not uncommon to be left with IBD and alimentary lymphoma as the top differentials. Both diseases effect the same age group and patients will present with similar clinical signs. Contrary to previously published information, thickening of the muscularis layer is not specific to lymphoma and the only way to get a definitive diagnosis is by intestinal biopsy [3]. Lymphocyte infiltration will be more superficial with IBD but may extend beyond the mucosa and submucosa with lymphoma. So, while both partial or full thickness biopsies are appropriate, it does require some clinical judgement in deciding what will be best for each patient. [10]

History and Presentation

Yazhi, was an 8-year-old, female spayed, domestic shorthair cat who presented to Mississippi State University College of Veterinary Medicine's Community Veterinary Service

on January 14, 2019, for a 6-month history of vomiting. Yazhi had been traveling the country on an R.V. with her two owners, one other cat, and one dog for the past five years. She had presented to two other veterinarians, a doctor in New Hampshire in July of 2018 and another in North Carolina in November of that same year. Bloodwork was performed in July and bloodwork and radiographs were done in November. Both sets of bloodwork and radiographs were unremarkable according to her medical records, and neither visit resulted in a diagnosis. The veterinarian in New Hampshire suggested Yazhi be fed only canned food to help with her vomiting. Initially, Yazhi was vomiting once a week, however, this had progressed to once every day or two by the time she presented to us. According her owners, Yazhi's vomiting spells were becoming more violent, with her forelimbs becoming rigid and stiff for several minutes after an episode. The only real change in Yazhi's behavior was that she was playing with her toys less. She had also started to drink water more than normal, especially prior to emesis.

Upon presentation, Yazhi was bright, alert, and responsive. Her vital signs were within normal limits with a temperature of 99.0^{o} F, a heartrate of 216 beats per minute, and a respiratory rate of 36 breaths per minute. Her mucous membranes were pink and moist with a capillary refill time of less than two seconds. Her heart auscultated normally, with no murmurs or arrhythmias being appreciated. Her lung sounds were normal with no crackles or wheezes present. Her abdomen was soft, and no pain was elicited upon palpation. No ulcers or signs of irritation were noted upon oral examination. Yazhi's peripheral lymph nodes were normal in size, smooth, and symmetrical. The remainder of her physical exam was unremarkable. Yazhi was up to date on vaccines and had Revolution applied monthly. Her owners were feeding her canned Wellness turkey and salmon.

Diagnostic Approach/ Considerations

After taking a thorough history and completing Yazhi's physical examination, our top differentials were inflammatory bowel disease, lymphoma, parasitism, and a GI motility disorder. We started with a minimum database consisting of a complete blood count (CBC), serum chemistry, urinalysis, and a fecal flotation exam. Her CBC was found to be within normal limits, however, her serum chemistry revealed some abnormalities. Yazhi was azotemic with a moderately elevated BUN and creatinine. She was moderately hyperphosphatemic, hypercholesterolemic, mildly hypochloremic, and she had a mildly elevated creatinine kinase. Yazhi's urinalysis showed dilute urine with a specific gravity of 1.024. Blood and a +1 protein were also seen; however, her urine was collected via cystocentesis. Her fecal sample came back with no parasites or ova observed.

Due to Yazhi's elevated renal values and decreased urine specific gravity we were able to determine that she had renal azotemia. It was also interesting that Yazhi's renal values, including her SDMA, were with within normal limits during her previous veterinary visits. We followed the IRIS guidelines for staging renal failure to determine how severe Yazhi's kidney damage was. A creatinine of 2.9 mg/dl put Yazhi on the borderline of Stage 2 and 3. An SDMA was performed through Idexx which was at the high end of normal. This was good news and pushed her into an IRIS Stage 2. A urine protein: creatinine ratio (UP/C) was also performed and came back as 0.1. A UP/C of less than 0.2 is considered non-proteinuric. To complete Yazhi's renal work-up a blood pressure was obtained, and her systolic reading was 150 mmHg. Systolic blood pressures between 140-159 mmHg are considered pre-hypertensive which means at this time she was at a low risk of incurring organ damage due to hypertension. The result of these diagnostics put Yazhi at Stage 2 kidney disease. [5]

While we did uncover renal disease. when ahw first started having vomiting episodes her renal values were normal. We continued our search for the source of her gastrointestinal and renal issues in radiology. Abdominal radiographs were performed and revealed gas filled and dilated segments of small bowel. The differentials given for this appearance were inflammatory bowel disease, neoplasia, or enteritis. Yazhi also had bilateral renal infarcts and her left kidney was smaller than the right. The top differential for this change was chronic kidney disease. Because of these abnormalities, it was recommended that an abdominal ultrasound be performed. Her ultrasound revealed bilateral renal flattening which was most likely a result of the previously mentioned renal infarcts. Bilateral nephrolithiasis were present and her left renal pelvis was dilated. The right adrenal gland was mildly enlarged, but this could be due to the angle of investigation or artifact, but hypertrophy of chronic disease could not be ruled out. A smoothly marginated nodule was appreciated on the head of the spleen; differentials included extramedullary hematopoiesis, lymphoid hyperplasia, or neoplasia. The left limb of the pancreas was hypoechoic, and it was theorized that Yazhi suffered from either active or chronic pancreatitis. A segment of bowel was mildly corrugated, and this was likely be due to enteritis. A urine culture was performed to rule out infection due to the dilation of her left renal pelvis and no growth was observed.

Her abdominal ultrasound and radiographs illustrated that Yazhi's kidney damage was real, but they also showed that there was some sort of inflammatory process occurring in the small intestines. At that time, our top two differentials were inflammatory bowel disease and lymphoma. As previously mentioned, the only way to get a firm diagnosis is by performing intestinal biopsies [3]. Yazhi's owners brought her back the next day for an upper G.I. endoscopic examination with biopsies. On her scope, the proximal esophagus was mildly hyperemic. The

stomach (cardia, body, and pylorus) were within normal limits and 12 biopsy samples were obtained. The duodenum had a characteristic cobblestone appearance and another 12 biopsy samples were taken. All biopsy samples were submitted for histopathology. After interpretation, Yazhi's stomach showed a minimal amount of lymphocytic inflammation in the underlying mucosa. However, her duodenum showed a mixed, mostly plasmacytic, inflammatory infiltration of the mucosa. Paired with the presence of occasional lacteal dilation, the biopsy was suggestive of inflammatory bowel disease.

Pathophysiology

Normal intestinal mucosa acts as a barrier and controls underlying gut-associated lymphoid tissue's (GALT) exposure to antigens. GALT should generate an appropriate and protective response against foreign antigens while being able to tolerate harmless ones, such as commensal GI bacteria and food [9]. The exact etiology of inflammatory bowel disease is unknown; however, it is mostly accepted that there is an immune mediated component with the primary pathway being some type of hypersensitivity. However, how or why this hypersensitivity occurs is not well understood [1].

Multiple factors help ensure normal GI function and a breakdown in any of these processes can lead to inflammation. These factors include the innate immune system and its ability to interact with substances within the intestinal lumen, the integrity of the intestinal mucosal barrier, the microbiome of the gut, and the patient's diet [3]. There are two main theories on what causes IBD in the cat. The first theory suggests that there is a breakdown in the intestinal mucosal barrier and this loss of integrity leads to an increase in gut permeability which increases antigen exposure. The second theory states that there is an aberrant immune response to luminal antigens due to defects in GALT suppressor function. This results in the patient

becoming predisposed to developing a hypersensitivity to antigens that are normally well tolerated [1].

Chronic inflammation leads to infiltration of the intestinal mucosa with various inflammatory cells. Other abnormalities that can be noted in the GI mucosa are architectural changes including villus atrophy and fusion; this change can result in protein loss which reflects a decreased in absorptive abilities or ulceration [2]. The location of the inflammation within the GI tract can influence what clinical signs will be seen, however, this "rule" seems to hold truer for dogs than cats. Inflammation of the stomach and proximal duodenum are more likely to result in vomiting. If the small intestines are primarily effected loose, fluid, or steatorheic stool will likely be present. Lastly, IBD of the colon results in diarrhea with tenesmus, mucus, and small sparse stools. If the owner is noticing the appearance of coffee grounds within the patients vomiting, one should be concerned that GI ulceration or erosion is occurring. [1]

Treatment and Management

Treatment of inflammatory bowel disease should focus the reduction of clinical signs, as resolving the disease is unlikely [2]. Eliminating what is causing a hypersensitive response is ideal, unfortunately, most causes of IBD are idiopathic and this may not be possible. One study suggested that approximately 50% of the cats with IBD improved after doing a diet elimination trial. The most common foods for an IBD feline to be sensitive to were beef and cereal grains (i.e. wheat, corn, barley). The only treatment that helped nearly 100% of cats improve was the use of a glucocorticoid [6]. For cats, prednisolone can be administered at a dose of 0.5-1 mg/kg every 12 hours for patients with mild to moderate inflammatory bowel disease. After 2-4 weeks, the dose can be reduced by 50%. If the patient tolerates that reduction after two weeks the dose can again be reduced by 50%. This can be done until the patient has reached the lowest effective

dose and most cats will tolerate every other, to every three-day dosing [1]. It has been suggested that adding an antibiotic, such as metronidazole, can help regulate the digestive flora. However, in most studies the patient was receiving a hypoallergenic diet and/or a glucocorticoid, so it is difficult to discern whether the antibiotics added any benefit [6].

Since we had a diagnosis of both Stage 2 renal disease and inflammatory bowel disease, it was decided to manage Yazhi's kidney disease with diet and IBD with medication. She was started on a renal diet with her owners taking samples of Hill's, Royal Canin, and Purina. It was discussed with her owners that cats are particularly difficult to keep interested in a renal diet due to its palatability. We suggested to constantly be switching up the flavors and textures of Yazhi's food. This can be accomplished easily as both Hill's and Royal Canin offer a variety of flavors in both wet and dry formulations. Mixing wet with various renal diet kibbles to keep a more diverse and unique flavor profile may also prove helpful. The cornerstone of renal nutrition is a diet that has low quantities of high-quality meat, high carbohydrate content, decreased phosphorus, and high levels of omega-3 fatty acids [8]. While a renal diet will not improve kidney damage that has already occurred, it will help slow the progression of the disease.

For the medical management of her inflammatory bowel disease Yazhi was started on several drugs, most of which were discontinued after her GI tract had calmed down. She went home on oral Cerenia (maropitant citrate) at 1 mg/kg every 24 hours for four days. This drug acts as an antiemetic by blocking NK-1 receptors, which stimulate vomiting [7]. Omeprazole at 1 mg/kg orally every 12 hours for 14 days which was prescribed to help reduce the incidence of stomach ulceration. Omeprazole is a proton pump inhibitor that prevents gastric acid secretions [7]. She also started on prednisolone at 0.5 mg/kg every 12 hours, and this would be the only drug that would be continued indefinitely. Prednisolone is a glucocorticoid that is four times as potent

as cortisol and is used to treat a variety of inflammatory/immune mediated disease [7]. Lastly, Yazhi's owners were given Gabapentin at 30 mg/kg to be given every 12 hours as needed for pain control and to help decrease anxiety during veterinary visits. Gabapentin is a GABA analogue that is an anticonvulsant, sedative, and used to treat chronic, neuropathic pain [7]. Gabapentin has also been shown to reduce stress and aggression in cats placed in stressful situations [4].

Case Outcome

Yazhi recovered uneventfully form her endoscopy procedure and was discharged the same day into her owner's care. They were told give her medications as prescribed and to call us with any questions. Since Yazhi was going to be back on the road, her owners were instructed to call Dr. Frum in three weeks to discuss lowering her prednisolone dose. We also suggested that she have bloodwork performed twice early to monitor the progression of her chronic kidney disease. On January 17, Yazhi's owners reported did very well post anesthesia and was enjoying her new renal diets. She had not vomited since she coming home and was starting to regain her normal energy level. On January 22, her owners called to inform us that when they discontinued her Cerenia Yazhi started vomiting approximately 36 hours later. Her owners were told that it would likely take several weeks for the steroid to take effect and reduce the inflammation in her intestinal tract. Cerenia was refilled and Ondansetron (0.5 mg/kg) was added as an additional antiemetic.

Over the course of the past few months, Yazhi has continued to do well. She has not had any vomiting spells since February and has been happy to eat her renal diets. Her owners have taken control of tapering down her steroid amount, working towards the lowest effective dose for her. Her owners recently made another reduction and she is now receiving 0.4 mg/kg/day, which

is a 60% reduction from her original dose. Yazhi's owners are grateful that they can manage her symptoms and she hopefully has many more years of adventure ahead of her!

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