Featured Case

EOSINOPHILIA IN A CAT

Contributing Author:
Heidi Ward, DVM, ACVIM (Oncology)

A 6 year old Male neutered DSH presented with a 1 month history of lethargy, anorexia, vomiting, diarrhea and weight loss. Previous diagnostics included a fecal floatation, FeLV/FIV, CBC/Profile and Heartworm tests. The only abnormality found upon initial work up was a peripheral leukocytosis of 31,500/ul consisting of a mature neutrophilia (12,915/ul), eosinophilia (14,175/ul) and monocytosis (1,260/ul). The cat was subsequently started on therapy with Pyrantel pamoate, Amoxicillin/Clavulanic acid, Fenbendazole and Metronidazole however no improvement was seen and was referred for further diagnostic work up 2 weeks later. On physical examination a palpable abdominal mass was detected. A repeat CBC, profile, thoracic and abdominal radiographs and abdominal ultrasound were performed. Thoracic radiographs were normal; abdominal radiographs revealed an increased opacity within the mid-abdomen and diffuse splenomegaly. The results of the CBC revealed a persistent leukocytosis (35,300/ul) with marked eosinophilia 22,945/ul.

CBC Results

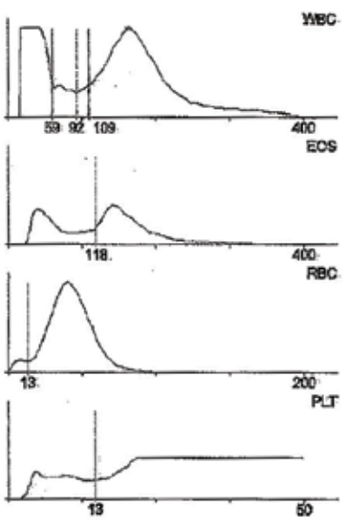
Gulf Coast Vet Oncology/Internal Medicine
7519 S Tamiami Trail
Sarasota, FL 34231
(941)926-1920

Sample ID 00572 Name
Patient ID call Age 9y
Type Cat Gender Spayed

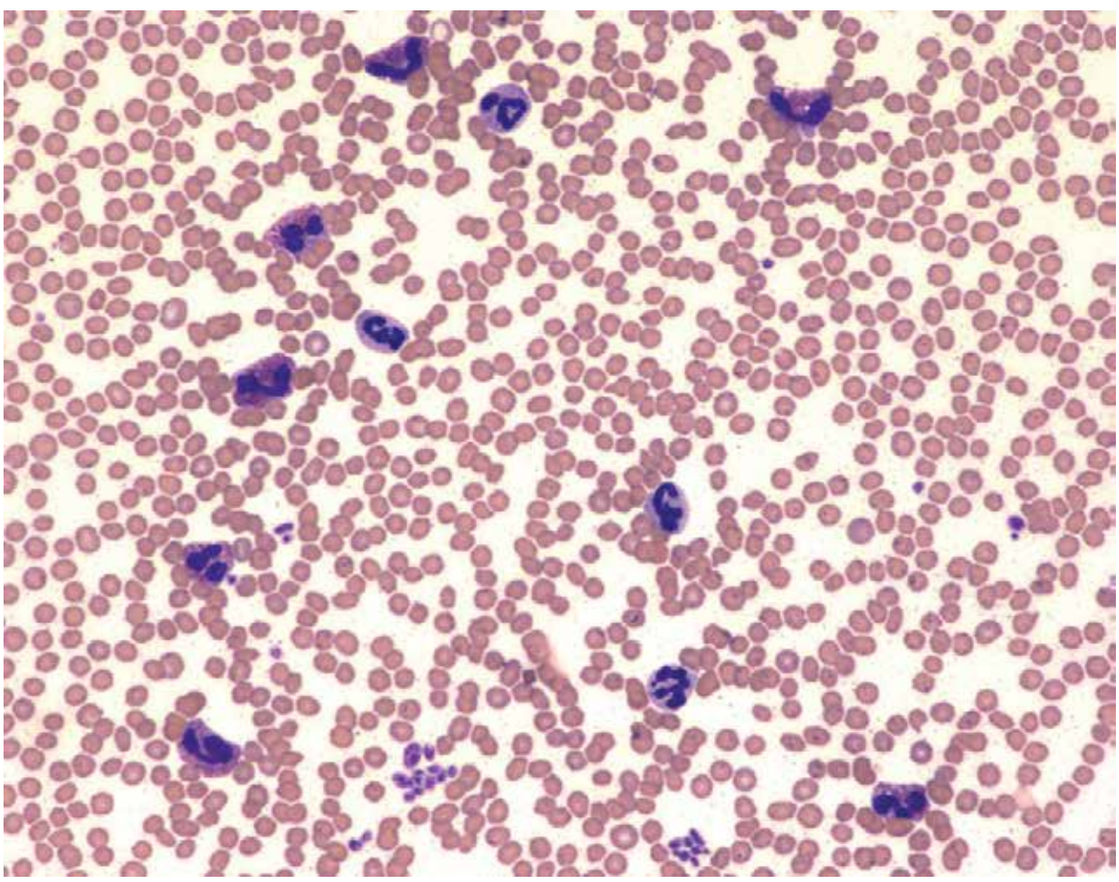
Test date 04/28/2014 08:39 AM Serial No. 380059
Report date 04/28/2014 08:45 AM
Doctor ward

WBC	65.79+	10^9/l	5.50	19.50
LYM	6.35	10^9/l	1.50	7.00
MON	3.32+	10^9/l	0.00	1.50
NEU	39.00+	10^9/l	2.50	14.00
EOS	16.48+	10^9/l	0.00	1.00
BAS	0.84+	10^9/l	0.00	0.20
LYM%	9.7	%	0.0	100.0
MON%	5.1	%	0.0	100.0
NEU%	59.3	%	0.0	100.0
EOS%	25.0	%	0.0	100.0
BAS%	1.0	%	0.0	100.0
RBC	6.63	10^12/l	5.00	10.00
HGB	9.2	g/dl	8.0	15.0
HCT	26.50	%	24.00	45.00
MCV	40	fl	39	55
MCH	13.9	pg	12.5	17.5
MCHC	34.8	g/dl	30.0	36.0
RDWc	26.0	%		
RDWs	43.0	fl		
PLT	221-	10^9/l	300	800
MPV	11.3-	fl	12.0	17.0
PCT	0.25	%		
PDWc	35.9	%		
PDWs	13.5	fl		

Warning W



CBC Smear



Marked Peripheral Eosinophilia.

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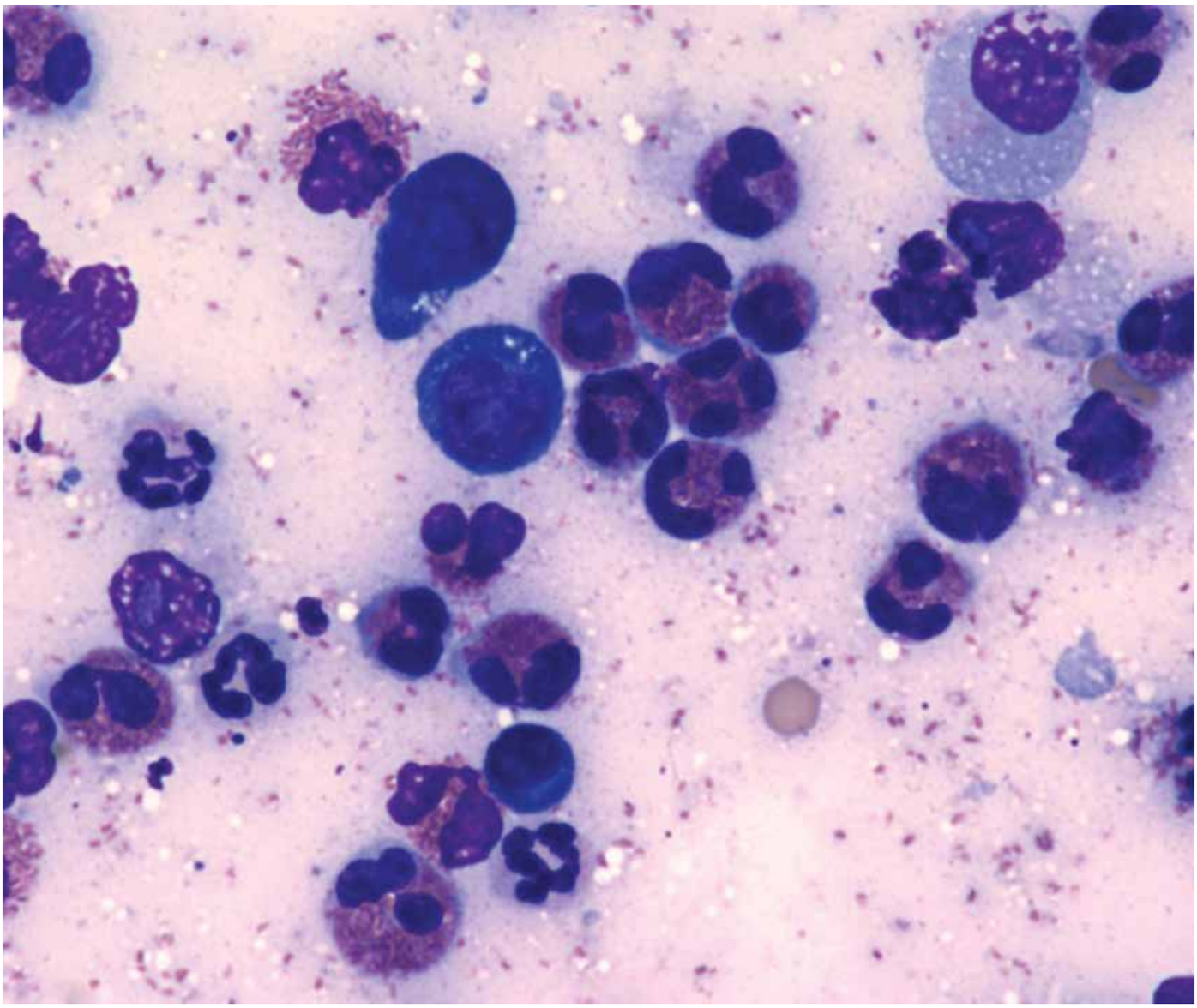
Cytology of Intestinal Mass



Nucleated cells consisted primarily of eosinophils found individually and in groups. Occasional foamy macrophages and a few apical round cells with nuclear diameters reanging from 12 - 15 microns were noted.

On ultrasonography of the abdomen, a 2.7 x 1 cm focal poorly echogenic circumferential small intestinal wall thickening with luminal narrowing was seen. No lymphadenopathy was detected. A fine needle aspirate of the intestinal mass was performed which revealed a predominant population of eosinophils found both individually and in groups. Occasional foamy macrophages and a few atypical round cells with nuclear diameters ranging from 12-15 um were also present. These cells had features consistent with atypical medium lymphocytes (ie round nuclei, coarsely granular chromatin, prominent nucleoli and scant amounts of deeply basophilic cytoplasm). In light of the presence of an eosinophilic inflammatory intestinal mass, atypical lymphocytes and peripheral eosinophilia, a differential diagnoses of hypereosinophilic syndrome or intermediate cell lymphoma with tumor associated eosinophilia was made.

An exploratory laparotomy to determine feasibility of resection of the intestinal mass and to further characterize the atypical cells and rule out underlying neoplasia was declined by the owner. The cat was subsequently given dexamethasone 4 mg SQ and released on Prednisone 5 mg q12 hr. No further vomiting or diarrhea was seen by the owner subsequent to steroids within 48 hours. On recheck 2 weeks later, the cat had gained ½ pound, the eosinophilia had resolved (870/ul) and ultrasonography of the abdomen revealed a reduction in size of the intestinal mass by 75% with no evidence of mesenteric lymphadenopathy or splenomegaly. The cat was continued on Prednisone 5 mg q 12hr. 3 months later the cat represented for vomiting and anorexia. A repeat CBC revealed a nonregenerative anemia and recurrence of marked leukocytosis 65,800/ ul with eosinophilia 29,610/ul. Ultrasonography revealed evidence of intestinal thickening, multifocal mesenteric lymphadenopathy and splenomegaly. Further therapy was declined and humane euthanasia was elected.

At necropsy, mesenteric lymphadenopathy and splenomegaly were detected and samples were submitted for histopathology. The lymph node revealed infiltration and replacement of normal architecture with large numbers of eosinophils intermixed with fewer mast cells, lymphocytes, plasma cells and fewer macrophages. There were also broad interconnecting trabeculae of fibrous tissue that contained plump fibroblasts which markedly distorted and

expanded the lymph node. These changes have been seen in association with gastrointestinal eosinophilic sclerosing fibroplasia. The spleen revealed that the red pulp was infiltrated by large numbers of well differentiated eosinophils suggestive for hypereosinophilic syndrome.

In cats, eosinophilia is defined as an absolute increase in the number of circulating eosinophils of more than 800/ul of blood.[1] Increases up to 5,000/µL are considered mild, up to 10,000/µL moderate and over 20,000/µL marked. General categories of diseases associated with eosinophilia include parasitic and infectious diseases, hypersensitivity disorders, eosinophilic infiltrative diseases, and neoplasia. In a retrospective study of 312 cats with eosinophilia only cats with flea allergy dermatitis, gastrointestinal disease, focal inflammation/eosinophilic granuloma and miscellaneous dermatopathies had eosinophil counts over 10,000/ul.[2] Paraneoplastic eosinophilia has been reported in association with mammary tumors, leiomyosarcoma, T-cell lymphoma, fibrosarcoma, mast cell tumors and urinary bladder tumors.[3] Hypereosinophilic syndrome (HES) is a disorder characterized by a persistent peripheral eosinophilia and organ infiltration by eosinophils, which eventually cause organ failure and death. It occurs primarily in cats and its origin is unknown.[12,13,14,15] Peripheral eosinophil counts in cats with HES range from 3,500/uL to 130,000/uL and the cells appear mature. The distinction between an eosinophilic leukemia and idiopathic hypereosinophilic syndrome remains elusive. Eosinophilic leukemia is diagnosed when serial evaluation of blood reveals prolonged, persistent marked eosinophilia with immature forms and the bone marrow is dominated by a disordered differentiation and maturation of eosinophils.[16,17]

The organs most commonly infiltrated with eosinophils in HES include the bone marrow, gastrointestinal tract, spleen, mesenteric lymph nodes and liver, but any organ can be affected. In humans, most morbidity and mortality is due to cardiac involvement. Clinical signs of HES are nonspecific and vary with the organ(s) affected and include diarrhea, weight loss, anorexia, pyrexia and pruritus. HES is typically but not always a progressively fatal disease. Management consists of lifelong therapy with corticosteroids.[11] Prednisone is started at 4-6 mg/kg /day for at least one month then gradually tapered to 1-2 mg/kg every 24 to 48 hours. Monitoring consists of repeating CBCs and careful abdominal palpation with imaging.

Causes of Intestinal eosinophilic inflammation include parasites, bacteria, food or environmental antigens, fungi, oomyctes, Toxoplasma gondii and herpesvirus. Eosinophils have been shown to produce numerous mediators such as TGF-B and IL-1b which play a role in fibrosis. A unique form of a feline eosinophilic lesion that appears to be limited to the gastrointestinal tract and regional lymph nodes has been termed Feline Gastrointestinal Eosinophilic Fibroplasia (FGESF).[4,5,6,7,8,9,10] The term FGESF was first proposed and described in 25 cats by Craig et al in 2009.4 In this subset

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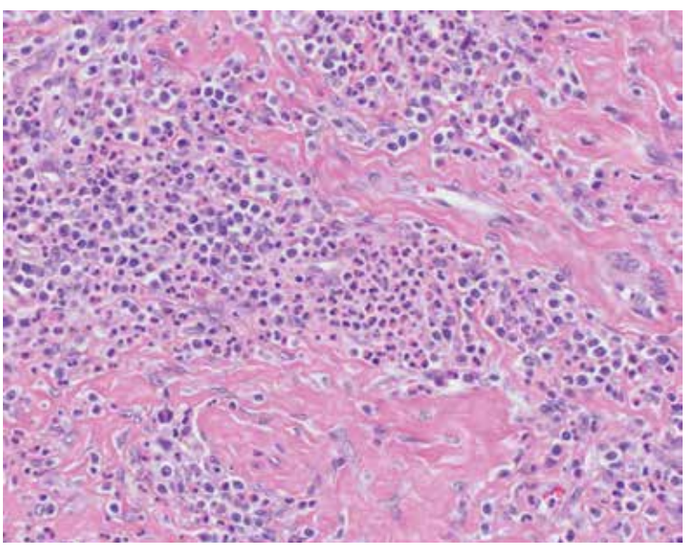
of cats, gastrointestinal involvement was most commonly seen at the pyloric sphincter (48%), ileocecocolic junction or colon (36%) and small intestine (16%). A subsequent retrospective detailing 13 cases with similar histologic features has also been reported by Linton et al in 2015.[6] Regional lymphadenopathy was a common finding in both studies. Vomiting, weight loss and a palpable abdominal mass appear to be the most common historical and physical examination findings.

The typical appearance of FGESF is that of an ulcerated mass expanding the wall of the site affected with a characteristic histologic finding of dense collagen trabeculae, fibroblasts and eosinophils. Cytological findings may reveal an eosinophilic matrix, fibroblasts and eosinophils however in some cases only eosinophils are seen.

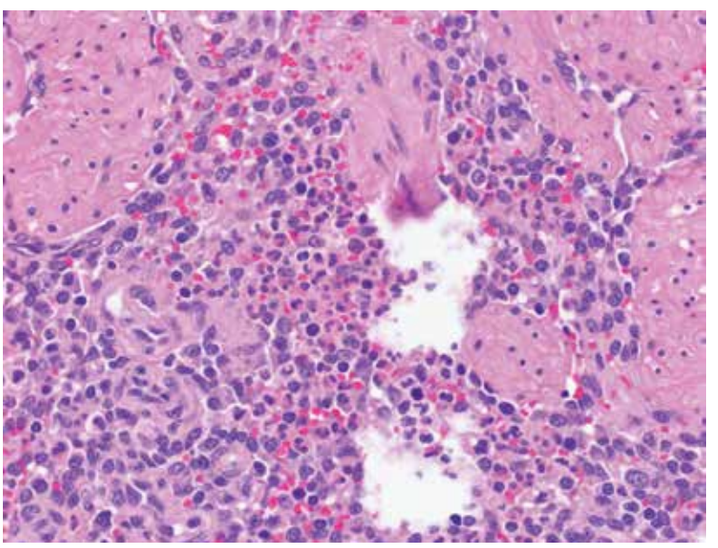
Craig et al postulate that bacteria may be responsible for the initiation of the inflammatory response and were detected in 56% of their cases however antibiotics were not a clinically effective treatment modality. In another study by Ozaki et al 2003, of 27 cats with lesions of similar histologic description bacteria were found in 100% whereas only 69% of cats in the retrospective reported by Linton et al revealed the presence of bacteria. Cats treated with complete excision of their lesions (in cases where feasible) in combination with prednisone had longer survival times than those treated with surgery and antibiotics alone. Prognosis for cats with FGESF is variable and may be associated with the initial location of the lesion as cats with ileocecocolic or colonic masses appear to have longer survivals than those with pyloric involvement as those in the latter group are less surgically accessible to complete excision.[4] In this cat, prednisone alone was helpful in providing an improved quality of life albeit temporarily and therefore steroids alone or in combination with other immunosuppressive agents should be considered in cases in which surgery is not an option.

Lymph Node Histopathology



The lymph node is infiltrated and replaced by large numbers of eosinophils intermixed with fewer mast cells, lymphocytes, plasma cells and fewer macrophages. There were also broad interconnecting trabeculae of fibrous tissue that contain plump fibroblasts which markedly distort and expand the lymph node.

Spleen Histopathology



The red pulp was infiltrated by large numbers of well differentiated eosinophils.

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