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Case Report

A Feline Gastrointestinal Eosinophilic Sclerosing Fibroplasia in a Scottish Fold Cat: A Case Report

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Abstract

A 2-year-old intact female Scottish fold cat was presented to the Prasu-Arthorn Animal Hospital, Faculty of Veterinary Science, Mahidol University, for a right nephrectomy because a renal mass was suspected. During the physical examination, the animal had an intra-abdominal mass with abdominal discomfort. No history of vomiting and diarrhea was reported. The blood chemistry and hematology revealed a markedly low albumin/globulin ratio and mild anemia with normal leukogram. The abdominal ultrasonographic examination and CT scan revealed an intestinal mass at the ileocecocolic junction. The mass was surgically excised, and jejuno-colic anastomosis was performed. Grossly, the mass was firm, very well circumscribed, measured 6×7×5 cm in diameter, and had fairly discrete central areas of tan to white discoloration. Microscopically, the wall of the large intestine was regionally extensively expanded by abundant, dense, thick bands of fibroplasia with associated dense infiltrates of predominant eosinophils, fewer lymphocytes and plasma cells, and multifocal areas of necrosis. Special staining for toluidine blue, Masson's trichrome, Periodic Acid Schiff (PAS), and Grocott Gomori methenamine silver stain (GMS) along with immunohistochemistry for CD3, CD20, and KIT was performed to rule out the possibility of infectious disease and other potential neoplasms such as mast cell tumor, lymphoma, and gastrointestinal stromal tumor. Taken together, the observed findings were most consistent with feline gastrointestinal eosinophilic sclerosing fibroplasia (FGESF). The immunosuppressive drugs were administered: prednisolone 2 mg/kg, orally every 24 hours, and cyclosporine 4.8 mg/kg, orally every 24 hours. The prednisolone dosage was tapered down by 25% every six weeks. There was no evidence of local recurrence detected in 172 days post-operation. In this case, a successful combination of surgical and medical treatment protocols and diagnostic techniques of the FGESF case was presented.

Keywords: Abdominal mass, Feline eosinophilic sclerosing fibroplasia, Ileocecocolic junction, Intramural mass

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Introduction

Feline gastrointestinal eosinophilic sclerosing fibroplasia (FGESF) was first described in 2009 (Craig *et al*., 2009). This condition is characterized by prominent eosinophil infiltration and dense collagen deposition forming a mass. The extra gastrointestinal form of FGESF, such as mesenteric lymph nodes, was also reported (Craig *et al*., 2009; Zampieri *et al*., 2022). Male Ragdoll cats are overrepresented (Linton *et al*., 2015). The underlying cause and disease mechanism cannot be determined, but the possible pathogenesis can be associated with abnormal inflammatory response to unknown antigens (Craig *et al*., 2009). However, some researchers have proposed potential underlying infectious causes, such as bacterial infections (Linton *et al*., 2015), fungal infections (Grau-Roma *et al*., 2014), or oomycete infections (Fortin *et al*., 2017)

The standard treatment for FGESF typically involves surgical removal and is often complemented by a combination of immunosuppressive agents, antibiotics, and immunomodulatory drugs (Craig *et al*., 2009; Linton *et al*., 2015). The recommended long-term therapy involves prednisolone with a starting dose of 2 mg/kg/day (Linton *et al*., 2015; Themie *et al*., 2019). The prognosis for cats with FGESF is usually guarded due to a late diagnosis, as well as delayed and inadequate treatment (Craig *et al*., 2009; Linton *et al*., 2015).

This is the first case report of FGESF in Thailand, which shows a successful combination of surgical and medical treatment protocols and diagnostic techniques.

Case description

A 2-year-old, intact female Scottish fold cat, with a weight of 2.6 kg and a body condition score of 2.5/5, residing indoors in solitary condition, was reported to have had an abdominal mass noticed by the owner for a month; otherwise, the animal appeared to be normal. The vaccine was up to date with monthly deworming. The animal was taken to the animal hospital. At that time, the results of hematology and blood biochemistry were within normal limits. Cystocentesis was performed for urinalysis, which revealed proteinuria (protein 2+) and pyuria (leucocyte 3+). Radiographic imaging (Fig.1) showed a soft tissue opacity mass in the middle part of the abdomen. A right renal abscess was suspected based on the results of an ultrasonographic examination. Fifteen ml of purulent exudate was collected through aspiration and was submitted for bacterial culture, and *Kocuria spp*. was isolated from the submitted specimen. Then, the animal was referred to Prasu-Arthorn Animal Hospital (PAAH) for a right nephrectomy.

During the physical examination, the animal was slightly depressed but was still responsive with 5% dehydration. An approximately 6 cm diameter, well-circumscribed, firm mass was palpated at the right middle abdomen. There was no evidence of peripheral lymph node enlargement. The systolic blood pressure measured 130 mmHg. The hematology revealed mild anemia [hematocrit (HCT) = 26.4% (reference range 30 - 45%)], slightly decreased hemoglobin [hemoglobin (Hb) = 8.9 g/dL (reference range 10.0 - 15.0 g/dL)], mild thrombocytopenia [platelet (PLT) count = 231 x 10^3/µL (reference range 300 - 600 x10^3/µL)]. No eosinophilia was detected based on the leukogram profile [eosinophil = 0.3 x 10^3/µL (reference range 0.0 - 1.5 x10^3/µL)]. Biochemistry parameters showed hypoalbuminemia [albumin (ALB) = 2.4 g/dL (reference range 2.6 - 3.9 g/dL)] and hyperproteinemia [total protein (TP) = 11.7 g/dL (reference range 5.7 - 8.9 g/dL)]. The calculated albumin to globulin ratio (A/G ratio) was 0.26, eliciting concerns regarding the potential dry form of feline infectious peritonitis (FIP) at that time. The cat was negative for feline leukemia virus (FeLV) antigen test, feline immunodeficiency virus (FIV) antibody test, and feline heartworm antigen test (SNAP® Feline triple™ test, IDEXX Laboratories). Ultrasonographic imaging and CT scan in Fig. 2 revealed a normal appearance of both kidneys. An intestinal mass was found at the ileocecocolic junction.

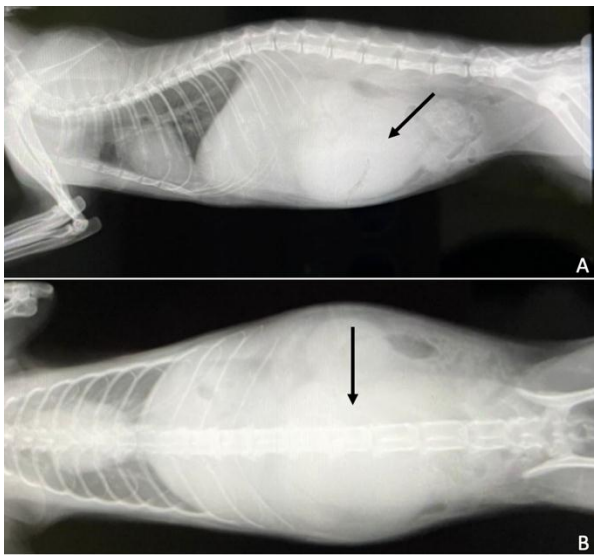

Figure 1 (A-B) Radiographs of the right lateral view (A) and dorsoventral view (B) from the private practitioner revealed a soft tissue opacity mass in an abdomen. (Black arrow).

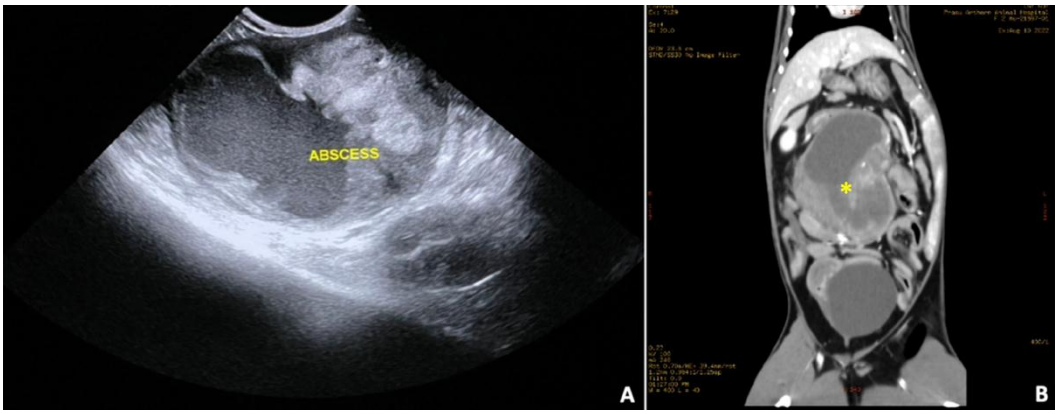

Figure 2 (A-B) Abdominal ultrasonographic examination (A) and CT scan (B) revealed an intestinal mass at the ileocecocolic junction (yellow asterisk).

Enterectomy and jejuno-colic anastomosis were performed. The cat was pre-medicated with morphine, 0.3 mg/kg body weight via intramuscular injection, and amoxicillin-clavulanic acid, 8.75 mg/kg body weight through subcutaneous route. General anesthesia was induced with alfaxalone 3 mg/kg body weight injected intravenously and maintained by using isoflurane. The surgical procedure revealed a space-occupying mass located between the ileum and the cecum, and the lymphatic vessels were dilated.

Grossly, the mass, measuring 6×7×5 cm in diameter, was firm and very well circumscribed with fairly discrete central areas of tan to white discoloration. The result of macerated tissue fungal culture from the removed mass yielded no growth. Colonies of *Staphylococcus aureus* were isolated, and Amoxicillin-clavulanic acid was an antibiotic of choice based on the results of bacteriology and drug sensitivity, respectively. The result of real-time polymerase chain reaction (qRT-PCR) for Feline coronavirus was negative.

Microscopically, the tunica muscularis of the large intestine was regionally extensively expanded and replaced by abundant, dense, thick bands of fibroplasia containing numerous spindled fibroblasts along with variably dense infiltrates of predominant eosinophils, fewer lymphocytes, and plasma cells and multifocal areas of necrosis (Fig 4). These bands of fibroplasia were highlighted by Masson's trichrome staining. No fungal hyphae were observed within the section, specially stained with PAS and GMS. Special staining with toluidine blue and immunohistochemistry using rabbit antibody against CD3 (Dako), polyclonal rabbit antibody against CD20 (Abcam), and polyclonal rabbit antibody against c-KIT) Dako) in Fig. 5 were performed to rule out the possibility of a mast cell tumor, lymphoma, and gastrointestinal stromal tumor. Taken together, the observed findings were most consistent with feline gastrointestinal eosinophilic sclerosing fibroplasia (FGESF).

The albumin level of this animal measured 2.7 g/dL on postoperative day 10 and remained above 3.3 g/dL until postoperative day 172. Folate and cobalamin levels were examined on postoperative day 32, which were in the normal references [folate 21 ng/ml (reference range 2.89 - 26.80 ng/ml), cobalamin 857.0 pg/ml (reference range 290 - 1,500 pg/ml)]. The complete blood count remained unremarkable during serial monitoring every six weeks. The immunosuppressive drugs were administered, including prednisolone 2 mg/kg orally every 24 hours and cyclosporine 4.8 mg/kg orally every 24 hours. The prednisolone dosage was tapered down by 25% every six weeks. A series of abdominal ultrasonography was performed every six weeks, which showed no evidence of local recurrence until postoperative day 172.

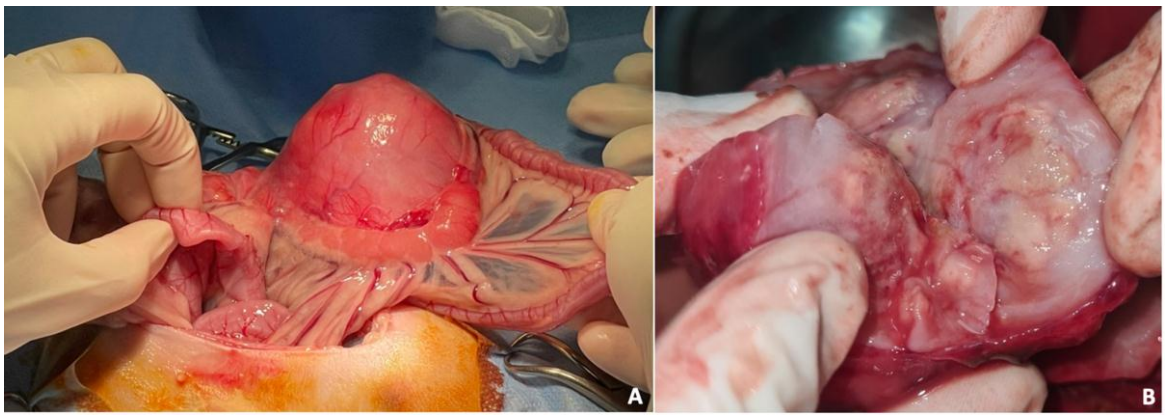

Figure 3 (A-B) A mass was located at the ileocecocolic junction (A) with central, coalescing areas exhibiting tan to white discoloration (B).

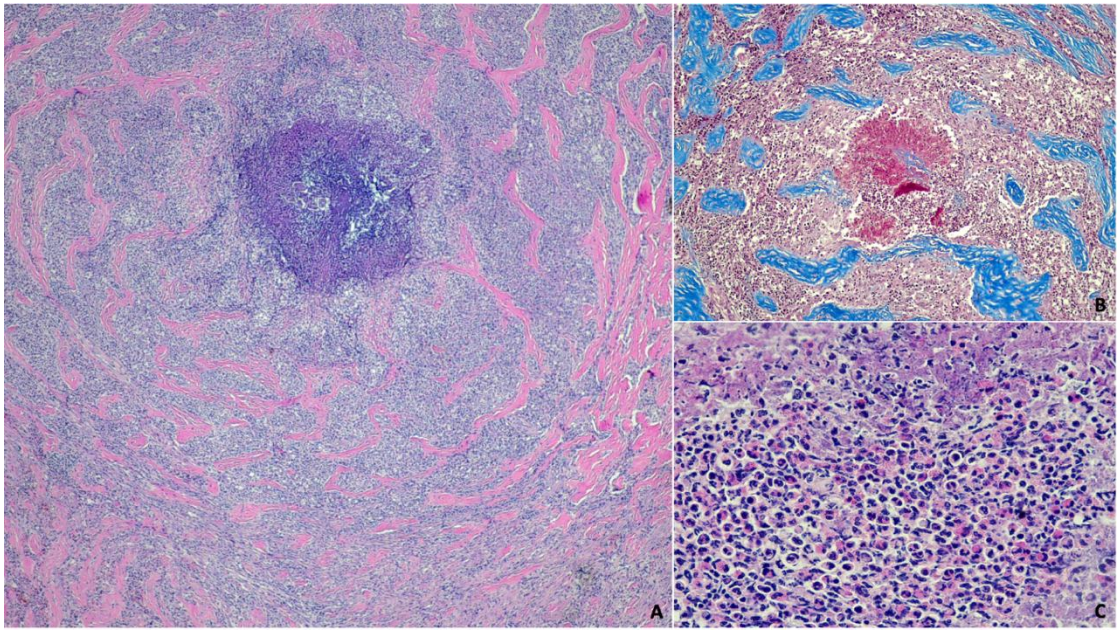

Figure 4 (A-C) (A) Microscopically, the intestinal wall is largely expanded by thick, densely irregular, scirrhous collagen bands with associated dense cellular infiltrations and occasional aggregates of karyorrhectic debris (H&E, 4× magnification). (B) Masson's trichrome staining highlights bands of fibroplasia (10× magnification). (C) Densely cellular infiltrates are composed of predominant eosinophils, fewer lymphocytes, and plasma cells (H&E, 40× magnification).

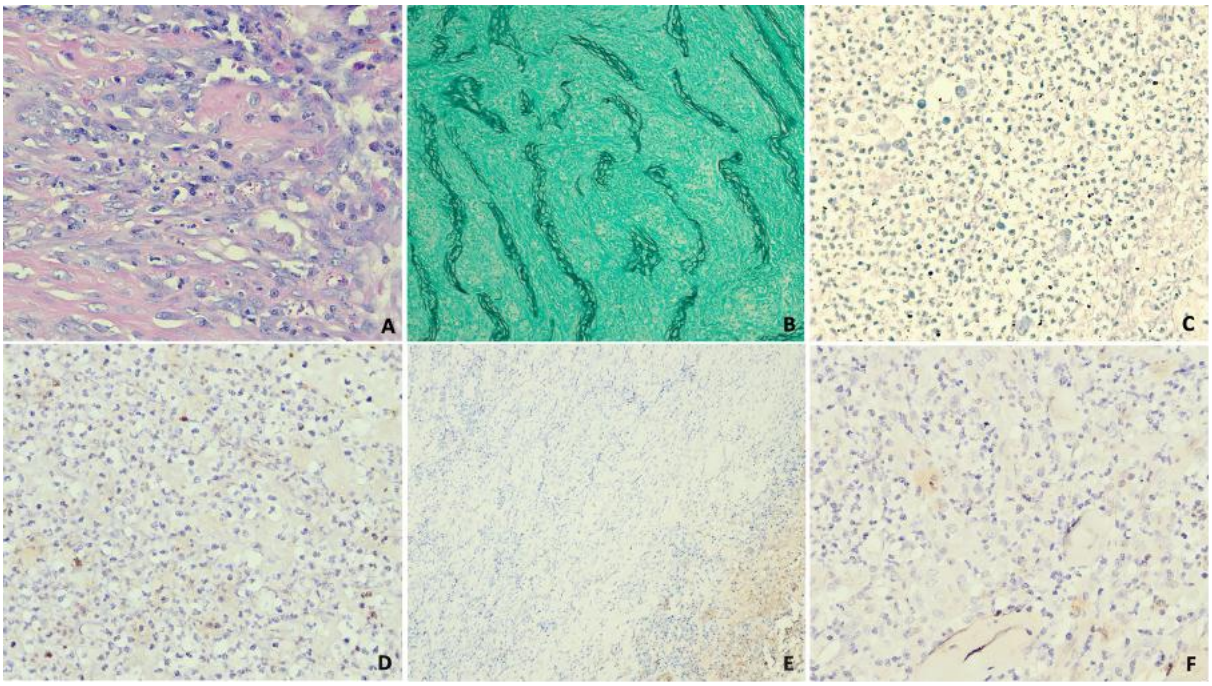

Figure 5 (A-F) Within the sections specifically stained with PAS (A, 40× magnification) and GMS (B, 10× magnification), no fungal hyphae were seen. Special staining for toluidine blue (C, 10× magnification) along with immunohistochemistry for CD3 (D, 40× magnification), CD20 (E, 10× magnification), and KIT (F, 40× magnification) was performed to rule out the possibility of mast cell tumor, lymphoma, and gastrointestinal stromal tumor.

Discussion

Cats with FGESF often display gastrointestinal obstruction-related clinical signs, and anorexia, vomiting, and diarrhea appear to be the most consistent findings among affected animals due to the narrowing of the gastrointestinal lumen (Craig *et al.*, 2009). However, the animal in the present case had a normal appetite without a history of vomiting and diarrhea. Other clinical characteristics that can be found in cats with FGESF include peripheral eosinophilia, neutrophilia, hyperproteinemia due to hyperglobulinemia, and hypoalbuminemia resulting in decreased albumin/globulin ratio. In one study, peripheral eosinophilia was found in 5 of 10 cases, hypoalbuminemia was detected in 5 of 11 cases, and an albumin/globulin ratio of less than 0.6 was reported in 7 of 11 cases (Linton *et al.*, 2015). The significance of the isolated *Staphylococcus aureus* is unclear, and it is unclear whether the bacterial organisms incite the observed inflammation or represent environmental contamination in the current case. In one study, Methicillin-resistant *Staphylococcus* was purposed to be

an etiology of subcutaneous abscess with prominent eosinophilic inflammation and fibrosing granulation tissue (Ozaki *et al.*, 2003). Based on the gross and microscopic findings, other differentials for nodular lesions of the gastrointestinal tract in cats include mast cell tumors, lymphoma, non-lymphogenic, non-angiogenic intestinal soft tissue sarcoma, gastrointestinal stromal tumor, intestinal adenocarcinoma, and granulomatous inflammation secondary to fungal/oomycetes infections, etc. (Grau *et al.*, 2014; Fortin *et al.*, 2017). Decreased albumin/globulin ratio can clinically mimic FIP (Tsai *et al.*, 2011; Thayer *et al.*, 2022). In our case, no peripheral eosinophilia and neutrophilia were detected, and FIP and fungal/oomycetes infection were ruled out based on the results of PCR testing and mycology.

Although there is currently no specific treatment for FGESF, several studies have demonstrated successful therapeutic outcomes using immunosuppressive drugs (Thieme *et al.*, 2019; Kambe *et al.*, 2020; Kim *et al.*, 2020). In a previous study by Kambe *et al.* (2020), cyclosporine and prednisolone were exclusively administered without surgical intervention. In that study, cyclosporine treatment was discontinued on day 469 after the initial diagnosis. The cat remained alive, without local recurrence, for 689 days. In addition, prednisolone was used as a single immunosuppressive treatment in a cat with an extramural form of FGESF without complete surgical excision reported in one case (Thieme *et al.*, 2019). In that report, the prednisolone dosage was initiated at 2 mg/kg/day. A CT scan was conducted on day 732, unveiling a reduction in the size of the mass to only one-quarter of its initial size since the start of treatment, and the cat was in good condition without any chief complaint or abnormal clinical signs. Subsequently, after 732 days, the administered prednisolone dosage was gradually tapered down to 0.5 mg/kg/day for long-term management. On the other hand, in one study, the mass recurred after one year of surgery, even though the mass was completely resected. This recurrence may be attributed to the cat owner declining the suggested corticosteroid treatment (Brloznik *et al.*, 2017). In another study conducted by Linton and colleagues in 2015, 8 out of 13 cats died within 3 to 152 days after the final diagnosis. However, among the surviving animals, the cats treated with immunomodulatory treatment (prednisolone) showed a prolonged lifespan, and the authors suggested that a multimodal approach to therapy, including surgical resection followed by immunomodulatory and antibiotic treatments, provides optimal treatment outcomes with various survival times ranging from 1–10 years.

This report demonstrated the first successful management of a FGESF cat in Thailand. CT scan proved to be a valuable diagnostic modality for localizing the abdominal mass. Histopathology, along with special staining and immunohistochemistry, is necessary for precise diagnosis. Notably, this animal has not experienced local recurrence following prolonged treatment involving cyclosporine, prednisolone, and surgical intervention.

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References

Brloznik M, Faraguna S, Gombac M and Svara T 2017. Recurrent feline gastrointestinal eosinophilic sclerosing fibroplasia and presumptive eosinophilic cystitis in a domestic short-haired cat: A case report. Veterinarni Medicina. 62: 295–300.

Catro-Lopez J, Fernandez M and De Sousa AR 2012. A case of feline gastrointestinal eosinophilic sclerosing fibroplasia associated with zygomycetes fungi. J Feline Med Surg. 14: 650.

Cho MJ, Kim MC and Seo KW 2017. Feline gastrointestinal eosinophilic sclerosing fibroplasia in a Bengal Cat. Journal of Veterinary Clinics. 34: 481–3.

Cocci A, Greci V and Treves EL 2018. Clinical and endoscopic findings and outcomes in two cats treated conservatively for feline gastrointestinal eosinophilic sclerosing fibroplasia. BSAVA Congress Proceedings 2018. 484.

Craig LE, Hardam EE, Hertzke DM, Flatland B, Rohrbach BW and Moore RR 2009. Feline gastrointestinal eosinophilic sclerosing fibroplasia. Veterinary Pathology. 46: 63–70.

Eckstrand CD, Barr BC, Woods LW, Spangler T and Murphy B 2013. Nematode-associated intramural alimentary nodules in pumas are histologically similar to gastrointestinal eosinophilic sclerosing fibroplasia of domestic cats. Journal of comparative pathology. 148: 405-409.

Montenegro NE, Castro DAR, López PAB, Velásquez CAC and Calvache TGP 2022. Feline gastrointestinal eosinophilic sclerosing fibroplasia. Brazilian Journal of Veterinary Pathology. 15: 57–61.

Ettinger SJ, Feldman EC and Côte E 2017. Textbook of Veterinary Internal Medicine: Diseases of the dog and the cat. Elsevier. St. Louis (Missouri). 8th edition.

Fortin JS, Calcutt MJ and Kim DY 2017. Sublingual pythiosis in a cat. Acta Veterinaria Scandinavica. 59.

Grau-Roma L, Galindo-Cardiel I, Isidoro-Ayza M, Fernandez M and Majó N 2014. A case of feline gastrointestinal eosinophilic sclerosing fibroplasia associated with Phycomycetes. Journal of Comparative Pathology. 151: 318-21.

Kambe N, Okabe R, Osada H, Ogawa M, Kishimoto M, Fukushima R, Kondo H and Ohmori K 2020. A case of feline gastrointestinal eosinophilic sclerosing

fibroplasia limited to the mesentery. Journal of Small Animal Practice. 61: 64-67.

Kim MH, Baek KO, Park GG, Jang JY and Lee JH 2020. A study on concentration, identification, and reduction of airborne microorganisms in the military working dog clinic. Safety and Health at Work. 11: 517-525.

Kim MS, Kim K, Lee GH, Kim CH, Jang SL, Suh GH and Lee CM 2021. Successful management of feline gastrointestinal eosinophilic sclerosing fibroplasia with mycophenolate mofetil and prednisolone following surgical resection in a cat. The Thai Journal of Veterinary Medicine. 51: 773-777.

Kolikonda MK, Jayakumar P, Sriramula S and Lippmann S 2016. Kocuria kristinae infection during adalimumab treatment. Postgraduate Medicine. 129: 296-298.

Linton M, Nimmo JS, Norris JM, Churcher R, Haynes S, Zoltowska A, Hughes S, Lessels NS, Wright M and Malik R 2015. Feline gastrointestinal eosinophilic sclerosing fibroplasia: 13 cases and review of an emerging clinical entity. Journal of Feline Medicine and Surgery. 17: 392–404.

Ozaki K, Yamagami T, Nomura K, Haritani M, Tsutsumi Y and Narama I 2003. Abscess-forming inflammatory granulation tissue with gram-positive cocci and prominent eosinophil infiltration in cats: Possible infection of methicillin-resistant staphylococcus. Veterinary Pathology. 40: 283–287.

Thayer V, Gogolski S, Felten S, Hartmann K, Kennedy M and Olah GA 2022. AAFP/EVERYCAT feline infectious peritonitis diagnosis guidelines. Journal of Feline Medicine and Surgery. 24: 905–933.

Thieme ME, Olsen AM, Woolcock AD, Miller MA and Simons MC 2019. Diagnosis and management of a case of retroperitoneal eosinophilic sclerosing fibroplasia in a cat. Journal of Feline Medicine and Surgery Open Reports. 5: 205511691986717.

Tsai CY, Su SH, Cheng YH, Chou YL, Tsai TH and Lieu AS 2010. Kocuria varians infection associated with brain abscess: A case report. BMC Infectious Diseases. 10.

UT Health San Antonio 2020. Special stains [Internet]. Department of Pathology and Laboratory Medicine. Available from: https://lsom.uthscsa.edu/pathology /reference-labs/histology-immunohistochemistry-laboratory/laboratory-services-2/spe cial-stains/.

Zampieri B, Church ME, Walsh K and Lennon EM 2022. Feline eosinophilic sclerosing fibroplasia – a characteristic inflammatory response in sites beyond the gastrointestinal tract: Case report and proposed nomenclature, Journal of Feline Medicine and Surgery Open Reports. 8: 205511692211175.