A Case of Feline Gastrointestinal Eosinophilic Sclerosing Fibroplasia

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Abstract: Feline gastrointestinal eosinophilic sclerosing fibroplasia was diagnosed in an 8-month-old Scottish fold that had a primary gastrointestinal mass involving the stomach, duodenum and mesenteric lymph nodes. Histopathologically, the most characteristic feature of this mass was granulation tissue with eosinophil infiltration and hyperplasia of sclerosing collagen fiber. Immunohistochemically, large spindle-shaped cells were positive for smooth muscle actin and vimentin. This case emphasizes the importance of feline gastrointestinal eosinophilic sclerosing fibroplasia as a differential diagnosis of gastrointestinal neoplastic lesions such as osteosarcoma and mast cell tumor in cats. (DOI: 10.1293/tox.26.51; J Toxicol Pathol 2013; 26: 51–53)

Key words: cat, gastrointestinal tract, granulation tissue, eosinophil, fibrosis

Feline gastrointestinal eosinophilic sclerosing fibroplasia (FGESF) has been described in cats¹. It is considered to be a type of feline eosinophilic inflammation, like feline indolent ulcer, eosinophilic plaque, eosinophilic granuloma and hypereosinophilic syndrome. A previous report of similar lesions in the subcutis and abdomen of cats in Japan proposed methicillin-resistant Staphylococcus as the cause². As the previous literature has indicated, the pathogenesis of FGESF is considered to be bacterial infection¹, ². However, no pathogens have been detected in bacterial analysis in some cases. Histomorphologically, FGESF has a very characteristic trabecular pattern of dense collagen that resembles osteoid, sometimes leading to a mistaken diagnosis of osteosarcoma, and also contains numerous mast cells, leading to the diagnosis of mast cell tumor. We describe the histomorphological and immunohistochemical features in this cat.

An 8-month-old castrated male Scottish fold was presented to a private animal hospital with a complaint of chronic vomiting and diarrhea. Radiography and ultrasonography revealed a nodular lesion located from the stomach to duodenum. In exploratory laparotomy, some tissue samples for biopsy were collected from both the duodenum and mesenteric lymph node. After fixation with 10% neutral-buffered formalin, the tissue samples were cut into pieces, embedded in paraffin and then sectioned at 2 mm. The sections were stained with hematoxylin and eosin. Additionally, Masson’s trichrome stain, Luna’s stain and toluidine blue stain were also applied. Immunohistochemical examinations were carried out on paraffin sections with the following primary antibodies: monoclonal mouse anti-smooth muscle actin (1:200, clone 1A4, Dako) and monoclonal mouse anti-vimentin (1:100, clone V9, Dako). A universal immunoenzyme polymer method (N-Histofine Simple Stain Max PO (M) or (R), Nichirei Corp., Tokyo, Japan) was used for immunoreaction. Each protocol included omission of the primary antibody as a negative control and reference tissues as a positive control.

Histomorphologically, biopsy samples of the duodenum consisted of a branching and anastomosing trabecular pattern surrounded and dissected by variably dense bands of collagen consistent with sclerosis (Fig. 1). The trabecular collagen merged gradually into more typical granulation tissue at the periphery of the lesions. In this lesion, many large spindle-shaped cells formed a fascicular or diffuse pattern (Fig. 2). Many eosinophils infiltrated the fibrous connective tissue and mucous membrane, and there were fewer neutrophils, mast cells, lymphocytes, and plasma cells within the fibrosis as well as within the mucosal epithelium. Lesions were either transmural or affected the inner layers of the gastrointestinal wall. Masson’s trichrome stain was used to confirm collagen in the sclerosing component, which is characterized by intense blue staining (Fig. 3). Many eosinophils were visualized using Luna’s stain, which dyes cytoplasmic granules red. A few mast cells were confirmed based on staining of metachromatic cytoplasmic granules with toluidine blue stain. Immunohistochemically, large spindle-shaped cells were labeled for anti-smooth muscle actin and anti-vimentin. In the biopsy samples of the mesen-
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Fig. 1. Sclerotic collagen bundles form a branching and anastomosing trabecular pattern. H.E. ×100.

Fig. 2. Large spindle-shaped cells proliferate in the lesion, which contains many eosinophils. H.E. ×400.

Fig. 3. Masson’s trichrome stain revealed that the sclerosing components were collagen. Masson’s trichrome stain ×100.

teric lymph node, follicular hyperplasia was observed, and many eosinophils infiltrated into the sinus.

Histologically, FGESF has often been misdiagnosed as osteosarcoma or mast cell tumor. The FGESF lesion has a branching and anastomosing trabecular pattern resembling an osteoid architecture. Additionally, sclerotic collagen bundles may be seen as the bone matrix. Myofibroblast-like large spindle-shaped cells that are immunoreactive to smooth muscle actin and vimentin also proliferate in this lesion. Although feline myofibroblasts are known to have a tendency to undergo malignant transformation in response to ocular trauma and vaccination, it is improbable that the lesion in this case is a neoplasm. The inflammatory context and gradual transition of this lesion to more typical granulation tissue are not consistent with neoplasia. In addition, this case is very young. Mast cells were confirmed in the lesion of this case, while these mast cells were intermingled with inflammatory cells and exhibited no atypism. Moreover, mast cells were scarcely seen in the center of this lesion. Therefore, this case cannot be diagnosed as a mast cell tumor. It is very important that a lesion like this in the gastrointestinal tract is distinguished from neoplasia.

This lesion was histologically characterized by infiltration of numerous eosinophils. Eosinophils produce many mediators. Sclerotic fibrosis, in particular, is regarded to be promoted by mediators of eosinophils. Major basic protein (MBP) was produced by eosinophil deposits in a lesion involving inflammatory fibrosis and was absent in the case of noninflammatory fibrosis in a study of human patients. Fibrogenic mediators produced by activated eosinophils such as TGF-β and IL-1β lead to fibroblast proliferation and extracellular matrix deposition. IL-33 found preferentially localized to the nucleus of epithelial and endothelial cells induces cutaneous fibrosis and intense inflammation that is associated with large numbers of infiltrating eosinophils. IL-33-induced fibrosis requires IL-13 secreted by eosinophils. Consequently, it is considered that eosinophils participate in specific fibrosis of FGESF, and may play a key role in the pathogenesis of FGESF.

Bacteria are presumed to be a pathogen in FGESF. Craig et al. report that bacteria, including Gram-negative rods, Gram-positive cocci, and Gram-positive rods, were found in the majority of cases. Ozaki et al. describe similar eosinophilic sclerosing lesions in the subcutis and abdomen. They proposed methicillin-resistant Staphylococcus as the cause. On the other hand, bacteria were not detected histologically in the lesions. While these lesions were considered to be due to bacteria initially, it was suspected that antibiotic therapy disinfected bacteria or that the exuberant inflammatory lesions were difficult to find histologically. In our case, bacteria were not confirmed microscopically in the lesion, suggesting that the subject samples were part of a mass in the gastrointestinal tract.

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