AKADÉMIAI KIADÓ

Acta Veterinaria Hungarica

68 (2020) 2, 193–196

DOI:
10.1556/004.2020.00025

ORIGINAL ARTICLE

Intestinal T-cell lymphoma in a coati (*Nasua nasua*) – Short communication

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Received: October 4, 2019 • Accepted: February 19, 2020
Published online: August 28, 2020

ABSTRACT

A 10-year-old female coati (*Nasua nasua*) was necropsied after an 8-day history of apathy, weight loss and dehydration. Gross changes consisted of multifocal to coalescing nodules ranging from 0.5 to 2.0 cm in diameter in the wall of the small intestine, adjacent to the mesentery and in the mesenteric lymph nodes. Histologically, neoplastic CD3-positive lymphocytes infiltrated all layers of the intestine, as well as the mesenteric adipose tissue and mesenteric lymph nodes. Based on the pathological and immunohistochemical findings, a diagnosis of intestinal T-cell lymphoma was made.

KEYWORDS

lymphoma, neoplasm, immunohistochemistry, wild animals, CD3

The coati (*Nasua nasua*) is an omnivorous wild mammal widely distributed in South and Central America. It belongs to the family *Procyonidae* and the subfamily *Procyoninae* (Beisiegel, 2001). Bacterial and parasitic diseases have been reported in this species (Langoni et al., 2009; Milanelo et al., 2009), but spontaneous neoplasms are rarely described (Reppas et al., 2001; Skorinsky et al., 2008), with only one reported case of epitheliotropic lymphoma in the skin (Skorinsky et al., 2008). The current study describes the morphological and immunohistochemical findings of a rare case of intestinal T-cell lymphoma in a coati. To the authors' knowledge, this is the first case of alimentary tract lymphoma in *N. nasua*.

A 10-year-old female coati at the Zoological Garden Foundation of Brasilia, Brazil, developed an 8-day history of apathy, weight loss and dehydration. Ultrasound examination revealed a soft tissue mass in the mesogastric region. The coati spontaneously died eight days after the onset of the clinical signs and was subjected to necropsy. On gross examination, the wall of the duodenum and jejunum, as well as the adjacent mesentery and mesenteric lymph nodes had numerous soft, smooth, white nodules ranging from 0.5 to 2.0 cm in diameter (Fig. 1A). In these areas, many affected intestinal segments were significantly narrowed. Samples of affected tissues and other routine samples were collected, fixed in 10% neutral buffered formalin, routinely processed for histology, and stained with haematoxylin and eosin.

Histologically, the nodules were composed of a non-encapsulated, highly cellular neoplastic proliferation constituted by sheets of lymphocytes (categorised as small lymphocytes) that expanded all layers of the intestine and also the adjacent mesentery and mesenteric lymph nodes (Fig. 1B). Neoplastic lymphocytes were round, with distinct cytoplasmic borders, and had sparse and weakly eosinophilic cytoplasm and round, hyperchromatic nuclei. Anisocytosis and anisokaryosis were moderate, and there were seven mitoses per 2.4 mm^2. Multifocally throughout the intestinal mucosa there was fusion of villi,

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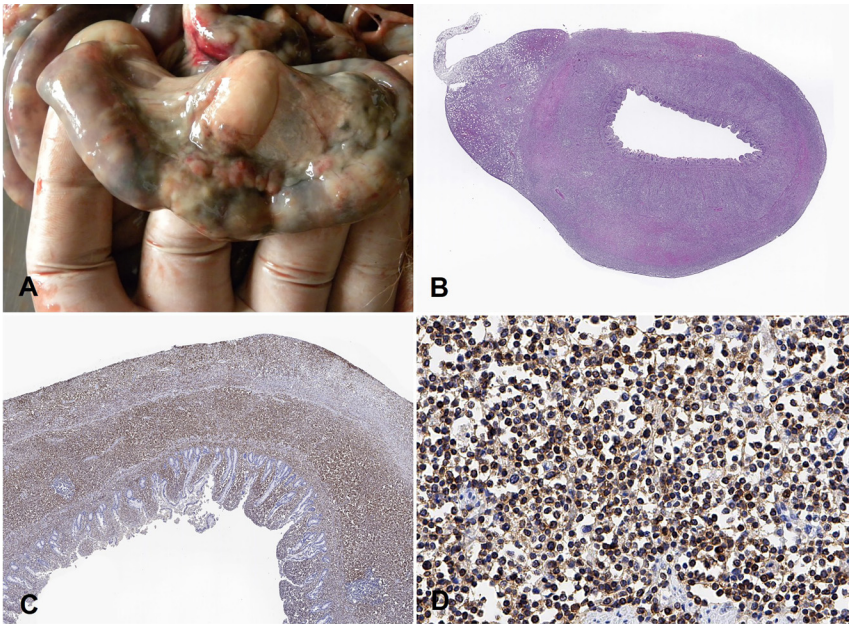

Fig. 1. (A) Soft, smooth and white nodules on the wall of the small intestine and adjacent mesentery. (B) Diffuse proliferation of neoplastic lymphocytes arranged in mantles in all layers of the small intestine, associated with villous fusion. Haematoxylin and eosin (HE), ×20. (C) Positive cytoplasmic labelling of neoplastic lymphocytes in all layers of the small intestine. Immunohistochemistry (IHC), CD3, ×100. (D) Detail of the neoplastic lymphocytes immunolabelled with CD3. IHC, CD3, ×400

irregular areas of necrosis, and aggregations of lymphocytes and plasma cells. The mesenteric lymph nodes presented histologic disorganisation and diffuse neoplastic proliferation with the same cytological features as those described in the small intestine. Neoplastic cells were not found in other organs.

To identify the origin of the neoplastic cells, tissue sections were immunolabelled for CD3 (directed against T lymphocytes; rabbit polyclonal antiserum, 1 in 1,000 dilution for 60 min; Dako, Carpinteria, California, USA; catalogue number A05452) and CD20 (directed against B lymphocytes; rabbit polyclonal antiserum, 1 in 2,000 dilution for 90 min; Biocare, Pacheco, California, USA; catalogue number 121R-18). Positive and negative control tissues consisted of canine lymph node. Neoplastic lymphocytes had strong membranous immunolabelling with CD3 (Fig. 1C and D) and no immunolabelling with CD20. Based on morphological and immunohistochemical findings and according to the Revised European-American Lymphoma/World Health Organization (REAL/WHO) classification (Valli et al., 2017), the neoplasm was classified as an intestinal T-cell lymphoma.

In dogs, primary alimentary lymphomas show no age, sex or breed predisposition (Coyle and Steinberg, 2004; Frank et al., 2007). Similar to the coati of the current report, the clinical signs associated with gastrointestinal lymphoma are secondary to neoplastic infiltration of the gastrointestinal wall and impaired water and nutrient absorption, including lethargy, polydipsia, polyuria, anorexia, pale mucous membranes, tense abdomen, haematemesis, melaena, vomiting and diarrhoea (Richter, 2003; Frank et al., 2007; De Zan et al., 2009; Frances et al., 2013; Malberg et al., 2017).

Ultrasonography is an important and useful tool to evaluate and localise intra-abdominal masses during the physical examination, as performed in the present case. However, this technique can be non-specific, as found previously in canine gastrointestinal lymphomas (Frances et al., 2013). The results of clinical laboratory tests (such as haematology and biochemistry) and endoscopic biopsies can assist in the clinical diagnostic investigation of alimentary lymphoma (Frank et al., 2007; Kaneko et al., 2009). Diagnostic confirmation of a T-cell lymphoma must be achieved by immunohistochemistry (Valli et al., 2017).

Lymphomas are commonly reported neoplasms in a wide range of domestic and wild animal species and can be classified according to clinical, pathological and immunophenotypic findings (Durham et al., 2012; Valli et al., 2017). Multicentric lymphoma is the most common anatomic form of canine, feline and equine lymphoma, followed by extranodal lymphoma in dogs, alimentary and mediastinal lymphoma in cats, and intestinal and cutaneous lymphoma in horses (Valli et al., 2000; Vezzali et al., 2009; Durham et al., 2012). Occasional cases of lymphoma have been described in wild animals, such as intestinal lymphoma in a sea lion (Colegrove et al., 2010), multicentric lymphoma in a raccoon (Hamir et al., 1996), hepatic lymphoma in a cheetah (Lindemann et al., 2015), enteric lymphoma in a harbour seal (Malberg et al., 2017), and cutaneous lymphoma in Tasmanian devils (Peck et al., 2019). Alimentary lymphoma can be single or multiple (Frank et al., 2007) and it occurs mainly in the small intestine, followed by the large intestine and stomach (Kaneko et al., 2009; Moore et al., 2012). The mesenteric lymph nodes are rarely affected (Coyle and Steinberg, 2004). In the current case, all layers of the small

intestine were affected and the neoplasm infiltrated the adjacent mesentery and lymph nodes, similar to what has been reported in cats and other animal species with alimentary lymphoma (De Zan et al., 2009; Moore et al., 2012; Malberg et al., 2017). As in the current case, most feline intestinal lymphomas (FIL) are of T-cell origin (Pohlman et al., 2009). Histologically, these FIL were classified mainly as lymphomas of small cell type (type 2) and less commonly as of large cell subtype (type 1) (Pohlman et al., 2009). In cats, FeLV-associated lymphoma is well established in the literature. However, this neoplasm is of unknown aetiology in the coati, similarly as in the dog (Skorinsky et al., 2008).

In some canine or feline cases, small cell intestinal lymphomas may be confused with inflammatory bowel disease (IBD). Immunohistochemistry (IHC) and clonality tests are useful to differentiate these lesions (Valli et al., 2017). In the current case, clonality evaluation was not performed. However, the histological changes of the present case, including the dense proliferation of a monomorphic population of T-lymphocytes throughout the intestinal wall and adjacent tissues, anisocytosis, anisokaryosis, and the moderate mitotic index of the neoplastic cells were highly suggestive of the diagnosis of intestinal lymphoma. Absence of other inflammatory cells, such as plasma cells, were also considered. Epitheliotropism of reactive lymphocytes in the villi is an important finding of IBD (Valli et al., 2017). In the present case, there was mild cell proliferation in the villi. Furthermore, IBD affecting coati has not been described in the literature.

Of the other species present in the family Procyonidae and the subfamily Procyoninae, lymphomas have been described only in raccoons (*Procyon lotor*) (Hamir et al., 1996). Only a cutaneous epitheliotropic lymphoma (mycosis fungoides) has been reported in coati (Skorinsky et al., 2008). To the authors' knowledge, this is the second case reported in this species and the first affecting the alimentary tract. Future epidemiological and pathological studies are needed to determine the prevalence and the aetiology of lymphomas in coatis.

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