

Short communication

Lymphosarcoma in a brown bear (*Ursus arctos*)

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An example of lymphoblastic lymphosarcoma was found in a 7-year-old male brown bear (*Ursus arctos*) that died after having a 7-month history of depression, anorexia and watery diarrhea. Grossly the mesenteric lymph nodes were enlarged to approximately 4 to 6 times their normal size and histologically diagnosed as lymphoblastic lymphosarcoma. The small intestinal mucosa was corrugated and had severe mural thickening due to infiltrated neoplastic cells. Hepatic metastasis was also noted. This is the first reported case of lymphosarcoma in *Ursidae* in Korea. As an incidental finding, endogenous lipid pneumonia was noted in the lung.

Key words: Lymphosarcoma, bear, *Ursidae*, endogenous lipid pneumonia

Lymphosarcoma is one of the most common types of neoplasm that occurs in many domestic and wild animal species [5]. In *Ursidae*, only a few cases of spontaneous neoplasms such as osteosarcoma, extrahepatic biliary carcinoma and beta cell neoplasm have been documented [1,3,8,10]. In this paper, we describe a case of lymphoblastic lymphosarcoma in a brown bear (*Ursus arctos*). To the author's knowledge, this is the first such case reported in Korea.

The animal was a 7-year-old male brown bear (*Ursus arctos*) that had been raised at the Everland Zoological Garden in Korea. The animal was found dead after a 7-month history of depression, watery diarrhea, and anorexia. The bear was unresponsive to symptomatic and fluid therapies. The bear was submitted to the Department of Veterinary Pathology, Seoul National University for a postmortem examination shortly after its death.

At necropsy, the bear was in poor physical condition and there was a considerable depletion of fat at the coronary groove and in the abdominal cavity. Mesenteric lymph nodes were enlarged to a diameter of approximately 6 to 8 cm. They were bulging and uniformly firm, and appeared tan on cut sections (Fig. 1). Several regions of the small intestine was severely thickened and had corrugated mucosal surfaces due to neoplastic nodules of variable sizes (Figs. 2 and 3). Numerous tan, firm, raised nodules, 1 to 1.5 cm in diameter were scattered throughout the hepatic lobes (Fig. 4). The nodules were also seen to be embedded in the hepatic parenchyma in the cut sections. The lung contained subpleural whitish plaques. The plaques were 1 to 3 mm in diameter and were raised slightly from the surface.

Tissue samples from the neoplastic masses of mesenteric lymph nodes, small intestine, and the liver and other representative parenchymal organs were fixed in 10% phosphate buffered neutral formalin, processed routinely, and stained with Hematoxylin and Eosin (H&E) for light microscopic examination.

Histologically, the mesenteric lymph nodes were composed of a dense population of neoplastic lymphoid cells resulting in the complete obliteration of the normal architecture of the lymph nodes. The neoplastic cells had round hyperchromatic nuclei and a small amount of cytoplasm (Fig. 5). The frequency of mitotic figures was low. The neoplastic lymphocytes invaded and infiltrated into the mucosa, submucosa and muscle layer of the small intestine and were also present in the liver (Figs. 6 and 7). The subpleural plaques noted in the lung consisted of foamy macrophages and cholesterol clefts (Fig. 8). Some of the plaques also had a mild to moderate lymphocytic infiltration at the periphery of the plaques.

The pulmonary lesion was compatible with a disease entity known as endogenous lipid pneumonia that is known to occur secondary to a variety of causes which include bronchial obstruction or irritation, long-term

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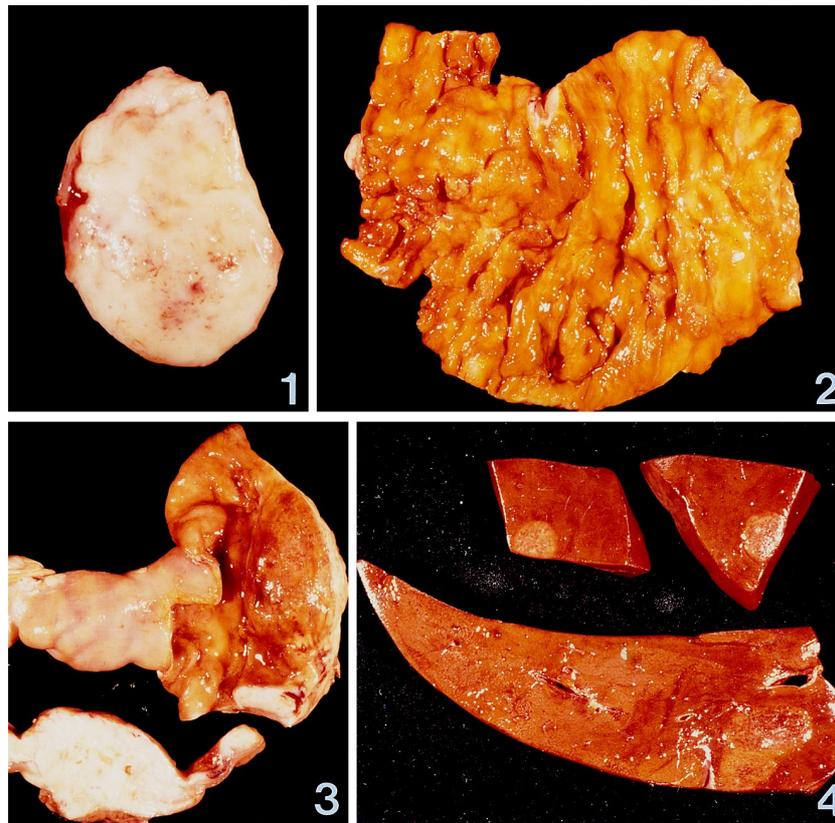


Fig. 1. Note marked swelling and tan discoloration of the mesenteric lymph nodes.
Fig. 2. Note thickening and corrugation of the small intestine mucosal surface.
Fig. 3. Note marked thickening and tan discoloration of the small intestine wall.
Fig. 4. Note the well-demarcated and slightly raised round nodules in the liver.

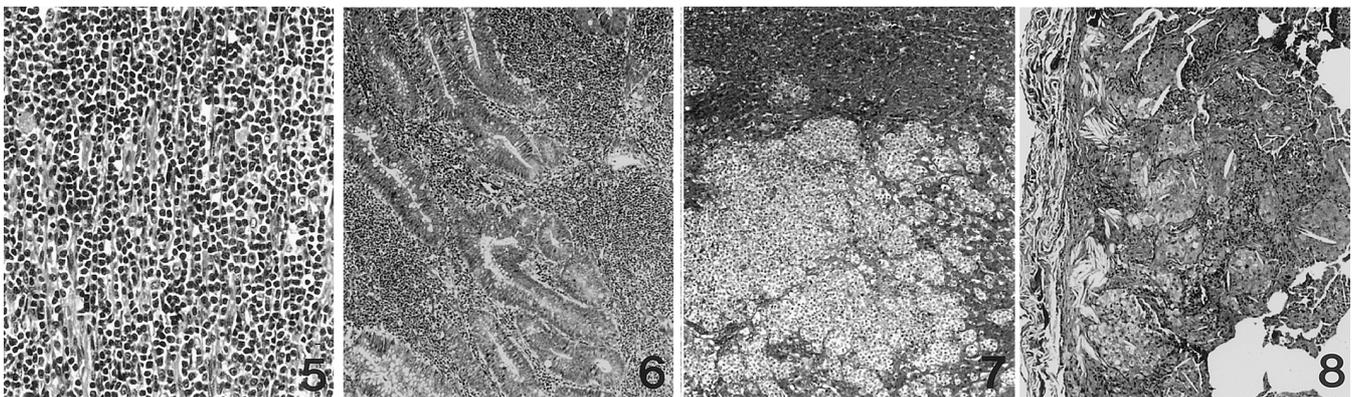


Fig. 5. The neoplastic cells are round and have hyperchromatic nuclei and a small amount of cytoplasm. H&E, X400.
Fig. 6. Note the infiltration of neoplastic lymphocytes into the small intestinal mucosa. H&E, X100.
Fig. 7. Note the metastatic foci of neoplastic lymphocytes in the liver. H&E, X100.
Fig. 8. Note the aggregates of foamy macrophages and the cholesterol clefts in the subpleural region of the lung. H&E, X100.

inhalation exposure to various dusts, pantothenic acid deficient diets, and hypophysectomy [2,6]. Hyperplasia of type II pneumocytes after a pulmonary injury and a resulting overproduction of the surfactant has been proposed to be the pathogenic mechanism of the lipid

pneumonia [7]. The cause of endogenous lipid pneumonia in this bear is as yet undetermined.

Lymphosarcoma and leiomyoma are the only reported intestinal tract neoplasms in *Ursidae* [4,9,11]. The cause of neoplasms in *Ursidae* is generally undetermined except for

extrahepatic biliary carcinoma and multiple pancreatic beta cell neoplasms in which a genetic predisposition and excessive carbohydrate consumption were suggested to be possible contributors to the development of those neoplasms [1,10]. The bear's mother which died at the age of 20 also had similar gross changes on necropsy which were suggestive of neoplasia. Histopathological examination was not performed at that time and therefore the exact type of neoplasm remained to be determined. Since the daughter also has died resulting from a neoplasm, a genetic factor could be suspected in this family.

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