

## Bilateral Renal Lymphosarcoma in a Dog

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**ABSTRACT.** A lymphosarcoma originating from kidneys, which metastasized to the ovaries, oviducts, heart and pancreas, was pathologically diagnosed in a 3-year-old female Japanese dog (Shiba dog). Clinically, the dog exhibited vomiting, diarrhea, oliguria and abdominal enlargement, associated with hypoglycemia. Grossly, the kidneys were enlarged and neoplastic masses were also seen in the ovaries and heart. Histologically, a majority of glomeruli and renal tubules were obliterated due to diffuse invasion by tumor cells. There were no metastatic lesions in the mesenteric and tracheobronchial lymph nodes, spleen and bone marrow. Most of the tumor cells were small- to medium- sized lymphoid cells with a large nucleus and scanty cytoplasm.—**KEY WORDS:** canine, kidney, lymphosarcoma.

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Lymphosarcoma (LSA) is a common tumor in domestic animals, and is anatomically classified into multicentric, thymic, alimentary, cutaneous and solitary types [7]. In dogs, the multicentric and alimentary types predominate [3, 5, 7], though the former is more common. However, the thymic, cutaneous and leukemic types are uncommon. LSA lesions in kidneys are frequent in cats, cattle, and chickens, but not in dogs although metastatic lesions can occur in this species [7, 8]. The organs or tissues affected in canine LSA are the liver, lung, spleen, lymph nodes, thymus, muscle, mediastinum, adrenals, alimentary tract, skin, central nervous system, spinal cord and bone marrow [1, 9, 10].

The purpose of this report is to present a case of lymphosarcoma originating from the kidneys with metastasis to ovaries, heart and pancreas, which are rarely involved in dogs. It was also interesting to note that the usual target organs, like the liver, lymph nodes, spleen and bone marrow did not reveal any neoplastic changes in this case.

The case was a 3-year-old female, Japanese dog (Shiba dog), weighing about 7.0 kg. Clinical signs included vomiting, diarrhea, and ascites. Other clinical parameters included Glucose 65 mg/dl, BUN 87 mg/dl, creatinine 1.65 mg/dl, AST (GOT) 78 IU/l, ALT (GPT) 6 IU/l, PLT  $6.2 \times 10^4/\mu\text{l}$ ,  $\text{Na}^+$  138 mEq/l,  $\text{K}^+$  4.2 mEq/l,  $\text{Ca}^{++}$  10.4 mEq/l, WBC  $425 \times 10^2/\mu\text{l}$  (eosinophils 3%, neutrophils 38%, lymphocytes 20%, monocytes 39%), RBC  $1,121 \times 10^4/\mu\text{l}$ , oliguria, and hematuria. She had persistent hypoglycemia. The condition of the dog deteriorated during the 14 days from admission to the clinic until death. LSA was not clearly diagnosed until death, although swelling of the kidneys and ovaries was observed ultrasonically and some abnormal cells were seen in smear slides from ascites.

The kidneys, measuring about 9 cm × 6 cm, were yellowish-white in color and soft in consistency (Fig. 1), and a blood clot was present in the right renal pelvis. The left pelvis was enlarged and hydronephrotic. Similar neoplastic masses varying from 0.5 cm to 2.0 cm in diameter were also found in the lungs, heart and ovaries (Fig. 2). The neoplastic tissue invaded the adjacent normal tissue and on cut surface the boundary between the two was indistinct. Hemorrhagic foci were detected in the pancreas (Fig. 3). Neoplastic foci in the alimentary



Fig. 1. Enlarged kidneys. L; left and R; right.

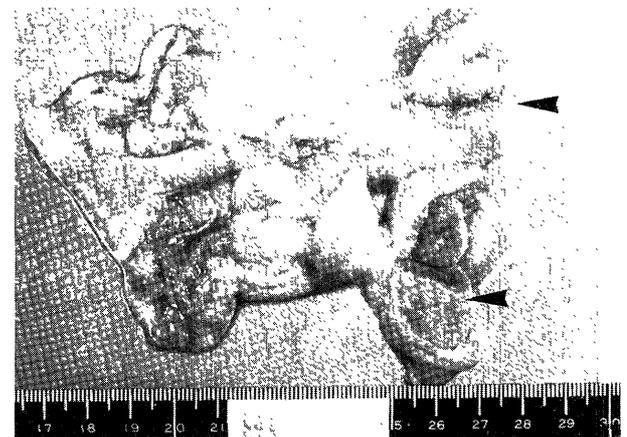


Fig. 2. Neoplastic proliferation in the right (top) and left (bottom) ovaries (arrows).

tract, seen mainly on the serosal membranes, were reddish-brown in color, variable in size, and either round, ellipsoid or polygonal in shape. The liver was slightly enlarged, fragile in consistency, yellowish-brown in color, and congested. None of the lymph nodes (especially mesenteric and tracheobronchial lymph nodes), spleen, bone marrow, adrenal glands, brain, spinal cord and skin had any gross neoplastic changes. Tissues were fixed in 10% formalin, and processed routinely for hematoxylin and eosin (HE) staining.

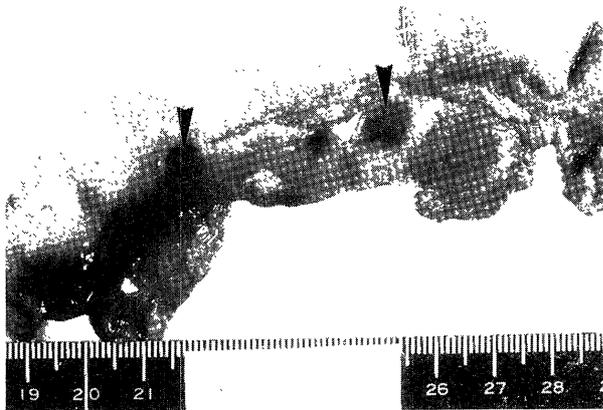


Fig. 3. Swelling with hemorrhagic foci in the pancreas (arrows).

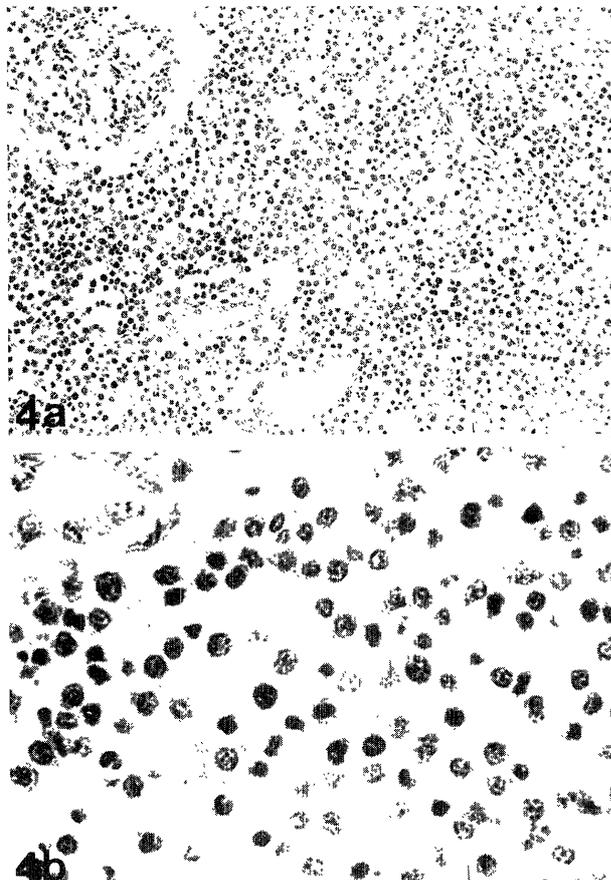


Fig. 4. Kidney. The renal tissue is replaced by tumor cells in 4a ( $\times 50$ ). The characterization of the tumor cells in 4b ( $\times 200$ ). HE stain.

Histopathologically, most parts of the renal tissues were replaced by the proliferating tumor cells arranged in diffuse, irregular sheets (Fig. 4a). Most of the tumor cells were small- to medium- sized lymphoid cells characterized by large darkly stained hyperchromatic nucleus with prominent nucleoli and scanty cytoplasm (Fig. 4b). Mitotic figures were seen in some neoplastic cells. Diffuse infiltration of tumor cells was noted in the cortex and medulla of the ovaries, alveolar septa and peribronchial

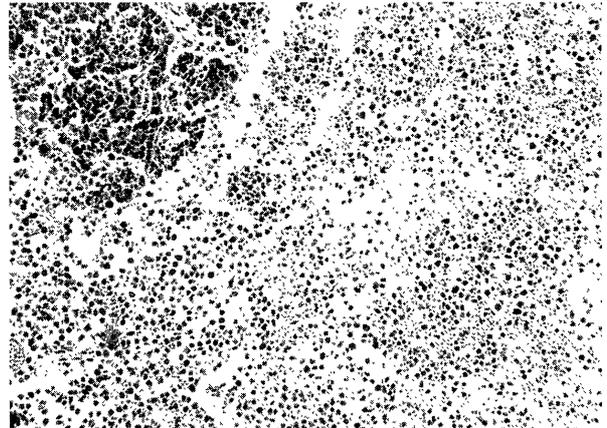


Fig. 5. Pancreas. Note tumor cell infiltration with hemorrhage ( $\times 50$ ). HE stain.

regions of the lung and interstitial tissue of the heart. Tumor cells extended from the lamina propria to the muscularis of the oviducts and were seen only in the subserosa in the alimentary tract. The pancreas revealed diffuse infiltration of tumor cells with hemorrhage (Fig. 5). The pattern and morphology of the tumor cells in these location was similar to that in the kidney. Chronic congestion of the liver was characterized by fibrosis around the central vein, sinusoid expansion with accumulation of red blood cells, widening of Disse's spaces and vacuolar degeneration of the hepatocytes. There was no neoplastic lesion in the liver and other organs like the lymph nodes, spleen, bone marrow, adrenal glands, brain, spinal cord and skin.

On the basis of the anatomical and histological characteristics of this tumor and, in accordance with the criteria of Jarrett and Mackey [6], we considered it to be a primary LSA. We could not find any report on renal LSA in young dogs. The neoplastic lesions of this case were observed in the kidney, heart, pancreas, ovaries, oviducts, and serosa of alimentary tract. It has been reported that the liver, lymph nodes and spleen are commonly involved in cases of canine LSA, the most common being the multicentric type involving lymph nodes [2-4, 8]. We searched for tumor cells in these tissues by wide spread sampling, but of no avail. This case was a diffuse LSA of small- and medium- size cell types, although the intermediate and large cell types are most common in dogs [7]. The dog investigated in this report was 3-year-old, much younger than the common 6- to 7-year-old category reported by Valli [8]. LSA can occur in many tissues, although it has been classified into multicentric, thymic, alimentary, cutaneous and solitary types. The case reported here does not fit into any of these types. In alimentary LSA, there are obvious tumor lesions with digestive tract which may originate from gut associated lymphoid tissue (GALT) and easily metastasize to the liver, spleen and mesenteric lymph node. We could not detect tumor cells in the GALT, liver and spleen in this case, although they metastasized to the ovaries, oviducts and pancreas. We

conclude the primary site to be the kidney because it has the most remarkable tumor lesions associated with necrosis of renal tissues.

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