

Visceral Lymphosarcoma in a Dog

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개의 淋巴肉腫의 일례보고

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초 록: 3주간에 걸쳐 심한 수척, 열노, 질루, 구토증상과 頸部腫瘍가 축진된 18개월령 암컷의 Great Dane개가 임상적으로 검사되고 사후에 부검되었다. 頸部腫瘍의 주사침 생검에서 관찰한 세포 소견에서 종양세포가 대식구 유래임을 짐작하였고 종양조직 표본에서도 주요 구성세포는 조직구의 특성을 나타내고 있었다.

육안적으로는 입과결, 편도선 및 비장에서 큰 결정상의 종양괴를 확인하였다. 이상과 같은 종양의 생검 및 조직소견과 육안소견의 특징에서 본 종양에는 다중심성으로 발생한 조직구성 淋巴肉腫으로 진단되었다.

Introduction

Lymphosarcoma is one of the most frequently occurring tumors in dogs, accounting for 5-7 per cent of all canine cancers.⁹⁾ Dorn *et al.*⁴⁾ reported an estimate of annual incidence as 24 per 100,000 dogs. Squire *et al.*¹¹⁾ in a prospective study of 100 naturally occurring canine lymphomas, reported that majority of dogs were presented clinically in stage III, and were classified histologically as stem cell type or histiocytic type.

There have been only a few reports on canine lymphosarcoma in this country.^{8,13)} Authors diagnosed a dog with lymphosarcoma clinically by needle aspiration smear of the palpable cervical mass and radiography of the abdominal mass. The clinical and histopathological findings of the dog were reported.

Materials and Methods

Animal inspected: An eighteen months old, female, Great Dane with prolonged anorexia and cachexia was presented to the Animal Hospital, College of Veterinary Medicine, Seoul National University on May 20, 1983.

Clinical examination: Routine physical and hematological examinations, radiography of the abdomen were performed. Needle aspiration smear of the palpable mass on the left upper cervical area was made and stained with Wright stain.

Histopathological examination: The patient died of the malignancy was necropsed. The tissues of the lymph nodes, spleen, tonsil, liver, kidney, adrenal gland, gastro-intestinal tracts, urinary bladder, prostate gland, ovary, lung and heart were fixed in 10% buffered formalin. Paraffin-embedded sections were

prepared and stained with hematoxylin and eosin for microscopic observation.

Results

Clinical findings: The dog had anorexia, depression, dehydration, severe emaciation, vaginal discharge, blood feces, vomiting, hematuria when it was initially presented to the hospital. There were the palpable masses in the abdomen and upper left cervix. Hematological parameters of the dog were within normal range, but slight inflammatory reactions (Table 1).

Table 1. Hematologic Findings of the Dog with Lymphosarcoma

Packed cell volume(%)	61
Leukocyte count (per microliter)	18,250
Plasma protein (g/100ml)	8.39
Fibrinogen (mg/100ml)	600
Plasma protein: Fibrinogen	13 : 1
Differential count of leukocytes(%)	
Neutrophil, segmenter	75
stab	8
Eosinophil	3
Lymphocyte	14
Monocyte	0

The radiography of the abdomen figured an extensive mass occupying large part of the abdominal cavity (Fig. 4).

Needle aspiration smear of the cervical mass revealed many immature lymphoid cells. The nucleus of the cells were characterized by either finely particulated chromatin pattern or coarsely reticulated chromatin pattern (Fig. 1,2). They had distinct nucleoli which were either central or eccentric (Fig. 1,2). The cells had relatively broad and indistinct cytoplasm, and distinct cytoplasmic vacuoles (Fig. 1,2).

Gross pathologic findings: The abdominal cavity contained a considerable quantity of watery blood stained fluid. The lymph nodes of the mandibular, pharyngeal, cervical and iliac regions were enlarged moderately. These enlarged neoplastic nodes were vary in diameter from two to four cm and showed soft consistency. Two groups of the tumor masses were noted at the spleen and the pelvic region(Fig. 3).

The spleen showed extreme enlargement with tumor masses (Fig. 3). A pale, fairly firm nodular mass (9×16×12cm) containing area of hemorrhage was in the head of the spleen and a similar mass (10×8×6cm) was in the tail of the organ. Both masses were surrounded by fibrous capsule. The cut surface of the tumor masses were composed of pale yellowish grey lobules of fairly firm tissue with several cysts ranged 4 to 5 cm in diameter containing cloudy, bloody fluid or necrotic debris.

A separate tumor masses composed of multiple pale well-circumscribed nodules from 5 to 9 cm in diameter was attached firmly to pelvic peritoneum and the urinary bladder (Fig. 3). The urinary bladder mucosa was thickened and reddened intensely, and exhibited gelatinous appearance. The urinary bladder contained bloody urine.

A similar mass 10×6×4cm in diameter was in the upper cervical area. The cut surface to of the mass was pale and firm in consistency, and had lobular pattern by fine discrete fibrous septa. The tonsils were reddened and formed irregularly protruded patches from the pharyngeal mucosa. There was no gross neoplastic change in the other organs.

Histopathologic findings: Microscopically, the tumors were characterized by massive solid proliferation of lymphoid cells displacing original tissue structure. With early involvement of the neoplastic process in the several lymph nodes, there were cords or sheets of the reticular cell proliferation through the lymphatic sinuses, lymphatic nodules or paracortical area resulting in to cortical or medullary effacement (Fig. 5). In these nodes follicular aggregation of the neoplastic cells were not detected but diffuse and cord like invasion of atypical lymphoid cells in the medullary cord or the lymphatic sinuses (Fig. 6). The histologic appearance of the tumor in the cervical area was of complete displacement of original architecture of the lymph node by the tumor cells.

The tumor consisted of the atypical large lymphoid cells mixed with fine trabecula of fibrous tissue(Fig. 9). The tumor cells displayed marked pleomorphism having in common a large pale nucleus and finely precipitated or reticulated chromatin, and eosinophilic cytoplasm (Fig. 10). Cytoplasm was abundant of ten

with indistinct margin. The tumor cells with distinct border had angular outline.

The tumor mass of the spleen showed variety in arrangement of tumor cells. Majority of the mass were composed of network of the histiocytic cells and fibrous trabeculae. Another pattern was seen as palisading arrangement around small blood vessels (Fig. 8). Where the neoplastic tissue invaded the splenic pulp the sinusoidal patterns were retained and the cords or sheets of the tumor cells were filled in the sinus (Fig. 7).

In the tonsils, massive proliferation of the tumor cells replaced most of the original lymphoid tissue showing clear demarkation between the tumor tissue and the intact lymphoid tissue (Fig. 11, 12).

Discussion

In this canine lymphosarcoma case the tumor was encountered predominantly in the lymph nodes, tonsils and spleen. The cervical tumor mass and the pelvic tumor mass might be originated from the cervical lymph node and the iliac lymph node respectively.

By Anderson *et al.* the major forms of lymphosarcoma in animals were grouped according to anatomical locations of tumor involvement. According to this category the tumor case observed by the authors was defined as a multicentric type.

Cotchin⁸⁾ described that the earliest involvement in the multicentric form was claimed to be the lymph node of the throat and neck. The large cervical tumor mass observed early on onset of clinical symptoms might be responsible for tumor development as a primary involvement of the neoplastic process.

Jarrett and Mackey⁷⁾ proposed cytologic classification of lymphoid tumors as stem cell, histiocytic, lymphoblastic and lymphocytic types. The tumor cells observed in this case closely resembled the lining cells of the cortical sinuses of the lymph node and displayed characteristics of the histiocytic type of lymphosar-

coma. Squire *et al.*¹¹⁾ commented that the histiocytic type was the secondly frequent pathologic classification, and this group had the highest per cent remission and the most longest mean survival periods.

Since Rappaport and Braylan¹⁰⁾, and Gall⁵⁾ proposed to classify the large cell lymphomas as histiocytic type the tumors of macrophages are still maintained as the histiocytic type. The prominent cytoplasmic vacuolation observed in the aspiration smears of the cervical tumor mass would be evidence of phagocytosis which suggests that this tumor was of macrophage origin.

In the splenic, tonsillar tumors and the lymph nodes with early involvement of tumor process, follicular aggregation of the tumor cells were not found. The discrete nodular tumor masses in these organs might have diffuse pattern of tumor involvement. Follicular form of tumor development has been recognized rarely in the dog.^{6,11)}

The Veterinary Cancer Society has adopted the clinical staging system advocated by WHO.²⁾ On regarding of the clinical stage of this tumor case with generalized lymph node, tonsillar and splenic involvement could be outlined as stage IV.

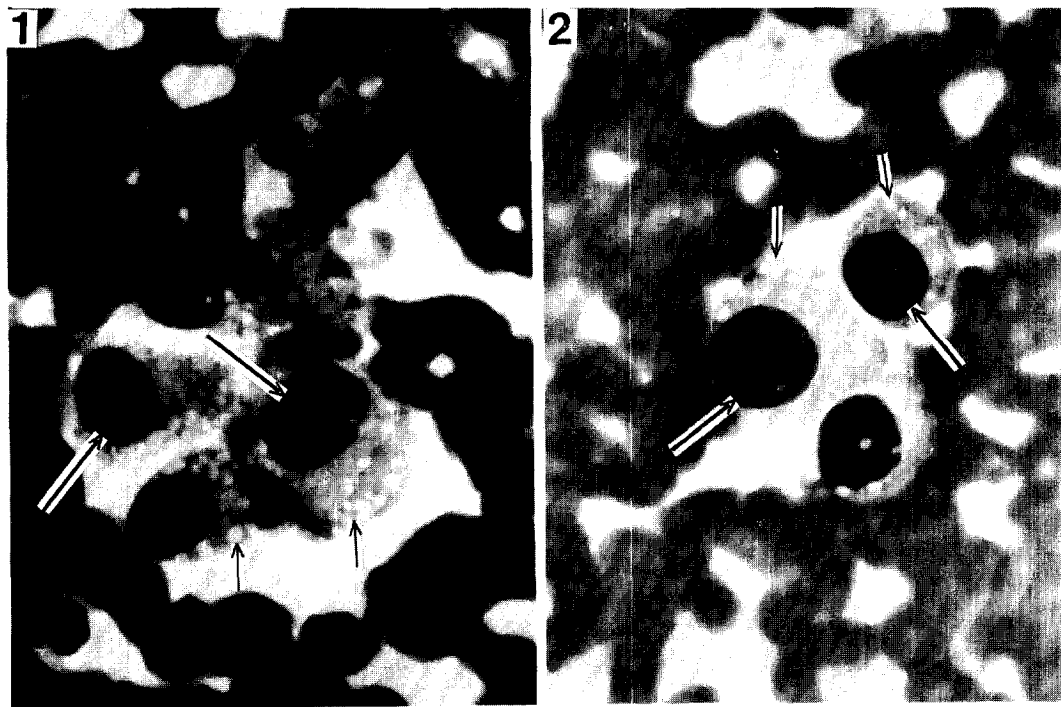
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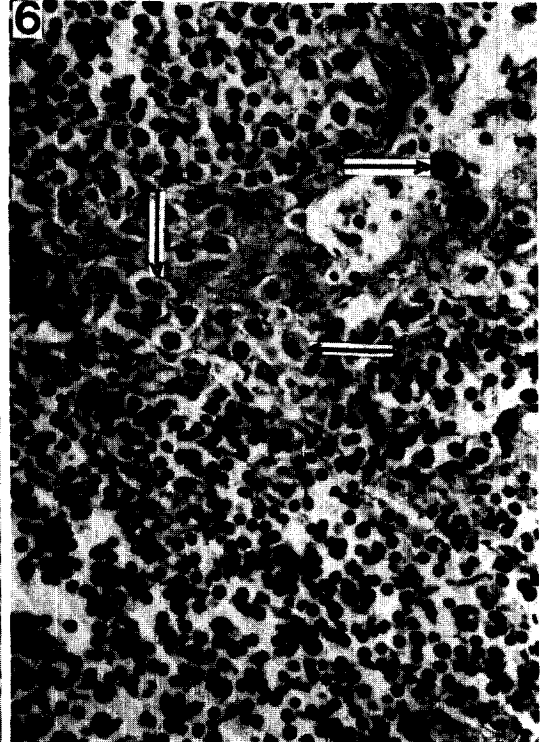
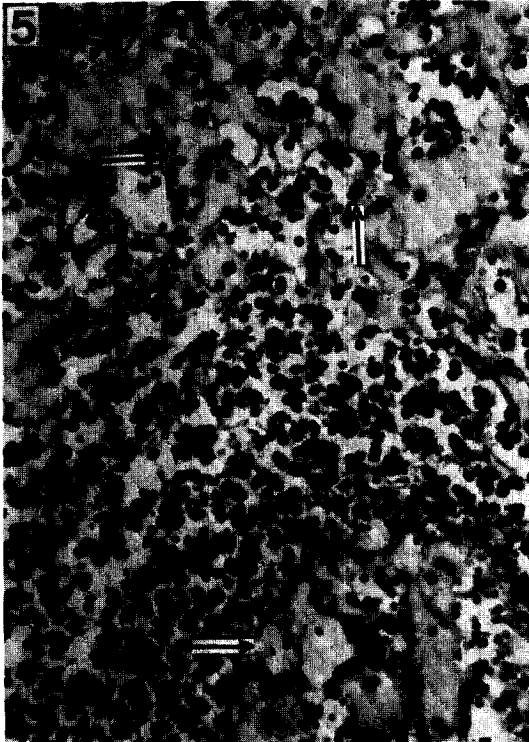
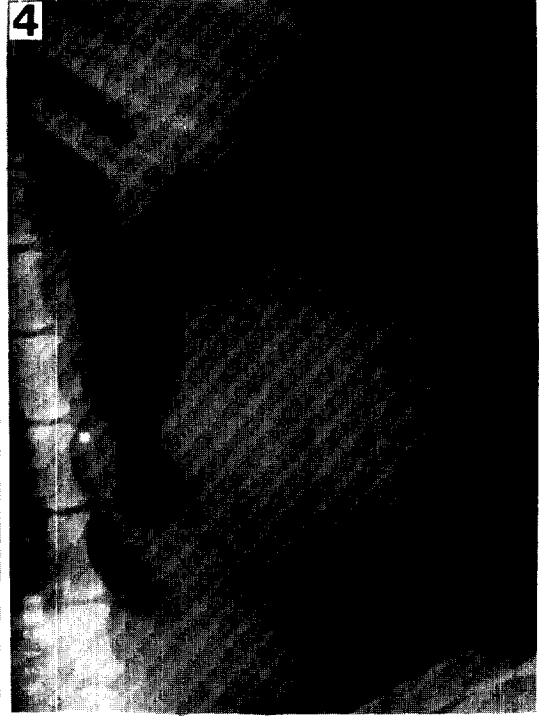
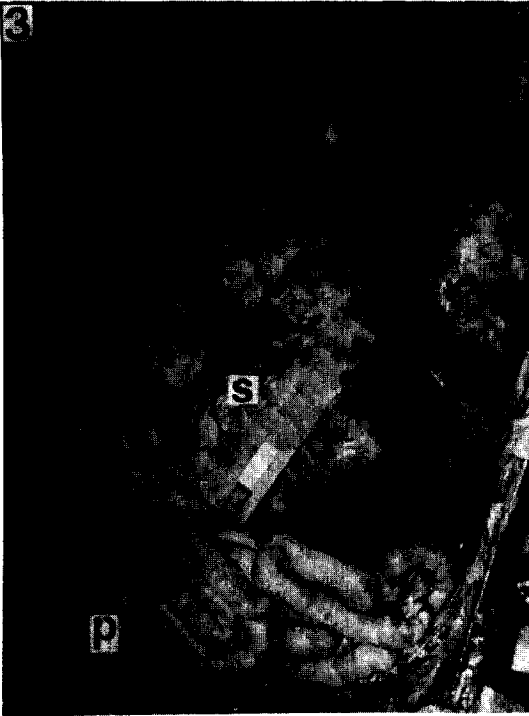
An eighteen months old, female, Great Dane dog which had shown signs of severe cachexia, dehydration, hematuria, vomiting and the palpable cervical mass during three weeks was examined clinically and necropsied after death. Diagnosis of this tumor case was made by gross pathology, cytology of the aspirate, radiography of the abdomen and the tumor tissue as multicentric, histiocytic lymphosarcoma. Cytologic findings of the needle aspirate of the cervical lesion were typical of macrophage origin cell. The tumor was encountered predominantly in the lymph nodes, tonsils and spleen. The predominant cell type of these tumor masses manifested characteristics of histiocytic cells.

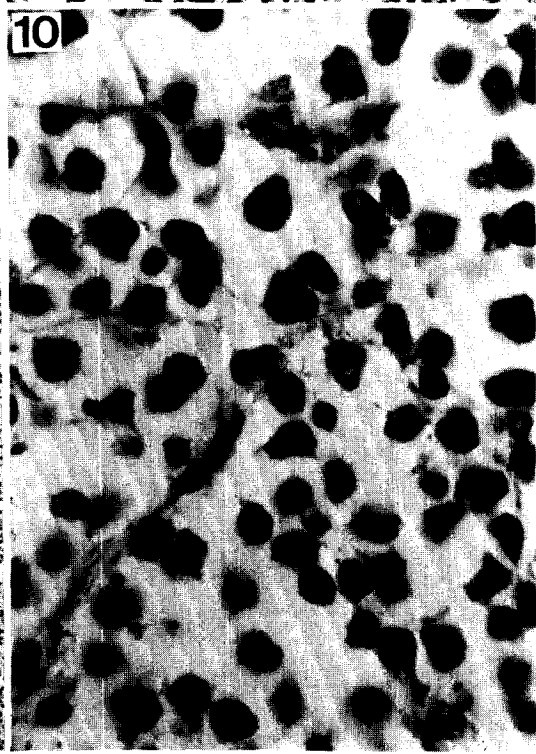
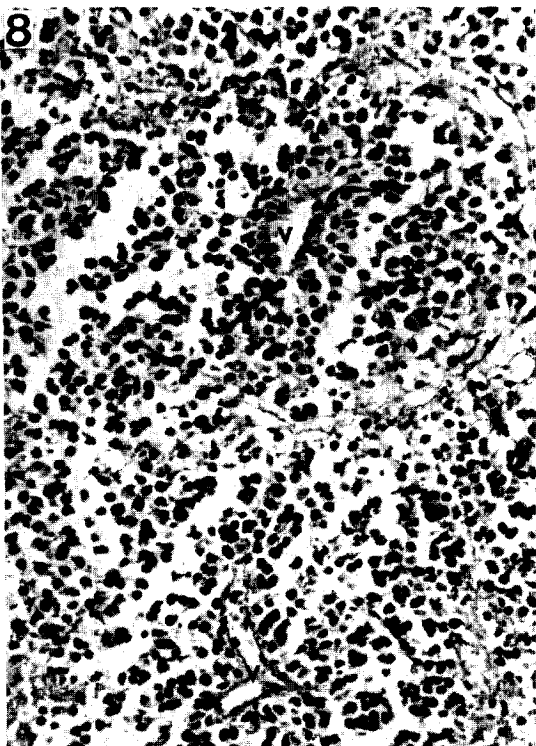
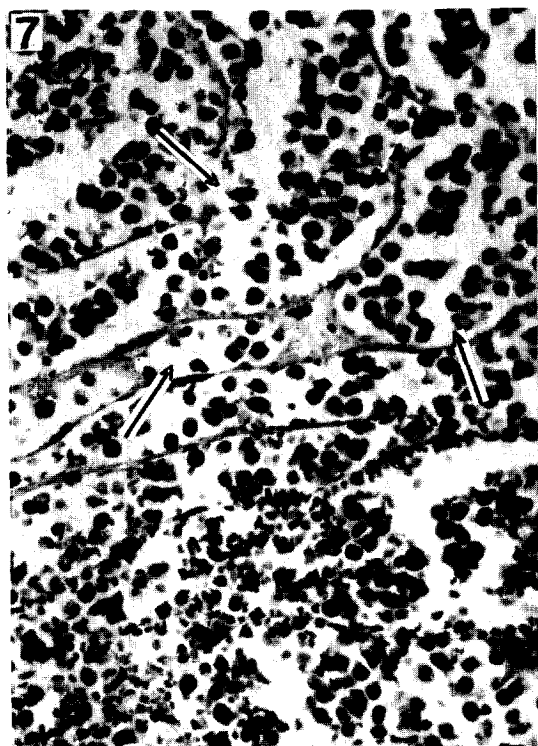
Explanation for Figures

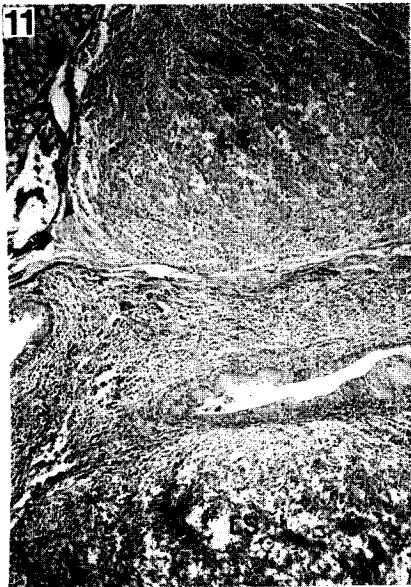
Fig. 1. Needle aspirate of the cervical lesion from a dog showing presence of macrophage like cells with predominant nucleoli, coarsely reticulated chromatin (long arrows) and cytoplasmic vacuolation (short arrows). Wright stain, $\times 1,000$.

- Fig. 2.** Aspiration smears of the cervical lesion showing tumor cells characterized with finely particulated distribution of chromatin (long arrows) and cytoplasmic vacuoles (short arrows). Wright stain, $\times 1,000$.
- Fig. 3.** The large tumor masses of the spleen (S) and the pelvic region (P).
- Fig. 4.** Abdominal radiograph demonstrates extensive involvement of the tumor in the abdomen.
- Fig. 5.** A lymph node with early involvement of the neoplastic process shows diffuse proliferation of reticular cells in the cortex (arrows). Hematoxylin and eosin (HE) stain, $\times 200$.
- Fig. 6.** A lymph node with early stage of the neoplastic process shows cords like involvement of atypical large lymphoid cells. HE stain, $\times 200$.
- Fig. 7.** The splenic sinuses involved with neoplastic change contain aggregation of atypical lymphoid cells (arrows). HE stain, $\times 200$.
- Fig. 8.** The splenic tumor showing palisading arrangement of the tumor cells around small blood vessels (V). HE stain, $\times 150$.
- Fig. 9.** The lymphosarcoma composed of network of atypical lymphoid cells (LS) and fibrous trabeculae (T). HE stain, $\times 80$.
- Fig. 10.** Higher magnification of Fig. 9 showing pleomorphic tumor cells with prominent nucleoli and distinct or indistinct cell border. HE stain, $\times 1,000$.
- Fig. 11.** Areas of tumor tissue (LS) in the tonsil shows diffuse proliferation of the cells replacing the tonsillar lymphoid tissue. HE stain, $\times 40$.
- Fig. 12.** Higher magnification of Fig. 11 shows clear demarkation between the tumor tissue (LS) and the intact lymphoid tissue (L). HE stain, $\times 200$.









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