Renal Lymphoma with Mesenteric Lymphomatosis in a Cat


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(Received: May 07, 2020 / Revised: June 25, 2020 / Accepted: July 06, 2020)

Abstract: A 6-year-old castrated male Russian Blue cat was presented for evaluation of dyschezia. Abdominal ultrasound revealed hyperechoic nodules in both kidneys, heterogeneous mass in abdomen, and extensive mesenteric thickening with multiple hypoechoic nodules. Computed tomography showed multiple hypodense lesions in both kidneys and diffuse nodular infiltration around the mesentery. Fine needle aspirates (FNA) acquired under ultrasound guidance from the mesentery consisted of large lymphocytes which have round to irregular nuclei with granular chromatin, prominent nucleoli and a small amount of basophilic cytoplasm. Polymerase chain reaction (PCR) for antigen receptor gene rearrangement result of FNA sample revealed a T-cell malignancy. The cat died from acute renal failure after 1 cycle of modified Madison-Wisconsin L-CHOP protocol. Postmortem examination revealed bilaterally enlarged lumpy-bumpy shaped kidneys. Histopathologic examination showed an infiltration of malignant lymphocytes into the renal parenchyma and mesentery. Immunohistochemical staining of the renal sample displayed a negative expression of CD3, PAX5, MUM-1, and CD79. The clinical features and prognosis of the cat with renal lymphoma with mesenteric lymphomatosis have been described in this report.

Key words: feline, lymphoma, acute renal failure, lymphomatosis.

Introduction

Lymphoma is one of the most common lymphoproliferative disorders, representing 50 to 90% of all hematopoietic tumors in cats (27). Among lymphomas, renal lymphoma is the second most extranodal lymphoma in cats (26). It can be presented as primary renal lymphoma or occur concurrent with other alimentary lymphomas (11,25). In general, more than half of cats with renal lymphoma have signs of renal insufficiency (13).

In spite of the high prevalence of feline lymphoma, peritoneal dissemination of lymphoma (lymphomatosis) has been rarely reported. The mechanism of invasion is unknown since there is no lymphoid tissue in peritoneum as previously described (14). Most renal lymphoma constituted a B-cell immunophenotype (6). In humans, non-B non-T lymphomas are referred to lymphoma lacks both b-cell and t-cell markers, which usually exhibit poor prognosis (9). This report describes a cat with renal lymphoma with mesenteric lymphomatosis, which showed negative expression to both B-cell and T-cell markers.

Case

A 6-year-old castrated male Russian Blue cat presented with dyschezia. A physical examination revealed low body condition score (2/5) and mass was palpated by abdominal examination. There were no remarkable findings in complete blood cell count, peripheral blood smear, and serum biochemical tests. Abdominal radiograph exhibited ill-defined round soft tissue opacity mass cranial to bladder (Fig 1). The following are abdominal ultrasonographic findings of the cat (Fig 2). The mass contained heterogeneous echotexture with mixed echogenicity and irregular discontinuous margin, which...
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infiltrated to mesentery. The mesenteric serosal border of this case was irregular and poorly ill defined, and coalesced with thickened hypoechoic and/or anechoic mesenteric tissues. Additionally, multiple discrete-to-coalescing hypoechoic lesions were observed in the visceral and parietal peritoneum. Hyperechoic nodules in both kidneys were also detected. Ultrasound guided fine-needle aspirate of the mesenteric lesion showed large atypical round cells with basophilic cytoplasm, irregular nuclear membrane (Fig 3). According to cytologic evaluation, it was considered that the abdominal mass was originated from malignant lymphoid tissues. Thus, polymerase chain reaction for antigen receptor rearrangement (PARR) was conducted to determine cell lineage and assess clonality to distinguish neoplastic from inflammatory lymphoid cells. Computed tomography (CT) was performed to evaluate local or distant metastasis, and set therapeutic plan appropriate to this cat.

CT revealed the abdominal mass, and diffuse nodular infiltration around the mesentery. Multiple hypodense lesions were found in both kidneys (Fig 4). Molecular clonality PCR testing by capillary electrophoresis of FNA sample showed monoclonal expansion of T cells.
Thus, high grade T-cell lymphoma was tentatively diagnosed.

Because of biologic aggressiveness, surgical removal of the mass was not considered. Instead, oral chlorambucil (2 mg/cat PO EOD) and prednisolone (initially 2 mg/kg PO daily, reduced to 1 mg/kg EOD) chemotherapy was initiated. During 1 month after chemotherapy, ultrasonographic findings showed gradual decrease in mass size. However, lymphoma was relapsed on day 54. Thus, Modified Madison-Wisconsin L-CHOP protocol was used as rescue chemotherapy. After 1 cycle of L-CHOP protocol, abdominal mass completely disappeared in abdominal ultrasound. However, irregular lumpy-bumpy shape and hypoechoic subcapsular thickening was detected in bilateral kidney. Hematological examination showed anemia (HCT 22.6%; reference, 25.0-50.0%), and serum biochemical profiles revealed increase in serum creatinine concentration (4.05 mg/dL; reference, 0.8-1.8 mg/dL). Despite aggressive fluid therapy, this cat died in day 91.

Postmortem examination revealed bilaterally enlarged kidneys. There were multifocal, nodular lymphomatous infiltrates throughout the cortex, which was swollen (Fig 5). Histopathological examination revealed malignant lymphocytic infiltration in both kidneys and mesentery (Fig 6). Thus, renal lymphoma was diagnosed, which have metastasized to the mesentery. Immunohistochemical staining (IHC) of the biopsy sample of the kidney showed a negative expression with markers of both B cell and T cell: 1) PAX5 (Clone 24/Pax5; BD Biosciences, San Jose, CA, USA); 2) MUM1 (Clone MUM1p; Dako, Tokyo, Japan); 3) CD79 (Clone HM57; Dako) and T cell marker: CD3 (Dako).

Among extranodal lymphoma, lymphoma in kidney is the second most common form (26). However, there are little information on the immunohistologic classification of renal lymphoma; In a previous study (6), majority constituted a B-cell immunophenotype. And, in Australia (6), most renal lymphoma was B-cell type and intermediate to high grade. However, in this case, PARR result of mesenteric FNA sample revealed T-cell malignancy, and IHC result of kidney sample showed a negative expression with markers of both B cell and T cell. Previous studies (21,22) described feline gastrointestinal large granulocyte lymphocyte (LGL) lymphoma cases which were nonreactive for both B- and T-cell markers. Feline non-B non-T LGL lymphoma is usually assumed to be a NK cell lymphoma because NK cells lack CD3 and T-cell receptor. However, there is no specific marker for feline NK cells, thus confirmation of cell origin is not feasible. PAX5 expression is used to differentiate the classic form from the atypical form in hodgkin lymphoma of humans, and people who lacks PAX5 expression has a less favorable prognosis. (5,8). Although it can be assumed that lack of PAX5 expression acts as a poor prognostic factor in feline lymphoma also (24), further studies are necessary to support this assumption. And, although IHC can be a valuable tool, a negative stain does not always exclude a specific cell type because technical difficulties or tumor cell dedifferentiation can cause loss of expression of expected proteins or markers, and it may result in a negative stain (4). Moreover, PARR was

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Fig 5. Postmortem findings of the cat diagnosed as renal lymphoma with mesenteric lymphomatosis. (A) Grossly, kidney was lumpy-bumpy due to multiple nodules. (B) When decapsulated, bilateral kidney showed severe congestion. (C) Multiple nodules were detected throughout the mesentery.

Fig 6. Histopathologic findings of the cat diagnosed as renal lymphoma with mesenteric lymphomatosis. (A) Malignant lymphocytes invaded around the left renal tubule, glomerulus, and collecting duct. (B) Neoplastic lymphocytes in kidney showed remarkable anisokaryosis and anisocytosis. (C) Diffuse invasion of malignant lymphocytes throughout the mesentery (H&E, original magnification 40x. (A, C) and 400x (B). Bar = 200 µm (A, C) and 20 µm (B)).
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Conclusions

This report describes the cat with an abdominal mass diagnosed as primary renal lymphoma and mesenteric metastasis. In this case, the chief complaint was dyschezia, which was caused by abdominal mass. However, the cat died from acute renal failure in spite of removal of abdominal mass. Although peritoneal lymphomatosis is rare in feline lymphoma, it should be included as a differential diagnosis in cats with other nodal or extranodal lesions. In addition, precise diagnosis including histopathologic evaluation of kidney is needed to early detection of acute renal failure when there are lesions in the kidney. Finally, negative expression of both B-cell and T-cell surface markers may be related to poor prognosis in cats.

Acknowledgements

This research was supported by the Bio & Medical Technology Development Program of the National Research Foundation (NRF) funded by the Korean government (MSIT) (2016M3A9B6903437). The authors thank to Dr. Woo-chang Jeong for excellent imaging support and Dr. Soo-hyeon Kim for histopathology services. The authors thank to Pobanilab Laboratories (Guri-si, Gyenggi-do, Korea) for molecular diagnostic services.

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