



## Lymphocytic Leukemia in a Golden Retriever Dog: A Case Report

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### Abstract

*Acute lymphocytic Leukemia was diagnosed in a seven year old, male, golden retriever dog that was presented with clinical signs such as anorexia, exercise intolerance, edema of hind limbs, edema of scrotum, tachycardia and pale mucus membranes. The case was diagnosed based on hematology and cytology of buffy coat. Blood smear and buffy coat smears revealed 100% lymphocytosis with lymphoblasts and prolymphocytes and complete absence of other leukocytes.*

**Key Words:** lymphocytic leukemia, canine, diagnosis, lymphoblasts, prolymphocytes

### I. INTRODUCTION

Leukemia is presence of malignant cells of hemolymphatic origin in the blood and bone marrow. In dogs, the most commonly encountered form of leukemia is lymphocytic leukemia where neoplastic lymphocytes are present in peripheral circulation. Although the cause of primary leukemia in dogs is unknown, the pathogenesis appears to involve critical hematological components, particularly leukemia initiating cells which develop as a result of age-related and breed-predisposed genetic mutations in hematopoietic stem cell lines that overwhelm the pituitary production of leukemia inhibitory factor. These leukemia initiating cells consequently invoke changes in matrix metalloproteinases and vascular endothelial growth factors which cause most of the hemodynamic features of the disease (1).

### II. CASE REPORT

Acute Lymphocytic leukemia was diagnosed in a seven year old, male, Golden retriever dog that was presented to Teaching Veterinary Clinical Complex, NTR college of Veterinary Science, Gannavaram. The clinical signs in the present case were anorexia, exercise intolerance, edema of hind limbs and scrotum, tachycardia and pale mucus membranes. Radiography and ultrasonography of the thorax and abdomen revealed cardiomegaly, hepatomegaly and splenomegaly with large intestinal flatulence. Similar clinical findings were reported by other authors (2&3) in their studies on Acute Lymphoblastic Leukemia in canines. Hematology revealed severe anaemia, severe leukocytosis, neutropenia, eosinopenia, thrombocytopenia and lymphocytosis (Table.1). Blood smear revealed large number of lymphocytes with moderate degree of pleiomorphism, irregular shaped nuclei, with densely clumped chromatin and prominent nucleoli which are characteristics of prolymphocytes (Fig. 1). There is complete absence of platelets and other type of leukocytes. Smear of buffy coat also revealed large number of lymphoblasts with prominent nucleoli and absence of other type of leukocytes. There was no evidence of blood parasitic infestation. Serum biochemistry revealed elevated levels of Blood urea nitrogen (BUN) and Alkaline phosphatase, hypoproteinemia and hypoalbuminemia.

Acute Leukemia arise from the neoplastic transformation and subsequent proliferation of early lymphoid precursor cells, leading to the arrest of normal cell lineage differentiation. The early blast cells proliferate in the bone marrow at the expense of normal hematopoiesis leading to anaemia, thrombocytopenia and severe leukocytosis (4). In the present case too, myelophthisis of bone marrow is the cause of severe anaemia and neutropenia manifested by severe pallor of visible mucous membranes and fever. The blast cells spill over into the blood and infiltrate the peripheral organs causing splenomegaly and hepatomegaly. Cardiomegaly might be due to consequence of hyperviscosity of blood.

Further, the present case is classified under acute lymphocytic leukemia based on the acute clinical signs seen since last 10 days, presence of pleiomorphic lymphocytes with heterogenous chromatin pattern and prominent nucleoli which are characteristic cytological features of prolymphocytes and lymphoblasts as reported by Couto (5).

The present case is differentially diagnosed from Lymphoma, characterized by severe lymphadenopathy (6) which is not a finding in the present case. Also, a pronounced lymphocytosis on the complete blood count is more consistent with lymphocytic leukemia unless it is stage V lymphoma with circulating neoplastic cells. Though bone marrow biopsy is a confirmatory test for leukemia, the extreme hematological findings and cytology are clear evidences of bone marrow myelophthisis due to leukemia (6)

In the present case, the prognosis was declared poor based on the extreme clinical and laboratory findings. Dogs with Acute lymphocytic leukemia will have very short survival times. They die from secondary infections attributable to reduced immunological responses and inability to produce circulating antibodies. The abnormalities are caused by a defective lymphocyte response (4). Follow up of present case revealed that the animal died after 15 days from the onset of clinical signs.

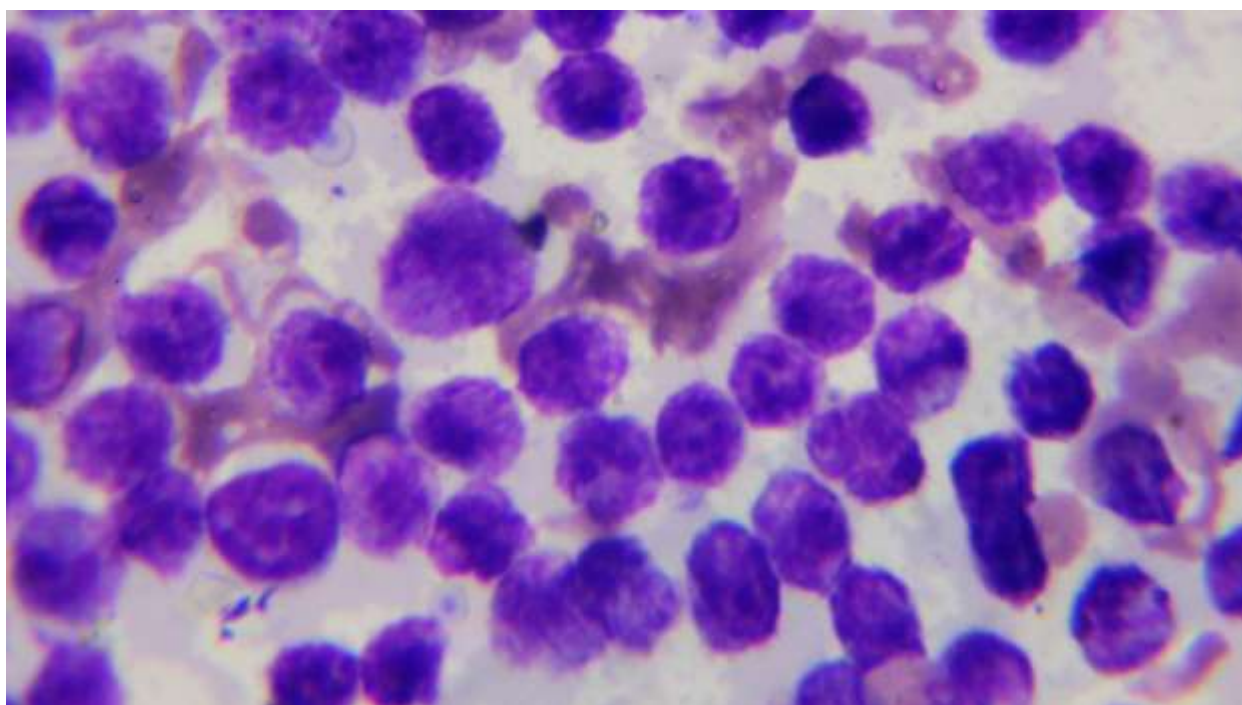
In conclusion, the course of acute lymphocytic leukemia is very rapid with an abnormal increase of immature lymphocytes hindering the production of other blood cells, posing an immediate threat to the patient's life.

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**Table 1. Hematology**

S. No.	Parameter	Result	Normal value
1.	Hb (g%)	2	12-18
2	PCV (%)	6	37-55
3	TEC (millions/cmm)	0.8	5.5-9.5
4	TLC (thousands/cmm)	192	6-17
5	Lymphocytes (%)	100	12-13
6	Neutrophils(%)	0	60-77
7	Eosinophils(%)	0	2-10
8	Basophils(%)	0	Rare
9	Monocytes(%)	0	3-10



**Fig.1: Blood smear showing large number of lymphocytes with moderate degree of pleiomorphism, irregular shaped nuclei with densely clumped chromatin and prominent nucleoli (Prolymphocytes). There is almost complete absence of RBCs, platelets and other leukocytes. Leishman's stain, 1000X.**

