Short Communication

AN OVERVIEW OF ACUTE LYMPHOID LEUKEMIA (ALL) IN A DOG

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Acute lymphocytic leukemia (ALL, also known as acute lymphoblastic leukemia, or acute lymphoid leukemia) is a proliferation of undifferentiated lymphocytes and is the most common cancer Leukemias are malignant neoplasms of hematopoietic stem cells arising in the bone marrow (Nelson and Couto, 1998). The prognosis with chemotherapy treatment is poor in canine and feline patients, and the average survival time is only a few months. If left untreated, the estimated survival time from diagnosis is less than two weeks (Waikart *et al*., 2007). ALL can occur at any age in animals, although it is more prevalent in young and middle-age populations (Meuten, 2002).

CASE HISTORY AND CLINICAL OBSERVATON : A 6-year old German shepherd male dog was presented to the clinic having history of sudden inappetence, dullness, weakness with diffuse distribution of wart like lesions all over the body. On clinical examination it showed fever (103.3^{0F}), diffusely spread colourless lesions expelling cheesy material on incision, muscle atrophy and emaciation. On palpation the submandibular lymph node was mildly swollen while other lymph nodes remained normal. Sudden onset of clinical signs, pancytopenia and systemic illness revealed Acute Lymphoid Leukemia (Lotter, 2003).

MATERIALS AND METHODS: The dog was restrained, and aseptic collection of blood was done in sterile EDTA vial and non- EDTA vials. The blood sample was centrifuged at 685x g for 15-18 minutes. For haematological analysis a uniform and thin blood smear was made on clean glass slide. The smear was air dried and stained with Leishman stain and observed under light microscope.

RESULT AND DISCUSSION: The clinical signs and symptoms shown by the dogs were vague and non-specific. Haematological analysis revealed anaemia, pancytopenia and severe leucocytosis. Microscopically, microcytic hypochromic anaemia was observed characterized by the uncontrolled proliferation of immature cancerous white blood cells in the bone marrow that normally would develop into mature white blood cells (with TLC of 128000/µl) (Figure 1).

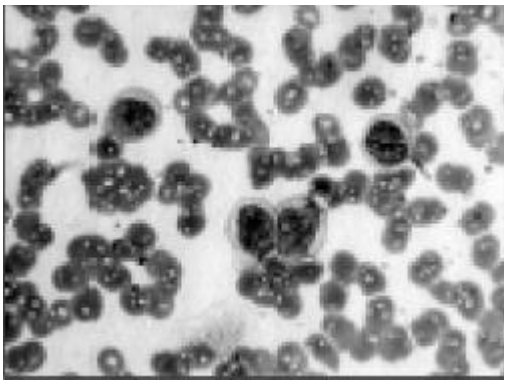

Fig.-1 Blood smear showing cell division of myeloblast.

Patients with ALL present most frequent signs of the uncontrolled growth of leukemic cells in bone marrow, lymphoid organ and other sites of extramedullary spread. Bone marrow involvement results in varying degrees of anaemia, thrombocytopenia and granulocytopenia that may be manifested by pallor, fatigue, petechiae, purpura or bleeding and fever (Stacey *et al*., 2001). The blood smear revealed large number of round lymphoid cells with decrease in platelet count (25000/µl) (Lotter, 2003) which indicated Acute Lymphoid Leukemia As precise classification of the leukemia depends upon the type of white blood cell whose growth has been arrested. In blood smear examination the predominant finding was monomorphic population of large sized (2-3 RBC's in size) lymphocytes with high nucleus:cytoplasm ratio with apparently no nucleoli (Kopla and Aizenberg, 1999). Intact cells had granular to fenestrated nuclear chromatin pattern (Figure 2). A few lymphocytes had indented nuclei. Plenty of lymphoblastic cells with large

nucleus were observed. These are “precursors” of normal mature leukocytes. Some of the lymphoid cells showed various stages of cell division (Figure 3). Lymphoblasts are large lymphocytes with a round nucleus and small amount of basophilic cytoplasm. They have fine granular chromatin and a visible nucleolus. ALL is often suspected after observation of moderate to high numbers of lymphoblasts in the blood. Definitive diagnosis however, requires bone marrow examination. Classically, greater than 30% of the nucleated bone marrow cells must be lymphoblasts to diagnose ALL. If spleen and lymph nodes are enlarged then their involvement is suspected. The most common sites of origin are lymph nodes but alimentary, splenic, thymic, mediastinal, renal and cutaneous lymphoma also occur (Latimer *et al*., 2003). As lymphoma progresses, the neoplastic lymphocytes may infiltrate the bone marrow and blood making it difficult to determine the site of origin. When lymphoma involves the bone marrow or peripheral blood, it is referred to as stage V lymphoma (Jones *et al*., 1997). Several factors may be used to differentiate ALL from stage V lymphoma. ALL is not associated with solid tissue masses (lymphadenopathy, splenomegaly, hepatomegaly), however, some cases of ALL may involve the liver and spleen. In cases with significant peripheral lymphadenopathy or hypercalcemia, lymphoma is more likely to be present.

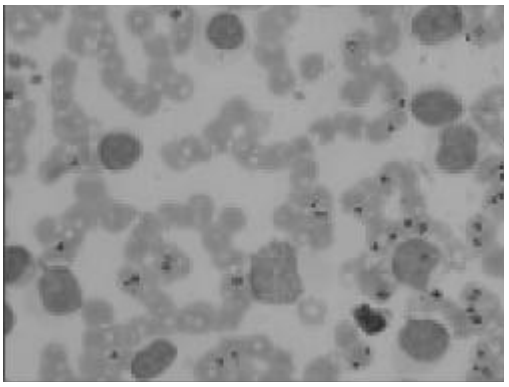

Fig.-2 Blood smear showing open type of lymphoblast and plenty of lymphoblast per high power field.

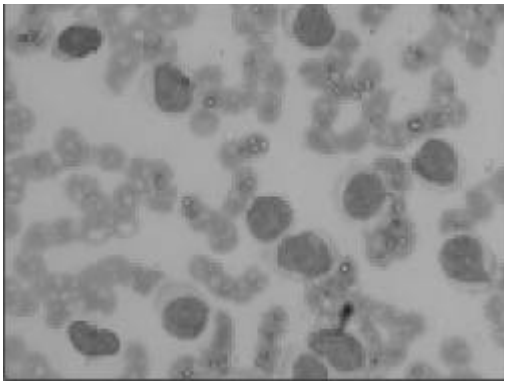

Fig.-3 Blood smear showing increase in nucleus to cytoplasm ration and plenty of lymphoblast per high power field.

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