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## Malignant histiocytosis in a dog: A case report

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#### Abstract

A 3 year old male German Shepherd was presented with a history of swelling on the submandibular region and was brought to Madras Veterinary College, Chennai-600 007 for postmortem examination. Necropsy examination revealed a 10-15 cm white lobulated mass on the right side of subcutis of the submandibular region. Internal examination revealed nodules on cortex of both the kidneys. Severe ulcerative lesions were seen in the stomach and duodenum. Cytologically, discrete round cells pleomorphic, with abundant cytoplasm and ovoid and indented nuclei. Histopathological examination revealed diffuse infiltration of large round to pleomorphic cells with abundant eosinophilic cytoplasm with ovoid to bean shaped nuclei with distinct cell margins. The cells were arranged as loose sheets with minimal fibrous stroma. Nuclei were hyperchromatic with prominent multiple nucleoli. Scanty mitoses were observed. For differential diagnosis of round cell tumors mast cells were ruled out by toluidine blue staining which was found to be negative. Immunohistochemistry for mast cell tumor was carried out for Ckit and was found to be negative. Specific expression of immunohistochemical markers for histiocytic cell type CD 18 showed diffuse intense cytoplasmic positivity for the markers. Both dermal and metastatic areas in the kidney expressed these specific histiocytic markers.

**Keywords:** Dog, malignant histiocytosis, pathology

#### Introduction

Malignant histiocytosis is a rare, progressive proliferative disorder of the mononuclear phagocyte system that has been described in adult dogs which includes Bernese Mountain dogs and other breed of dogs [1, 2, 3]. Malignant histiocytosis is diagnosed histologically by the often systemic proliferation of large, pleomorphic, single and multinucleated histiocytes with marked cellular atypia and phagocytosis of erythrocytes and leukocytes [4]. The lung and hilar lymph nodes are mostly affected [1, 4] whereas it is also observed from other lymph nodes and various internal organs like liver, spleen, bone marrow and central nervous system [1, 4, 5]. No sex predisposition has been reported and dogs of any age can be affected [6, 7]. Currently, the most useful immunohistochemical criteria for identifying histiocytosis cells in formalin fixed paraffin - embedded tissues is CD 18. Immunohistochemistry was done to differentiate with other round cells tumors ie. Mast cell tumor subcutaneous and kidney nodular mass stained negative with toluidine blue and Ckit. The present paper reports on the occurrence of malignant histiocytosis in a German Shepherd.

#### Materials and Methods

The study was performed at Department of Veterinary Pathology Madras Veterinary College, Chennai. The representative tissues samples were fixed in 10% neutral buffered formalin, the tissues were processed and paraffinized tissue were cut into sections of 4-5 µm thickness and stained with routine Hematoxylin and Eosin (H & E) for histopathological examination [8]. For differential diagnosis of round cell tumors mast cells were ruled out by toluidine blue staining which was found to be negative. Immunohistochemistry (IHC) was performed using CD 18. Steps include paraffin deparaffinization and antigen retrieval, followed by endogenous horseradish peroxidase inactivation and blocking. The slides were incubated with primary antibody CD 18 followed by incubated with appropriate secondary antibodies. Then they were incubated with streptavidin and horseradish peroxidase followed by chromogen development using 3, 3'-diaminobenzidine (DAB) and hematoxylin counterstaining.

#### Results

A 3 year old German Shepherd with the history of swelling in submandibular region. Gross examination revealed a spherical firm swelling measuring about 10-15 cm in size on the right

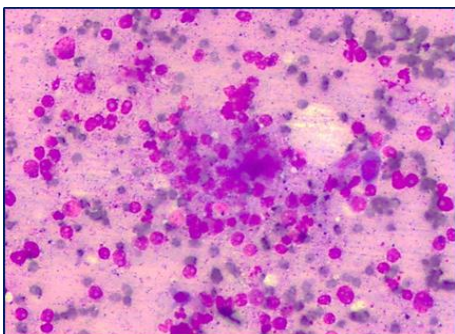
side of subcutis of the submandibular region. On incision of skin, light white lobulated mass was observed (Fig.1). Kidney showed a spherical white nodular mass measuring about 0.5 cm in diameter on the posterior side of cortex of both kidneys (Fig. 2). Duodenal mucosa revealed ulcer approximately 2 cm in diameter. The mucosa of the intestine was congested with mucous mixed contents. Gastric mucosa revealed severe haemorrhages. Cytologically, discrete round cells pleomorphic, with abundant cytoplasm and ovoid and indented nuclei (Fig. 3). Histopathological examination revealed diffuse infiltration of large round to pleomorphic cells with abundant eosinophilic cytoplasm with ovoid to bean shaped nuclei with distinct cell margins (Fig. 4). The cells were arranged as loose sheets with minimal fibrous stroma. Nuclei were hyperchromatic with prominent multiple nucleoli. Scanty mitoses was observed (Fig. 5). For differential diagnosis of round cell tumors mast cells were ruled out by toluidine blue staining which was found to be negative. Immunohistochemistry for mast cell tumor was carried out for ckit and was found to be negative. Specific expression of immunohistochemical markers for histiocytic cell type CD 18 showed diffuse intense cytoplasmic positivity for the markers (Fig. 6). Both dermal and metastatic areas in the kidney expressed these specific histiocytic markers.



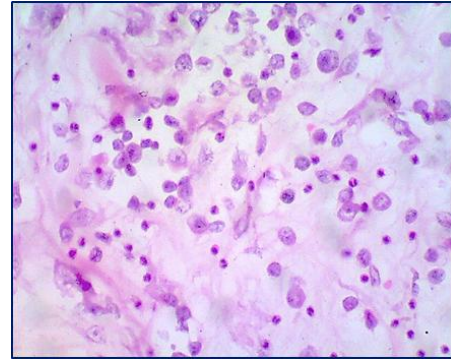
**Fig 1:** Nodule growth in subcutis of submandibular region



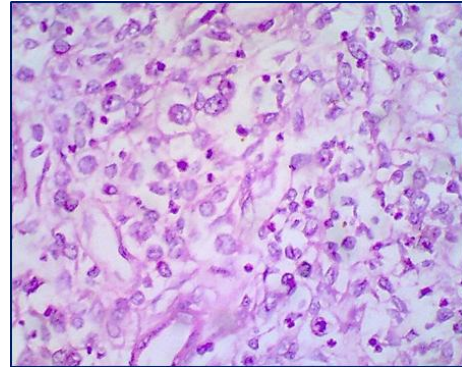
**Fig 2:** Kidney- Nodule on the cortical surface



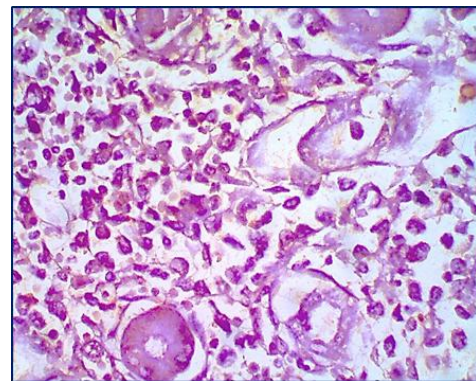
**Fig 3:** Pleomorphic cells with faint blue cytoplasm and round to indented nuclei LG – 200x



**Fig 4:** Subcutis – Pleomorphic cells with abundant cytoplasm and round to elongate nuclei with multiple nucleoli in dermis HE 400x



**Fig 5:** Kidney – Pleomorphic cells resembling histiocytes HE 400x



**Fig 6:** Kidney – CD 18 cytoplasmic immunoreactivity IPT- DAB 400x

### Discussion

The diagnosis of malignant histiocytosis was based on histopathological examination and was confirmed by immunohistochemistry. Malignant histiocytosis is quite distinctive from the other histiocytic disorders in its light microscopic appearance and biological behaviour. In dogs there is a predilection for rottweilers, golden retrievers and Bernese mountain dogs [1, 2, 3]. Classically malignant histiocytosis involves viscera most notably in spleen, liver, lung, kidney, lymph nodes and bones but the skin tumors can occur either alone or part of the multiorgan diseases. In the present study, the malignant histiocytosis was observed in the submandibular skin region and metastasis was observed in the kidney [9]. Histopathological examination revealed diffuse infiltration of large round to pleomorphic cells with abundant eosinophilic cytoplasm with ovoid to bean shaped nuclei with distinct cell margins. The cells were arranged as loose sheets with minimal fibrous stroma. Nuclei were hyperchromatic with prominent multiple nucleoli along with scanty mitoses.

These observations are in accordance with the findings of others workers<sup>[10, 11]</sup>.

### Summary

A 3 old male German Shepherd was presented with submandibular swelling. Necropsy revealed nodule on the submandibular region and internal examination revealed nodule on the cortical surface on both the kidney and duodenal ulceration. Histopathological examination revealed diffuse infiltration of large round to pleomorphic cells with abundant cytoplasm which was confirmed as malignant fibrous histiocytoma with metastasis to kidney.

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