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Short Communication

PATHOMORPHOLOGY OF CUTANEOUS HISTIOCYTIC SARCOMA IN A KOMBAI DOG

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SUMMARY

Histiocytic sarcoma is an aggressive syndrome with three entities including localized, disseminated and hemophagocytic histiocytic sarcoma. A 2.5 years old male Kombai dog was presented to Veterinary Clinical Complex with a history of mass above the hock joint. On clinical examination, the mass was hard and immovable. Cytological examination revealed pleomorphic cells with abundant cytoplasm, mild vacuolation, and occasional giant cells. Histopathological examination revealed pleomorphic cells which were round to spindyloid, arranged in loose sheets with no stroma characterized by hyperchromatic nuclei with one or two nucleoli and moderate eosinophilic cytoplasm. The neoplastic cells showed strong vimentin expression in immunohistochemistry. Based on the gross, cytological, histopathological and immunohistochemical features, the case was diagnosed as cutaneous histiocytic sarcoma.

Keywords: Dog, Histiocytic sarcoma, Vimentin

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Histiocytic sarcoma is an aggressive syndrome with three entities including localized, disseminated and hemophagocytic histiocytic sarcoma (Meuten, 2017). The localized form is more common in the skin or subcutis, usually around the joints. (Moore, 2014). Histologically, it is composed of highly cellular pleomorphic histiocytic cells with anisocytosis, eosinophilic foamy cytoplasm, central nuclei with prominent nucleoli, frequent multi-nucleated cells and mitotic figures (Coomer and Liptak, 2008). This report describes the pathological and immunohistochemical findings of a case of cutaneous histiocytic sarcoma in a dog.

A male Kombai dog of 2.5 years was brought to the Veterinary Clinical Complex, Veterinary College and Research Institute, Namakkal with a history of growth on the medial aspect of hind limb above the hock joint (Fig. 1). On Clinical examination, the mass was hard and immovable. The tumour mass was surgically excised. The representative samples from the excised tumour mass of 2 to 3 cm in size were fixed in 10 per cent neutral buffered formalin. Paraffin embedded tissue sections of 4 micron thickness were cut and stained with Haematoxylin and Eosin (H & E) as per the standard procedure (Luna, 1968). Additionally, immunohistochemistry for the vimentin marker was performed as per the standard protocol (Gopal *et al.*, 2024).

Fine needle aspiration cytology (FNAC) was performed as per the standard protocol and the methanol fixed smears were stained with Giemsa (Menard, 1986). Cytological examination of fine needle aspirates of the mass revealed the presence of multinucleated giant cells, some of which exhibited with prominent nucleoli and cytoplasmic vacuolation (Fig. 2). Mitotic figures and morphological abnormalities such as anisocytosis and anisokaryosis were observed reflecting cellular and nuclear atypia (Fig. 3).

Grossly, the mass was spherical to round around 3×5 cm in size, cut surface was homogenously grey in color and slightly hard in consistency. Histopathological examination revealed pleomorphic cells that varied in morphology, ranging from round to spindle-shaped. These cells were loosely arranged in sheets with no stroma (Fig. 4). The cells exhibited distinct features, including hyperchromatic nuclei with one or two prominent nucleoli. The cytoplasm is moderately eosinophilic and mitotic figures were frequently observed, indicating active proliferation and few lymphocytes were scattered throughout the sections (Fig. 5). Immunohistochemistry revealed strong positivity for vimentin, a marker indicative of mesenchymal origin, within the neoplastic cells. (Fig. 6).

Histiocytes are a type of leukocyte found in tissues, playing a crucial role in the immune system (Fulmer and Mouldin, 2007). Canine histiocytic proliferative disorders encompass a broad range of diseases, including reactive histiocytosis, cutaneous histiocytoma and malignant histiocytosis (Affolter and Moore, 2000). Histiocytic diseases further categorized into non-malignant non-neoplastic conditions (reactive histiocytosis-cutaneous or systemic histiocytosis) and non-malignant neoplastic

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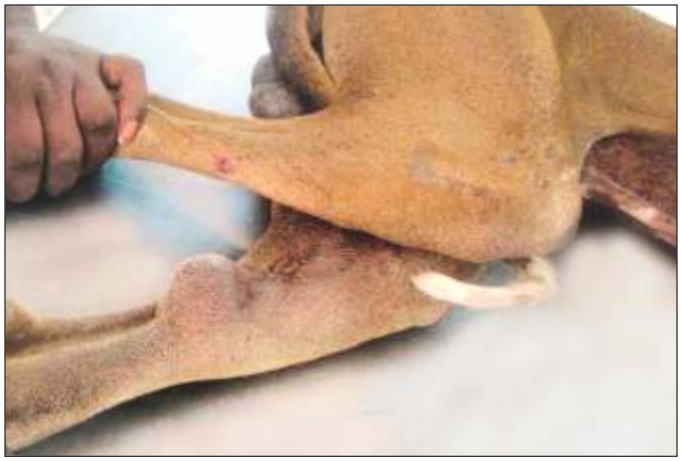

Fig. 1. Hard spherical growth on the medial aspect of the hind limb.

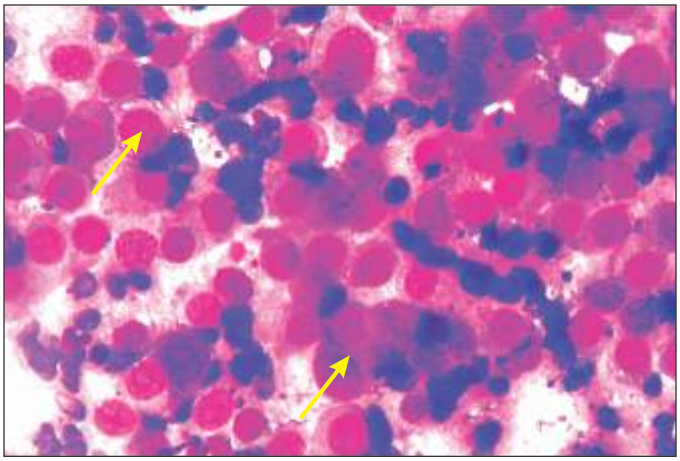

Fig. 2. Cytology revealed multinucleated giant cells with prominent nucleoli (Arrow) and cytoplasmic vacuolation (Arrow). (Giemsa × 400).

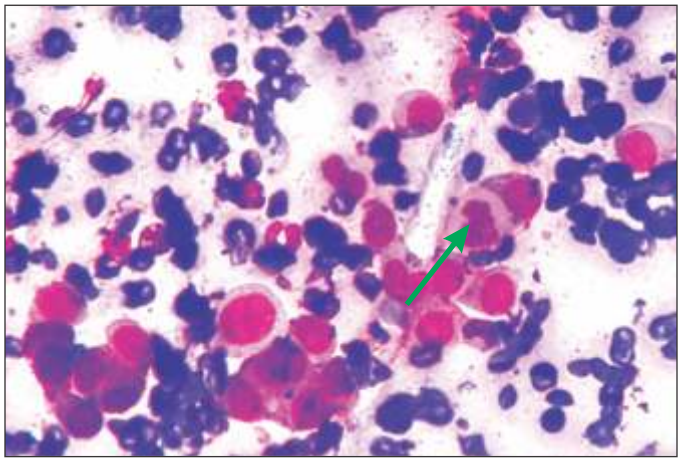

Fig. 3. Cytology revealed neoplastic cells with mitotic figures (Arrow), anisocytosis and anisokaryosis (Giemsa × 400).

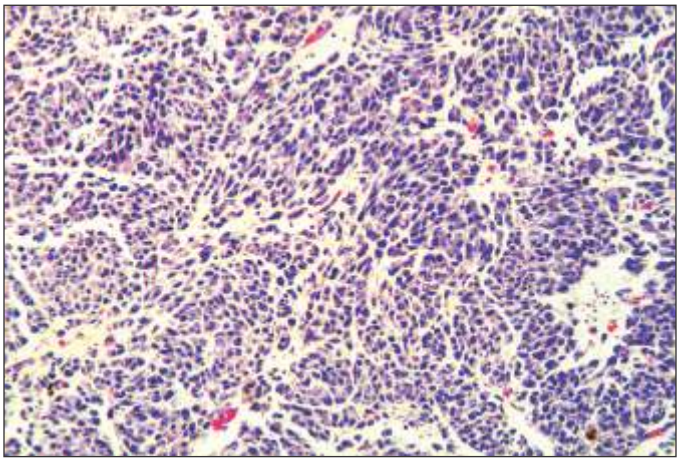

Fig. 4. Sheet of round to spindyloid cells arranged in loose sheets with no stroma (H&E × 100).

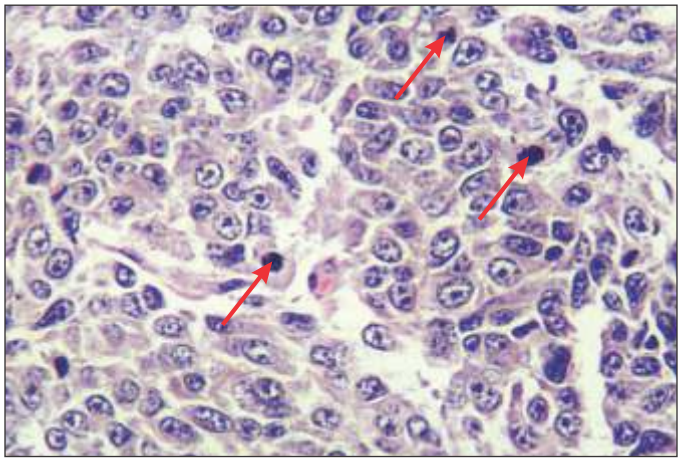

Fig. 5. The pleomorphic cells had hyperchromatic nuclei with one or two nucleoli, moderate eosinophilic cytoplasm and mitotic figures (Arrow) (H&E × 400).

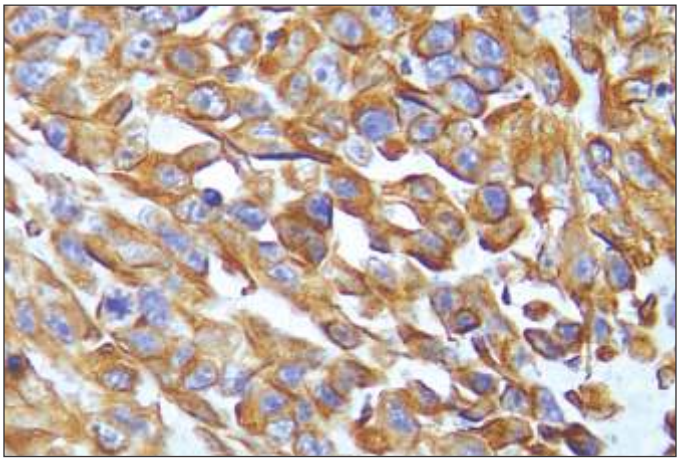

Fig. 6. The neoplastic cells showed strong vimentin expression in immunohistochemistry. (IHC × 400).

conditions (cutaneous histiocytoma) and malignant neoplastic conditions (localized histiocytic sarcoma and disseminated histiocytic sarcoma) (Coomerand Liptok, 2008). In the present study the tumour was in the subcutaneous tissue of hind limb and penetrated into the deep dermis. This was confirmed as localized histiocytic sarcoma.

Cutaneous histiocytoma is a benign tumour commonly found in the adnexa, while canine histiocytic sarcoma accounts for less than 1% of lymphoid cancers in dogs

(Ramsey *et al.*, 1996; Skorupski *et al.*, 2007). Disseminated histiocytic sarcoma is a highly aggressive, systemic disease characterized by multiple tumour masses in various organs. The primary sites of occurrence include the spleen, lungs and bone marrow. Secondary sites such as lymph nodes and the liver may also be involved, along with other organs over time (Affolter and Moore, 2002). Localized histiocytic sarcoma typically appears as a solitary lesion in the skin or subcutis of the extremities. In some cases, it also arises in periarticular tissues near large appendicular joints, the spleen, lymph nodes, lungs or bone marrow (Moore, 2014). This form of sarcoma is locally invasive, often spreading to nearby lymph nodes. (Affolter and Moore, 2002). In the present case, the mass was on appendicular skeleton with involvement of adjacent tissue. This is correlating with the findings of Moore (2014) but spreading to regional lymphnode and other internal organs were not recorded in the current study.

Cytologically histiocytic sarcomas showed low to moderate cellularity. The cells were varying in shape, ranging from round to polygonal or spindle-shaped, and margins may appear poorly defined. Most of the neoplastic cells had a round to oval nucleus and some of the nucleus showed indentation. (Mastrostini *et al.*, 2012). In the present case, cytology smear showed more number of multinucleated cells and abundant cytoplasm with vacuolations. This might indicate the involvement of reactive histiocytes.

Histologically, tumour nodules may consist of individual large round cells with abundant eosinophilic cytoplasm. Some cells exhibit cytoplasmic vacuolization, while others display dense clusters of spindle cells with cytoplasmic projections. Both patterns were noted by Affolter and Moore (2002). In the present case, the neoplastic cells were arranged in sheets, predominantly the neoplastic cells were round in shape and few scattered spindle shaped cells. These findings showed the variation in distribution of different cell population within and between the tumours. The mitotic index in these tumours varies and is inversely related to the degree of lymphocytic infiltration. Epidermal alterations often include ulceration, parakeratosis, intra-epidermal aggregates of tumour cells, and evidence of hydropic degeneration (Pazdzior-Czapula *et al.*, 2015). The epidermal alterations were not found in the study.

The definitive diagnosis of histiocytic diseases relies on the identification of standard clinicopathologic and morphologic characteristics of histiocytes (Coomer and Liptok, 2008). Immunohistochemical analysis of MHCII, CD18 and CD3 and CD79 (lymphocytic markers to differentiating from lymphoma) were performed for the diagnosis of canine cutaneous histiocytic tumours. The E-cadherin was used to identify the involvement of Langerhans cells (Mastrorilli *et al.*, 2012; Pazdzior-Czapula *et al.*, 2015). Advanced imaging modalities such as CT and MRI are valuable tools for assessing both localized and disseminated histiocytic sarcomas (Mullin *et al.*, 2019).

Based on cytological, histopathological and immuno-histochemical findings, this case was diagnosed as cutaneous histiocytic sarcoma in a dog.

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