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Pathology of cutaneous hemangiosarcoma in dogs

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Abstract

A total of 500 dogs presented with cutaneous masses were screened for identification of tumours. Samples were collected by Fine needle aspiration cytology (FNAC) for cytological identification of tumours during which cytologic smears of two masses revealed blood cells and pleomorphic spindle shaped cells with oval to elongated, vesicular nuclei. Histopathological examination revealed vascular spaces containing red blood cells lined by elongated, plumpy neoplastic endothelial cells with oval to elongated vesicular nuclei and prominent nucleoli. Immunohistochemistry revealed a moderate positive expression of CD31 marker. Based on the above findings, the tumour was diagnosed as hemangiosarcoma.

Keywords: Dog, FNAC, cytology, histopathology, hemangiosarcoma

Introduction

hemangiosarcoma is a malignant blood vascular tumour compared to haemangioma which is a benign vascular neoplasm. The recognized variants of hemangiosarcoma include solar induced hemangiosarcoma and epithelioid hemangiosarcomas and histiocytoid (Gross *et al.*, 2005) [1]. Helfand (2008) [2] reported hemangiosarcoma as a very aggressive cancer in dogs with high mortality rate and median survival of 3–6 months with a ten percent one-year survival rate. Yager and Wilcock (1994) [3] reported that in contrast to all other cutaneous spindle cell tumours, the blood vessels in hemangiosarcoma tumour are made by the tumour cells themselves and the mitotic index is variable. The tumour cells may be found individually or in sheets, typically have a pleomorphic appearance but usually are irregular to spindle in shape (Cowell *et al.*, 2007) [4].

Papilloma, mast cell tumours, histiocytoma and lymphoma have been reported as the cutaneous tumours of high occurrence in dogs as per the available literature. Moreover, though hemangiosarcoma can occur in any part of the body including the skin and eyes, they are more often recorded and reported in visceral organs like spleen. Hence the present study is aimed at documenting the diagnosis of hemangiosarcoma in two dogs presented with cutaneous masses based on gross, cytological, histopathological and immunohistochemical investigation.

Materials and Methods

A total of 500 dogs with tumour suspected masses on the skin presented to the Small Animal Clinics, Madras Veterinary College Teaching Hospital, Chennai over a period of three years were included in the present study. The animal details like breed, sex and age were collected. The masses were clinically examined for their location on the body, whether they were solitary in occurrence or in multiple sites. The gross examination of every mass for its colour, size, shape, the margins, presence of ulceration etc was critically evaluated. Radiography reports were checked to identify the presence of metastasis if any. Samples were collected for cytologic screening by FNAC and stained as per Meinkoth and Cowell (2002) [5]. For confirmatory diagnosis, samples were collected and processed for histopathological examination by collecting sections of excised mass after surgery in 10 per cent neutral buffered formalin.

Immunohistochemical study was further carried out to identify the expression of CD31 which is a marker for hemangiosarcoma. Biopsy tissues fixed in neutral buffered formalin for 48-72 hrs were processed and embedded in paraffin wax. Sections were cut at 4 µm from the blocks and mounted on APES precoated glass slides. The slides were dried overnight in oven at 60°C to enhance section adhesion.

Routine dewaxing and rehydration was carried out, 15 minutes in xylol and placed 3 min each in 100%, 96% and 70% alcohol. Immunostaining for the CD31 markers was then done on the paraffin embedded tissues using HRP polymer and the staining method was carried out as per the standard procedure recommended by the manufacturer.

Results and Discussion

In the present study, to identify tumours in 500 cases presented with cutaneous masses, 160 cases were found to be neoplastic, of which two tumours were diagnosed as hemangiosarcoma. This accounted to a population incidence of 1.25 per cent of skin tumour incidence and 0.40 per cent incidence of total tumour incidence in canine population during the study period. Of the two cases of hemangiosarcoma, one case was recorded in Non-descript and another case in Dobermann. Both cases were males and belonged to the age group of 5-10 years. This was in concordance with Hargis *et al.* (1992) [6] who also earlier reported that majority of cutaneous hemangiosarcomas occurred in adult to aged breeds.

The tumour was located in inguinal region in a case and in limb in another case. Grossly, the tumour appeared as irregular spherical ulcerated mass in a case (Fig.1) and spherical in another case with a size of 4-6 cm in dia. The cut surface was reddish and contained multiple blood clots. Multilobulated haemorrhagic surface was observed in cut section of another case of hemangiosarcoma (Fig.2). Rajni (2005) [7] has reported that hemangiosarcomas appear soft, round to globulated with reddish cut surface containing blood clots.

Cytologic smears did not reveal neoplastic cell except for

blood cells. Few areas showed pleomorphic spindle shaped cells with oval to elongated, vesicular nuclei.

The histopathological features were screened critically to differentiate this tumour from similiar tumours like haemangiopericytoma. Subapriya *et al.* (2018) [8] reported diagnosis of canine cutaneous haemangiopericytoma by observing the histological features like perivascular whorls of fusiform cells like a fingerprint pattern with blood vessels at the centre of the whorl and positive expression to markers like PCNA, Vimentin and p53. Histopathological examination of hemangiosarcoma suspected masses revealed vascular spaces containing red blood cells lined by elongated, plumpy neoplastic endothelial cells (Fig.3 & 4). Minimum vascular spaces were observed in areas of high cellularity. Indistinct elongated eosinophilic cytoplasm containing oval to elongated vesicular nuclei with prominent nucleoli were seen.

Immunohistochemical study was carried out with CD31 marker to avail a confirmatory diagnosis. The findings showed moderate expression of CD31 by the neoplastic cells which confirmed the tumours as hemangiosarcoma. This is in agreement with Tsuji *et al.* (2013) [9] who diagnosed hemangiosarcoma in a male Golden Retriever presented with multiple cutaneous and subcutaneous masses from the left elbow to the digits by strong positive expression for CD31.

Conclusion

In the light of details obtained by gross appearance of the cutaneous masses, appearance on cut section, cytological, histopathological and immunohistochemical findings, two cases of hemangiosarcoma were diagnosed in a population of 160 dogs with skin tumours.



Fig.1 Hemangiosarcoma- Non-descript-Grey brown, irregular round, ulcerated mass

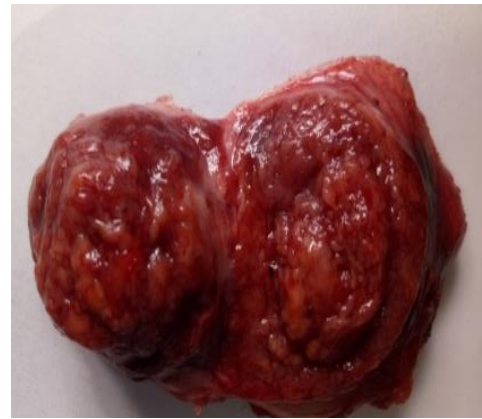


Fig.2 Hemangiosarcoma- Cut section - Red, multilobulated, haemorrhagic

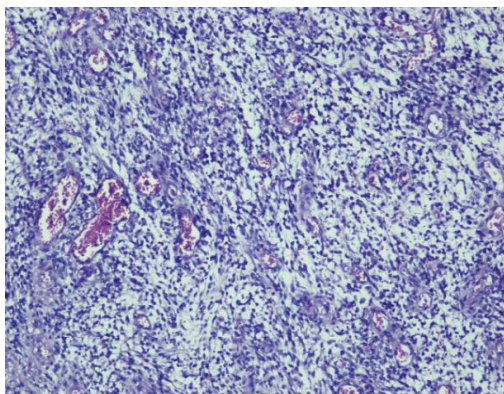


Fig.3 Hemangiosarcoma – Plumpy endothelial cells H&E x 100

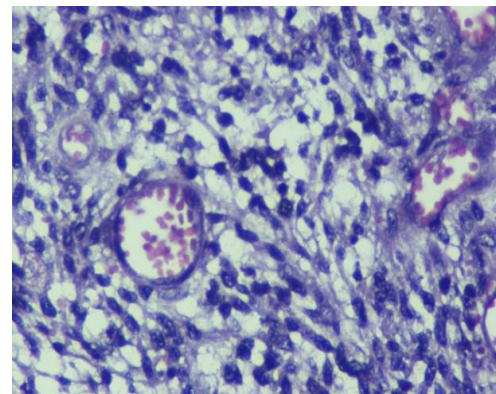


Fig.4 Hemangiosarcoma – Plumpy endothelial cells H&E x 400

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