Histomorphology and cytology of cutaneous mastocytoma in a dog

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Received: 21.08.13; Accepted: 19.12.13

ABSTRACT

A case of mastocytoma was observed in a seven-year-old male mongrel dog. The dog was brought to the small animal clinic with the history of anorexia, lethargy and weight loss over a period of one month. Clinical examination of the dog revealed no abnormality except a growth on the right perineum. Haematology parameters were normal except leucocytosis due to eosinophilia and basophilia. No changes were observed in serum biochemical parameters. Impression smears from the growth revealed sheets of neoplastic mast cells which stained with Wright-Giemsa stain. Examination of the cut surfaces were air-dried and appeared grayish-red in colour. Impression smears prepared from the cut surfaces were air-dried and stained with Wright-Giemsa stain. Examination of the smears revealed sheets of neoplastic mast cells which were well differentiated and pleomorphic with indistinct cell boundaries. Nuclei were round to oval and often were observed in serum biochemical parameters. Impression smears from the growth revealed sheets of mast cells with very high pigment. Neoplastic cells were well differentiated and pleomorphic with indistinct cell boundaries. Nuclei were round to oval and often in irregular shape. Histopathology of the growth revealed the features of mastocytoma consisting high cellularity, marked cellular pleomorphism, anisocytosis and anisokaryosis. Marked infiltration of eosinophils was noticed throughout the tumour. Clinico-pathology, cytology and histopathology findings were consistent for diagnosis of canine mastocytoma.

Keywords: Canine mastocytoma, cytology, haemato-biochemistry, histopathology.

Mast cells are originating from bone marrow and spread throughout the body's connective tissues. They are normal components of the immune system. Mast cell granules contain histamine, heparin and platelet-activating factors1. These substances cause itching, gastric ulcers, flatulence, allergic reactions, loss of appetite, vomiting and diarrhoea2,3,4. The tumours originate from mast cells are called as mast cell tumours or mastocytomas. Mast cell tumours usually develop from visceral organs or skin1. Cutaneous mast cell tumours in dogs are accounting for 7-21% of all skin tumours5,6. They grow very quickly and spread to the lymph nodes, spleen, liver and bone marrow1. The causes of the mast cell tumours are unknown. Dogs that develop mast cell tumours are at an average age of 8 to 9 years, although any age could be affected5,7. There is a dearth of the literature on clinico-pathological features of canine mast cell tumours and hence the case is reported.

A seven-year-old male mongrel dog brought to the small animal clinic with the history of anorexia, lethargy and weight loss over a period of one month. The animal was maintained on regular deworming and vaccination schedule against parasitic and infectious diseases. The dog weighed about 17 kg, appeared dull and depressed. Visible mucous membranes were pink and moist. On clinical examination, all vital signs were normal except an abnormal growth in the right perineum. The growth was developing slowly over a period of 4 months.

Blood samples were collected by venipuncture for haemato-biochemical analysis. No changes were observed in blood pictures like red blood cell count (6.48x109/mm3), haemoglobin (12.7 g/dl), haematocrit (42.76%) and platelets (310x103/mm3) except significant elevation of leucocyte counts (35.63x109/mm3). Moderate elevation of neutrophils (21.38x109/mm3), lymphocytes (4.63x109/mm3) and monocytes (0.36x109/mm3) were observed. Marked eosinophilia (5.70x109/mm3) and mild basophilia (3.56x109/mm3) were also noticed.

Serum biochemical parameters such as glucose (92 mg/dl), total protein (6.4 g/dl), cholesterol (132 mg/dl), triglycerides (57 mg/dl), total bilirubin (0.23 mg/dl), blood urea nitrogen (16.0 mg/dl), creatinine (0.59 mg/dl), alanine transaminase (40.7 u/l), aspartate transaminase (67 u/l), alkaline phosphatase (47 u/l), gamma glutamyl transferase (1.64 u/l), calcium (11.24 mg/dl), phosphorus (3.6 mg/dl), sodium (136 mmol/l), potassium (4.12 mmol/l) and chlorides (121.7 mmol/l) did not show any abnormalities.

A tennis-ball sized growth was removed from the right perineum by aseptic surgical procedures under general anesthesia. Growth was measured 8.0 x 6.0 cms and weighed 185 gms. Cut surface of the growth appeared grayish-red in colour. Impression smears prepared from the cut surfaces were air-dried and stained with Wright-Giemsa stain. Examination of the smears revealed sheets of neoplastic mast cells which were well differentiated and pleomorphic with indistinct
cell boundaries. Heavily pigmented purple coloured granules distributed densely in the cytoplasm (Fig. 1). Nuclei were round to oval and often irregular in shape with indistinct nuclear membranes. Mostly nuclei were masked by basophilic granules.

Tissue pieces from the growth were removed and fixed in 10% neutral buffered formalin, processed and embedded in paraffin, sectioned at 3-5µ thickness, and stained with hematoxylin and eosin (H&E). Histopathology of the mass revealed the features of mastocytoma consisting high cellularity, marked cellular pleomorphism, anisocytosis and anisokaryosis. The neoplastic cells contained pink coloured cytoplasmic granules. Nuclei were pleomorphic and vesicular contained prominent nucleoli. Increased neovascularisation, high nucleus to cytoplasm ratio and few mitotic figures were noticed. Marked infiltration of eosinophils noticed throughout the tumour and infiltrations were more around the blood vessels (Fig. 2).

The clinical signs reported earlier including anorexia, lethargy and weight loss due to release of vasoactive amines by mast cells were also observed in the present case. These signs are sequel to stimulation of H2 receptors of parietal cells in the stomach by high levels of histamine. Haematological changes reported earlier are associated with visceral form of mastocytoma differed from the present finding where the tumour recorded in this report is cutaneous form. Alterations observed in this case like leucocytosis due to basophilia and eosinophilia are similar to the earlier reports. Systemic involvement accompanied by large number of peripheral mast cells is not observed in this case.

Cytoplasmic granules are used to differentiate mastocytoma with other type of round cell tumours. By histologic classification, this is following Grade I tumour due to the involvement of superficial dermis. Mast cell tumours metastasize usually to the local lymph nodes followed by spleen, liver and other visceral organs. Cutaneous mastocytoma observed in the present finding did not reveal any metastasis. The eosinophilic infiltration observed in this study correlated well with the earlier reports. Mast cell tumours are aggressive in dogs and grow very quickly is not in accordance with this case, where the tumour developed over a period of 4 months.

REFERENCES
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