Recurrent Mastocytoma In A Dog

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ABSTRACT

A 10 year-old Goldin Shefer dog, showing a vigorous recurrent tumor- mass (5x3x2.5cms),on the left upper chest region, was admitted to the Veterinary hospital, Fac. Vet. Med, Tripoli, Libya. The tumor-mass was surgically exiced and submitted for pathologic iinvestigations. It was examined for color, consistency, shape and weight. The cut-surface was examined and a specimen was fixed in 10% neutral buffered formalin. Five micron -thick paraffin sections were prepared and stained by H&E, Giemsa stain , besides a diagnostic AgNORs staining technique .Such tumor- mass was the third time to recur in this dog .

Histopathologically, the tumor -mass revealed a large number of mast- cells containing the charachteristic coarse basophilic granules with enlarged vesicular hyperchromatic nuclei and mitotic activity. The newly dividing mast-cells were free or having a few basophilic granules with numerous mitotic figures. The tumor cells were concentrically lamellated in rows or sheets. Some neoplastic cells were deeply infiltrating the subcutaneous tissue. Tumor giant cells and a moderate number of reactive eosinophils were seen among the tumor cells

INTRODUCTION

Mast cell tumor (MCT) is the most frequent cutaneous neoplasm of dogs, where it occurs most often on the posterior part of the body, the flank and the scrotum as a bulging mass, 2-5cm in diameter and 1-3 cm high *(1)*. The author added that the average age of dogs with MCT was 8.2-8.5 years. The histologic structure of mastcytoma is diagnostic, except in the very poorly differentiated tumors. The mast cells form diffuse loose sheets or densely packed cords of round cells with a central round nucleus, abundant granular basophilic cytoplasm, and distinct cell membrane. Mature eosinophils are diffusely scattered among the neoplastic cells. The solid tumors tended to form cellular-cords alternating with collagen bundles, particularly at the border of the tumor *(2)*. Mastocytoma is very common in dogs and a few cases have been observed in cats and horse. These tumors constitute approximately 20% of the skin tumors found in dogs *(3)* Additionally the mastocytes characteristically contain cytoplasmic granules that stain metachromatically with toluidine blue. The granules grow with maturation of the cell and in the fully developed cell have a laminated structure. The granules contain heparin, histamine and probably hyaluronic acid. Serotonine is present in some species. Pruritus, skin erythema, bruising, edema and ulceration are common with mastocytoma. Local recurrence and metastasis can be a comman problem. Microscopically, the neoplastic cells form diffuse sheets or densely packed cords of round to polygonal cells with a round centrally placed nucleus and a moderate amount of coarsely granuler basophilic cytoplasm. A variable number of reactive eosinophils are scatterd among the neoplastic cells *(4)*. The author added that the tumor cells exhibited, varying degrees of differentiation, based upon the presence of metachromatic granules in their cytoplasm along with the degree of pleomorphism and mitotic activity. Binucleated tumor giant cells were detected. The neoplastic mast -cells may be seen in all tissues ,especially skin, lungs and intestine, where it helps in fighting infections and are responsible for the allergic reaction and can be seen at sites of inflammation *(5)*. Genetic mutation in mast cell C-Kit-gene led to excessive Kit- signaling

with a consequent loss of growth control .Since mast cells can release histamine ,secondary gastrointestinal ulcerations occur in about 83% of the affected dogs, consequently signs of mast cell tumor may include vomiting, anorexia, gastro- intestinal bleeding and abdominal pain *(6)*. The author added that, the etiology of the mast-cell tumor is unknown ,however hereditary and viral causes may be involved and rarely the tumor formation may be associated with the application of skin irritants or chronic inflammation. Hyperinduction of IL3, immunologically or chemically by calcium inophores, was produced by mast-cells through stimulation of IgE receptors. Oncogenic IL3 expression, in autocrine tumor lines may result from escape from the negative control either by alterations in the IL3 geneor by loss of transacting suppression *(7)*. Unlike the cutaneous mast cell tumors, the visceral and systemic forms (disseminated mastcytosis and mast-cell-leukemia) are rare in dogs *(3)*. The cutaneous MCT is comman in cats as it reached 21% of feline skin-neoplasm, but most of them were benign.Some of these tumors showed pleomorphism *(8)*.

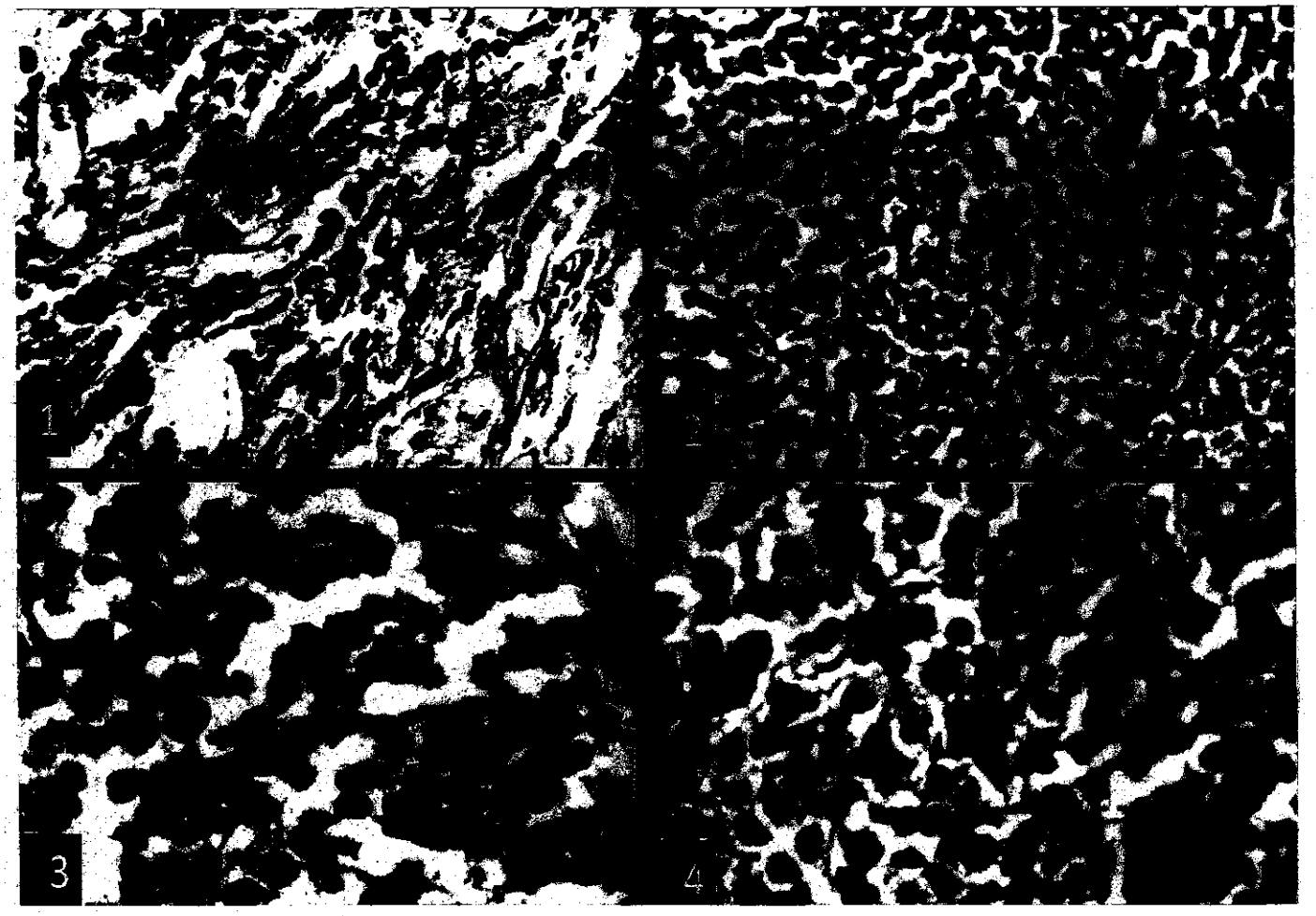
MATERIAL AND METHODS

A ten year old Golden Shefer dog was admitted to the hospital of Fac. Vet. Med. Tripoli ,Libya with a nodular firm grayish-white tumor mass . The tumor was surgically removed from the upper chest wall. The excised mass arised upper to two previously surgically removed tumors. Specimens were collected and fixed in 10% neutral buffered formalin . Five micron thick paraffin -sections were prepared and stained by H&E, and Giemsa stains. *(9)*, besides the diagnostic AgNORs staining technique *(10)*.

RESULT AND DISCUSSION

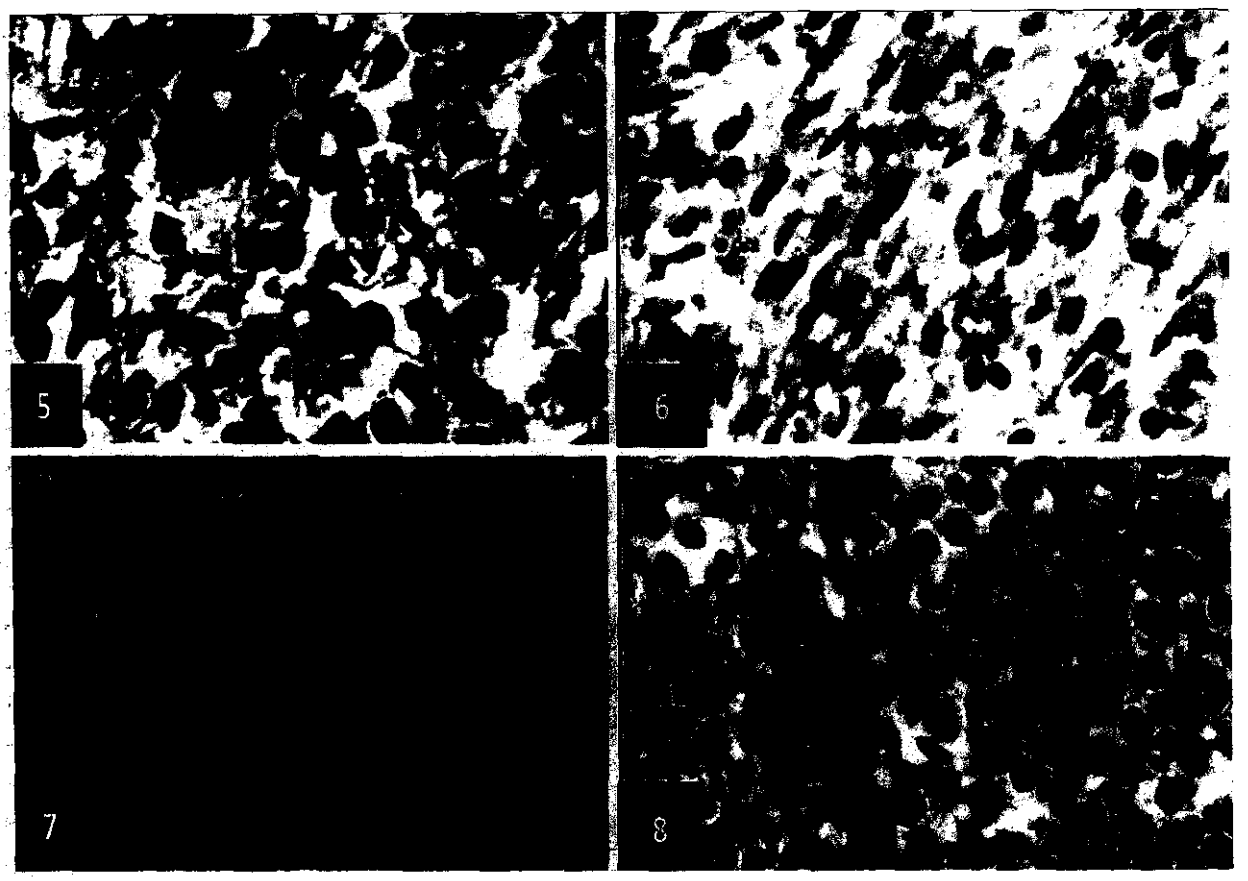
Clinically the affected dog revealed normal body temperature, blood pressure. puls and respiratory rate .The most charachteristic signs were pruritus ,rubbing of the body against hard objects and ulceration of the skin accompanied by bloody mixed serous exudation, particularly from the affected parts. The animal was slightly depressed. Macroscopically the tumor measured 5x3x2.5cm. It was irregular in shape, weighiting 130-150 grams, encapsulated, grayish-white and firm with a granular cut-surface. Microscopically the tumor consisted of cords (fig.1) or sheets (fig.2) of neoplastic cells, they were rounded, with enlarged vesicular hyperchromatic nuclei, containing single or multiple nucleoli .The cytoplasm contained a variable amount of coarse basophilic granules(80% of the cells).Such granules were characteristically demonstrated by Giemsa stain (fig.3).Some cells were of variable sizes. Mitotic figures were moderate(about2-4/HPF, figs.4&5). Similar results were previously reported *(4)*. The morphological and biological behaviour of tumors are closely related to each other , they help the diagnosis of tumors *(11)*. The author added that staining of the nucleolar organizer regions (AgNORs) basically meets this new concept. The NORs (rDNA) encode for ribosomal RNA and are thus of central importance for the protein synthesis of a cell. Silver stains NOR-associated proteins and elucidates the activated rDNA. Therefore, the AgNOR staining covers the proliferative potential of a given cell or a tumor. In our study the application of AgNORs staining technique was helpful for MCT-diagnosis. We used two types of negative control-tissues, fibroma and normal connective tissue of the same animal, in area near the tumor. We observed that the average NORs per cell in fibroma was 2.4 (fig.6.) and for control tissue of the same animal was 2.03(fig.7),meanwhile it was3.13 for mastocytoma-cells (fig.8). It is clear that the proliferative potential of mast cell tumor is higher than the control tissues, but it is of medium grade. Such results are in a accordance with others *(6)*. Multinucleated giant cells were seen (fig.9). Some tumor cells subcutaneously infiltrated deeply to invade or replace the adipose tissue (fig.10).Vascular involvement by the tumor cells was also observed. This tumor could be a transitional phase between grades (II and III). it is mostly stage (III) based upon the multirecurency and involvement of the blood vessels. The latter, specially capillaries, were dialated, packed by

neutrophils and eosinophils. Moreover, they were sometimes invaded by the tumor cells. Multifocal hemorrhages were also seen. The proportional correlation between mast cell and vascularization suggests that the mast cells may have a role in tumor progression via promoting the angiogenesis *(12)*. The etiologic cause of this tumor is unclear, but a possibility of genetic factor (C-Kit gene mutation)and or presence of infectious agent may be involved. Moreover, the application of topical skin irritants or chronic dermatitis are also possible causes *(6)*.



Figs (1-4)

1- The mast-cells are arranged in cords H&E,. X100.
2- The mast cells appear as sheet . H&E,. X 100.
3- Basophilic granules are scattered in the mast-cell-cytoplasm. Giemsa stain , x 1000.
4- The mast-cells are showing a moderate mitotic- activity H&E ., x 100.



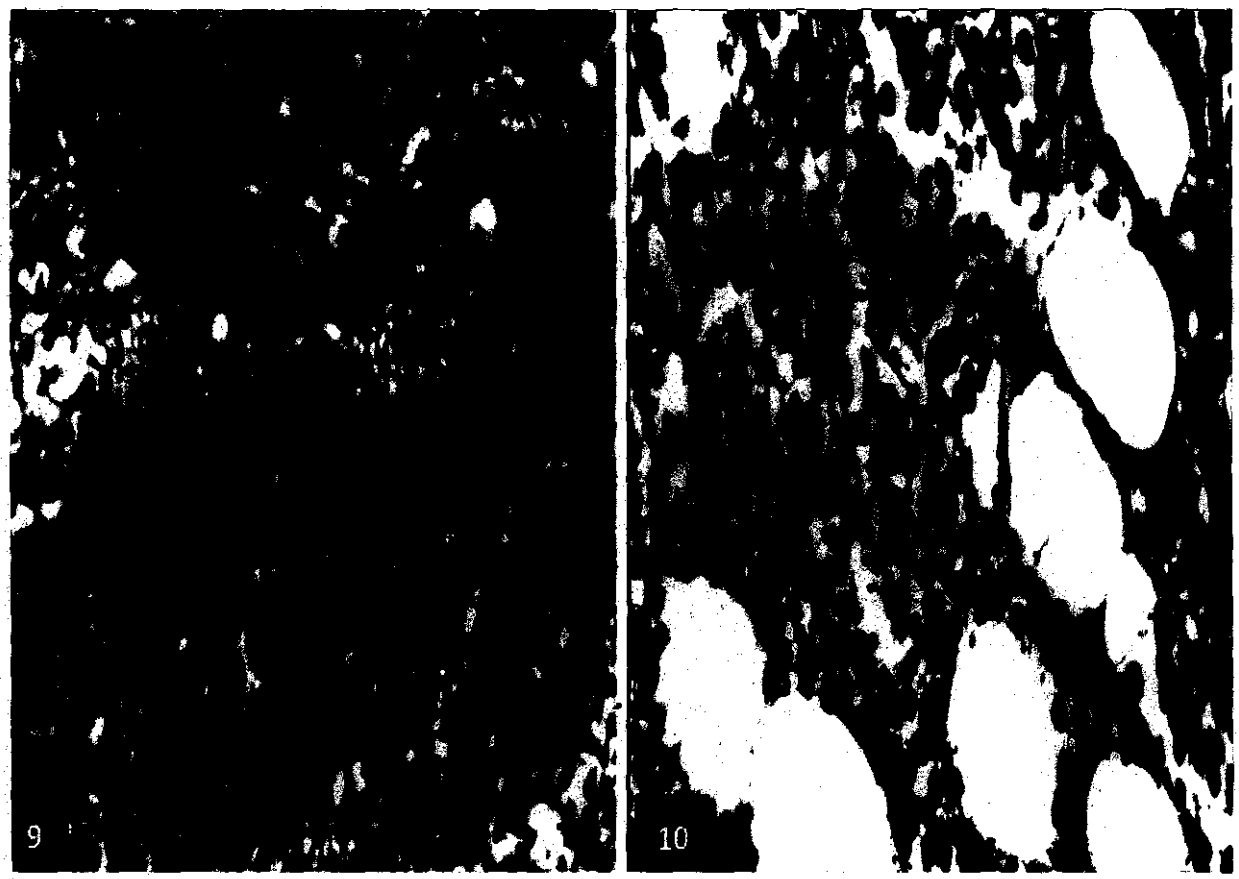
Figs (5-8)

5: Magnified Fig (4) to show the mitotic activity. H&E., x400

6 : Nuclear organizing regions , for fibroma , appear as instranuclear black dots . AgNOR stain .x100.;

7: Nuclear organizing regions, for normal connective tissue of the same animal , appear as black dots. AgNOR stain, x100.

8: Nuclear organizing regions, the mast cell tumor, appear as black dots of average number (3.13) in the nuclei . AgNOR stain, X1000.



Figs (9&10)

9: Multinucleated tumor giant cells are seen H&E x100

10 : Neoplastic cells invading and replacing the subcutaneous adipose tissue. H&E.,100.

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الملخص العربي

ورم مرتجع للخلايا ذات الحبيبات الزرقاء (خلايا الماست) في كلب

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سجلت هذه الحالة في كلب من نوع الجولدن شفر عمرة عشر سنوات في صورة ورم متعدد الرجوع وذلك في منطقة اعلي الكتف.وكان حجم هذا الورم حوالي 5 سم في 3 سم في 2.5 سم.اخذت عينات وتم صبغها بواسطة صبغة الهيماتوكسالين والايوسين وصبغة الجمسا. وقد لوحظ ان الورم يتكون من مجموعات وصفوف من خلايا تحتوي علي عدد كبير الحبيبات الزرقاء والتي تم التعرف عليها بدقة بواسطة صبغة الجمسا .كذلك تم تحديد النشاط الانقسامي للخلايا بواسطة صبغة الاجنور التي تحتوي علي محلول الفضة ذات التفاعل العالي مع الريبوزومال –ار-ن ي.وقد تم تحديد درجة هذا الورم ومدي انتشارة وذلك عن طريق الفحص المجهري الدقيق والصبغات المختلفة.