

## EPIDEMIOLOGICAL AND MORPHOLOGICAL CHARACTERISTICS OF CUTANEOUS ROUND CELL TUMORS DIAGNOSED USING ASPIRATIVE CYTOLOGY IN DOGS

Georgeta DINESCU, Raluca Ioana RIZAC, Valentina PETRE,  
Claudia Mariana CONSTANTINESCU, Patricia Valentina DOBRE, Andrei TĂNASE

University of Agronomic Sciences and Veterinary Medicine of Bucharest,  
59 Marasti Blvd., District 1, Bucharest, Romania

Corresponding author email: ginadinescu2015@gmail.com

### Abstract

*This paper's purpose is to identify the epidemiologic and morphologic characteristics of cutaneous round cell tumors diagnosed using aspirative cytology in dogs. The study was conducted over a period of five years on a total of 225 dogs, aiming predisposition to gender, age and lesion location, as well as identifying the cytomorphologic characteristics of the lesions. Cytology was performed using FNA, smears being displayed by spreading, air dried and Romanowsky stained. Of the 225 studied cases of cutaneous round cell tumors, 110 (49%) were histiocytic tumors, 96 (43%) were diagnosed as mast cell tumors, 10 (4%) were plasma cell tumors, 2 (1%) cutaneous lymphomas and 7 (3%) were extragenital transmissible venereal tumors (cutaneous). The difference between sexes was not significant, 51% of the affected animals being males and 49% females. Most tumors were localized on the limbs (46%), followed by the trunk (38%) and head (20%). The relevance of the cytological examination was maximum for the mast cell tumors, differential diagnostic problems being faced between histiocytic tumors and plasma cell tumors or transmissible venereal tumors. Proper evaluation of cell populations, identifying the specific elements and morphological features of each cell type are essential, increasing the value of cytopathological diagnosis in veterinary medicine practice.*

**Key words:** round cell tumors, cutaneous, dogs, cytological diagnosis.

### INTRODUCTION

Cutaneous round cell tumors are common in dogs, this category including mast cell tumors, histiocytic tumors, plasma cell tumors, cutaneous lymphoma and transmissible venereal tumors – extragenital type (Moore, 2007; Raskin, 2010).

### MATERIALS AND METHODS

This paper is a retrospective, epidemiologic and cytomorphological study conducted over a period of 5 years (2010 – 2014) on a total of 225 dogs diagnosed with cutaneous round cell tumors. The epidemiological study followed breed and gender predisposition, age and lesion location, and the morphological study aimed to identify the cytomorphological characteristics of the lesions, as well as the relevance of FNA (fine needle aspiration) in the diagnosis of cutaneous round cell tumors. The cytological examination was performed using FNA, the smears being displayed by spreading, air dried and Romanowsky stained.

### RESULTS AND DISCUSSIONS

Of the 225 studied cases of cutaneous round cell tumors, 110 (49%) were histiocytic tumors, 96 (43%) were diagnosed as mast cell tumors, 10 (4%) were plasma cell tumors, 2 (1%) cutaneous lymphomas and 7 (3%) were extragenital transmissible venereal tumors (cutaneous) (Figure 1).

The epidemiological and morphological data obtained on the studied cases are presented in the tables and charts below (Table 1).

It should be noted that in some cases, especially those diagnosed as mast cell tumors or histiocytic tumors, the lesions were multicentric. Regarding the sex of affected animals, it was found that out of 225 dogs diagnosed with cutaneous round cell tumors, 115 were males (51%) and 110 were females (49%), gender differences not being significant (Figure 2).

As is evident from the data presented in the chart below, most tumors were located on the limbs (46%), followed by the trunk (38%) and head (20%) (Figure 3).

Table 1. Presentation of the studied cases

Cutaneous round cell tumors	Total number of cases	Sex		Age limits	Location			
		M	F		H	N	T	L
Mast cell tumor	96	46	50	6 months – 15 years	14	3	33	48
Histiocytic tumor	110	55	55	2 months – 14 years	27	15	41	54
Plasma cell tumor	10	7	3	2-16 years	2	1	5	2
Lymphoma	2	2	0	2-7 years	0	0	2	0
TVT	7	5	2	2-13 years	2	0	5	0
<b>TOTAL</b>	<b>225</b>	<b>115</b>	<b>110</b>	<b>2 months – 16 years</b>	<b>45</b>	<b>19</b>	<b>86</b>	<b>104</b>

M = male, F = female, H = head, N = neck, T = trunk, L = limbs

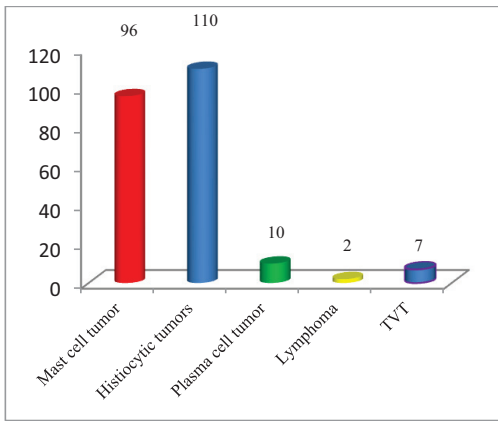


Figure 1. Cases distribution according to the lesion type

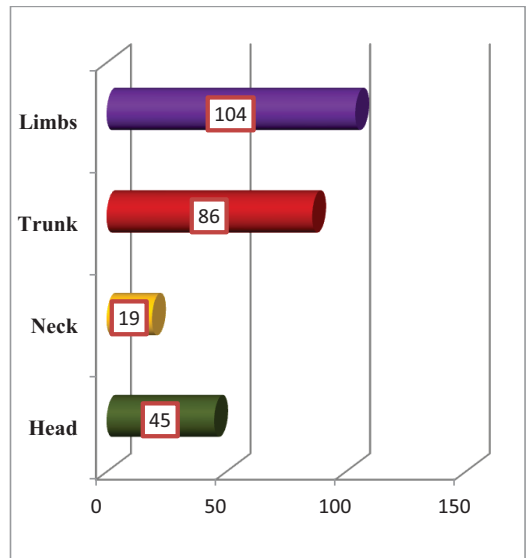


Figure 3. Distribution of cutaneous round cell tumors according to location

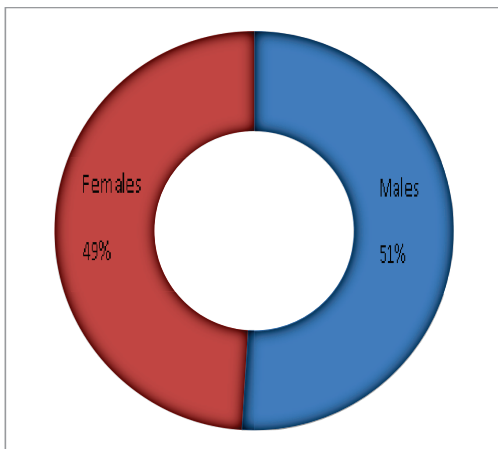


Figure 2. Cases distribution according to gender

A special mention is required to be made concerning histiocytic tumors, which are divided into several distinct entities, each with its epidemiological, morphology and prognosis characteristics (Dinescu, 2011). Chart 4 exhibits the pathological entities which are included in the histiocytic skin tumors category in dogs, along with the incidence of each lesion among the studied cases.

Of the 110 cases diagnosed with histiocytic tumors, 48% were represented by canine cutaneous histiocytoma, 21% by reactive histiocytosis, and 31% were malignant histiocytic tumors (Figure 4).

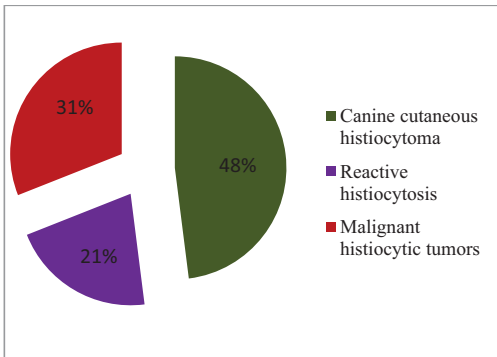


Figure 4. The incidence of different types of diagnosed histiocytic cutaneous tumors

A particular aspect was represented by the cutaneous form of the transmissible venereal tumor, metastasis of its genital form.

It was diagnosed in both males (n=5) and females (n=2), locations being the trunk (n=5) and head (n=2).

Considering the increased incidence of transmissible venereal tumor in our country, the increased frequency of extra genital location of this tumor is easily explained.

Thus, during the 5 years of this study, 43 dogs were diagnosed with transmissible venereal tumors.

Of these, 26 (60%) have presented genital localization and 17 (40%) extra genital localization, 7 of them having cutaneous localization and 10 other localizations (oral, nasal). Gross aspects were equally diverse and uncharacteristic.

The majority had a nodular character, alopecic or covered with hair (Fig. 5, 6, 7), of elastic or increased consistency, while the larger ones often presented ulcerated areas (Fig. 6).



Figure 5 and 6. German Shepherd, 9 years old, with tumor localized at the medial humero-radio-ulnar joint (axilar region), left anterior limb, approx. 15 cm in diameter, elastic-hard consistency, adherent to the underlying tissues, ulcerated surface.



Figure 7. Amstaff, M, 8 years old. Nodular, partially depilated tumor, 3-4 cm in diameter, located in the olecranon region, right anterior limb, adhering to the skin, non-adhering to the substrate.

In case of round cell tumors, the cytomorphological pattern has a high degree of specificity, which allows a definitive diagnosis in a very high proportion (Curtseit, 2012).

The relevance of the cytological examination in the case of mast cell tumors is at the highest level, the cytopathologic diagnosis usually being more relevant than the histopathological, since it allows identification of mast cell specific granules (Fig. 8).

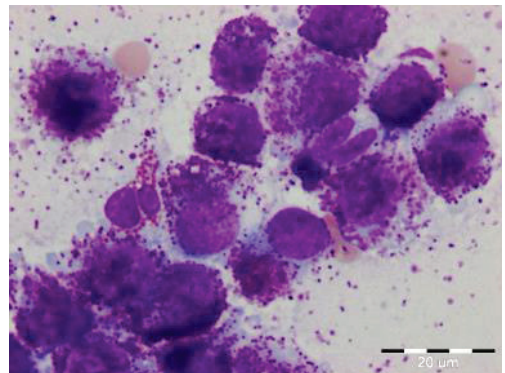


Figure 8. Mast cell tumor. Monomorphic population of round cells with tumoral mast cell morphology, prominent centrally or eccentrically located nuclei, cells with intracytoplasmic metachromatic granules and moderate degree of degranulation. M-G.G. stained, x1000

Cytopathologic diagnosis of histiocytic tumors is based on the presence of a monomorphic population of round, small and medium sized cells, often with an indented nucleus, with a variable amount of cytoplasm, very often vacuolated (Fig. 9 and 10). Sometimes cytopathologic differential diagnosis problems occur between different types of histiocytic

tumors, epidemiological elements playing an important role in their differentiation.

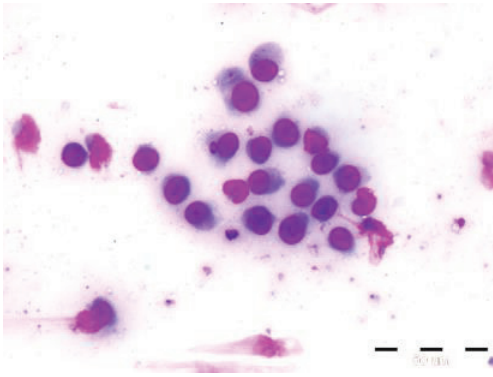


Figure 9. Benign histiocytic tumor - Canine cutaneous histiocytoma. Monomorphic population of round cells with histiocyte morphology, with variable amount of cytoplasm and eccentric nucleus. M-G.G. stained, x400

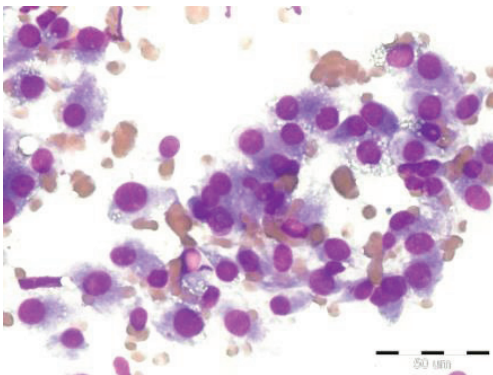


Figure 10. Malignant histiocytic tumor - Histiocytic sarcoma. Monomorphic population of round and spindle-shaped cells with round or oval, central or eccentric nuclei, with anisocytosis, anisocariosis, binucleation, basophilic cytoplasm with intracytoplasmic vacuoles. M-G.G. stained, x400

Plasma cell tumors also offer the cytological image of a round cell smear, the nucleus often having an eccentric position, showing a specific perinuclear blank halo. Bi- and multinucleation are common (Fig. 11).

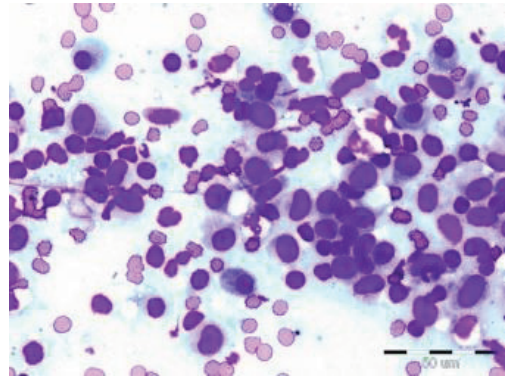


Figure 11. Plasma cell tumor. Monomorphic population of round cells with plasma cell morphology, with round or oval nucleus, finely granular chromatin, small unique nucleolus, basophilic eccentrically arranged cytoplasm. Sometimes a perinuclear bright halo is observed, specific to plasma cells. M-G.G. stained, x400

Cutaneous lymphomas are characterized by a monomorphic population of tumoral lymphoblasts, with euromatic nuclei and numerous nucleoli. Mitoses can be frequent and atypical (Fig. 12).

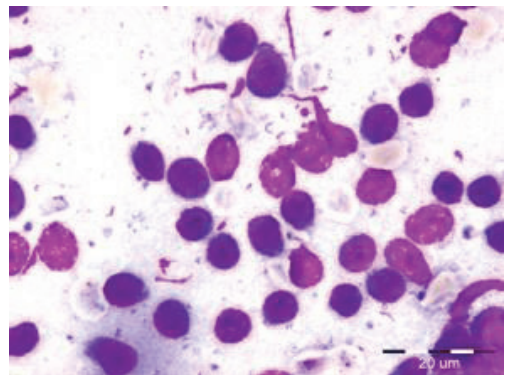


Figure 12. Cutaneous lymphoma. Monomorphic population of round cells with tumoral lymphocyte morphology, round nucleus, with anisocariosis, numerous nucleoli and scarce, slightly basophilic cytoplasm. M-G.G. stained, x400

Venereal transmissible tumor is also characterized by a monomorphic population of round cells, round nuclei with coarse chromatin and often vacuolated cytoplasm. Atypical mitoses are common (Fig. 13).

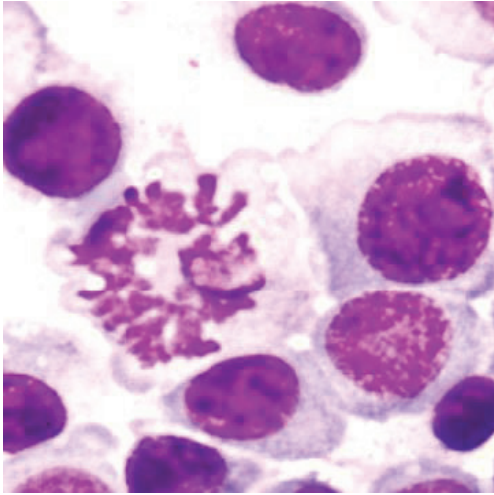


Figure 13. Cutaneous transmissible venereal tumor. Monomorphic round cell population specific to TVT, with abundant basophilic cytoplasm, with intracytoplasmic vacuoles, round nuclei, numerous nucleoli, coarse chromatin and atypical mitoses. M-G.G. stained, x1000

Differential diagnosis problems may arise in aspiration cytology between histiocytic tumors and plasma cell tumors or transmissible venereal tumors. Proper evaluation of cell populations, identifying the specific elements and morphological features of each cell type are essential, increasing the value of cytopathology diagnosis in veterinary medical practice.

## CONCLUSIONS

1. Of the 225 cases diagnosed with cutaneous round cell tumors, 96 (43%) were mast cell tumors, 110 (49%) histiocytic tumors, 10 (4%) plasma cell tumors, 2 (1%) cutaneous lymphomas and 7 cases (3%) were extragenital transmissible venereal tumors - cutaneous.

2. Most tumors were localized on the limbs (46%), followed by the trunk (38%) and head (20%).
3. No gender predisposition has been observed, of the 225 dogs diagnosed with cutaneous round cell tumors 115 were males (51%) and 110 were females (49%).
4. Out of 110 cases of cutaneous histiocytic lesions, 48% (n=53) were diagnosed as canine cutaneous histiocytoma, 21% (n=23) as reactive histiocytosis and 31% as malignant histiocytic tumors.
5. Cytopathologic differential diagnostic problems have occurred with histiocytic tumors, but epidemiological elements have allowed their elucidation.
6. High specificity cytomorphological characteristics of round cell tumors allowed an accurate and definitive diagnosis in over 90% of cases.
7. Aspirative cytology is an option with a high diagnostic value in cutaneous round cell tumors in dogs.

## REFERENCES

- Curtseit S., Popa E., Dinescu G., Militaru M., 2012. Evaluation of malignancy of canine mast cell tumour using computer-aided morphometry. *J. Comp. Pat.*, Vol. 146, Issue 1, pag 80
- Dinescu G., Ciobotaru E., Curtseit S., Gupceag E., Feghiu A., Militaru M., 2011. Overview of epidemiology and morphological diagnosos of cutaneous lesions in dog. *Lucrări Ştiinţifice Medicină Veterinară*, Vol. XLIV (2), Timișoara, 56-61
- Moore P.F., 2007. Cell differentiation markers in the diagnosis and classification of histiocytic proliferative disease of dogs, *European Society of Veterinary Pathology, Proceedings 25th Meeting*, 29 August-01 September, Munich, Germany, pp. 5-7
- Raskin R.E., 2010. *Skin and subcutaneous tissues din Canine and Feline Cytology: A Color Atlas and Interpretation Guide*, 2nd ed., Saunders, Missouri, USA, pp. 62-66.