CITOMORPHOLOGICAL DIAGNOSTIC OF MALIGNANT HISTIOCYTIC NEOPLASM IN DOGS

[1]Emilia BALINT, [2]Nicoale MANOLESCU, [1]Daniel LASTOFKA, [3]Andrei POPESCU
[1]The Faculty of Veterinary Medicine, Bucharest, Romania; [2]Bucharest Oncological Institute; [3]PhD Student at the Romanian Academy
emilia_balint@yahoo.com

Abstract
From the literature results that it can't be found information, for the canine species, about the cytomorfological differential diagnosis in the malignant histio-dendritical proliferations. In this paper the authors want to bring a series of exclusive cytomorphologic arguments for the positive diagnosis and differential diagnosis of canine malignat proliferations, which have as a proliferative cellular base, the histiocytic cell and the dendritic cell. In this study we discuss three cytomorphologic forms of malignant proliferations of the histiocytic and dendritic cell. Two of these forms, the dendritic sarcoma and the histiocytic sarcoma, belong to the malignant lymphoma category; these are solid tumors localized in the tegument, lymph nodes and spleen. The third histiocytic proliferation forms is the histiomonocytic leukemia, which belongs to the liquid forms, localized in the hematopoietic marrow, with permanent cytemic discharge in the peripheral blood. Between the dendritic sarcoma and the histiocytic sarcoma diagnosis confusions can be created. The differential diagnosis can be made with difficulty on the histopathological sample, but very easily on the cytomorphological ones. The differences obtained by the cytomorphological technique, which ensures at the end the differential diagnosis, are generated by two easily identifiable aspects: the first one consist in the presence of a large cytoplasm with multiple prolongations in dendritic sarcoma and total absence of this aspect in the histiocytic malignant cellular forms; the second aspect consists in the presence of a true syncytial cellular pointing out a veritable cytoplasmic mega-anastomosis in the dendritic sarcoma, and the lack of this aspect in the histiocytic proliferations. Histiomonocytic leukemia differs fundamentally from any other leukemia cell form by the the existence of a very high cellular polymorphism with cell gigantism and monstrosities. Finally, we make the assessment that besides the cytomorphological exam, there is no other methodology of these histiocytic proliferative variants except immunohistochemistry, which is an expensive and time consuming method. Histopathology can only provide the information that the malignant proliferation have as a cellular base, the histiocytic cell.

Keywords: *cancer, dendritic cell, histiocyte, histiomonocyte leukemia, sarcoma*

Introduction

Reviewing the literature of the past few years there were clearly outlined some aspects of general consensus. These aspects are: the relatively low incidence of histiocytic disease in dogs; this kind of neoplasia display very uncharacteristic clinical and pathological coarse of evolution exception being made by the cutaneous expressions; the diagnostic can be done by citology from fine needle aspiration of the lymph nodes or from peripheral blood smear which can be confirmed by histopathology or immunohistochemistry; the general cytomorphological aspects of these malignant proliferations resemble a lot the histiocytic cell; the differential diagnosis must be done between the histyomacrophagic and histyodendritic proliferations (1,2,3,4,5,6,7).

Materials and method

Our study was conducted within the Clinic of the Faculty of Veterinary Medicine in Bucharest on a number of 5 dogs, 4 of which presented with adenopathy, 2 of which were diagnosed with histiocytic sarcoma and 2 with dendritic sarcoma, the last one being diagnosed with acute histio-monocytic leukemia, an incidental finding at a routine hematologic exam.

The method comprised the citomorphological exam of peripheral blood and of fine needle aspirates from reactive lymph nodes. The smears obtained were stained in a panoptic fashion with May-Grunwald Giemsa.

Results and discussions

In the first section of this chapter we will make a brief cytomorphological description of each cell population in histiocytic proliferations from our cases as it follows:

- Histiocytic sarcoma is characterized by a monomorphous cell proliferation. The cells have relatively wide amphophylic cytoplasm with rare inclusions. The nucleus is round or oval, placed centrally or eccentrically, with spongy, quite lax chromatin. The nuclei may contain 1 or 2 prominent nucleoli, which in some cases have a gigantic aspect. In the smear can be identified rare huge cells, with only one nucleus but atypical.
- Dendritic sarcoma can be easily distinguished from the histiocytic sarcoma because the specific cell population is polymorphous with marked atypical morphology up to monster cells. Cells have basophilic cytoplasm which generates many expansions but have no inclusions. The nuclei are of various shapes and sizes with lax reticular chromatin and faded nucleoli. Little atypical mitosis can also be seen in large-sized cells. Clusters of 3 to 5 cells can be seen due to lack of cytoplasmic separation.
- Histio-monocytic leukemia is present in the peripheral blood with mixed proliferated cell population, both histiocytes and monocytes. The cells are large-sized, with slight basophilic cytoplasm (resembling cigar smoke). The nuclei can be round or irregular in shape, with stratified, quite lax chromatin. The nucleoli are all faded, not well contoured. Few microscope fields shown rare very large cells with strange shapes.

We consider that, by our cytomorphological architecture description of the cells population within each type of histiocytic malignant proliferation, the positive and differential diagnosis poses no great challenge or additional diagnostic investigations.

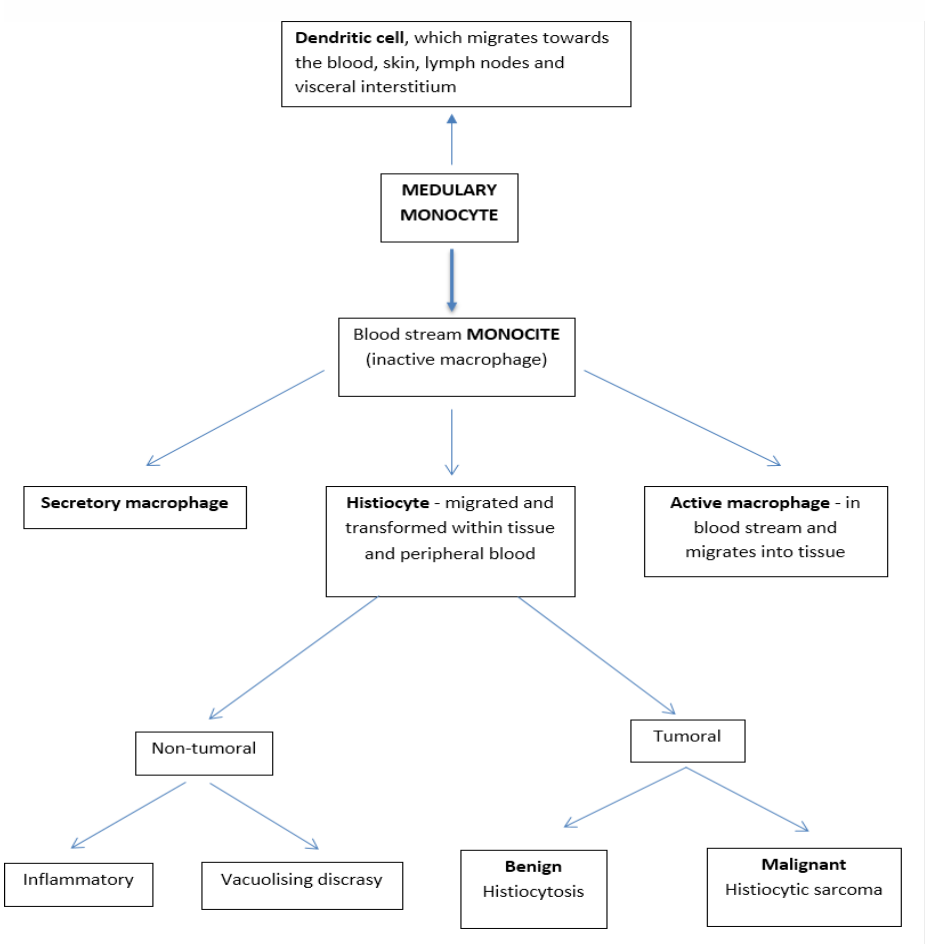
Next we will try to establish both consensus and divergences between literature and our cytomorphological data obtained from our cases.

Convergences are numerous and refer mainly to the validity of cytomorphogical exam in veterinary oncology as the first diagnostic tool of major importance for small animal cancer diagnostic. This statement is sustained by the fact that it is a fast and cheap method, and poses no additional risk for the patient. Referring to histiocytic proliferations all descriptions found in the literature resembled with our observations. Histopathology is of great use every time the cytomorphological exam in inconclusive. Speaking of immunohistochemistry, it is a significantly more laborious and a lot more expensive method, reason to be usually rejected by the owners.

There are also 2 contrary aspects between literature and the experience of our cytomorphology school. First is represented by the fact that simple classic cytology (May-Grunwald Giemsa staining) can establish a positive and differential diagnosis between the histiocytic and dendritic sarcomas (see the description above).

The second argument refers to the need of including the acute histio-monocytic leukemia within the histicytes pathology classifications. All of these cells, simple histiocytes or with macrophagic or dendritic orientation, originate from the medullary primordial stem cell, which, in its maturation process generates an intermediate stage called mielo-monocytic oriented stem cell.

Under this circumstances we believe that the histiocyte and its pathology has a much wider frame and thus we propose the following chart for a better understanding of tumoral and non-tumoral histiocytic pathology.



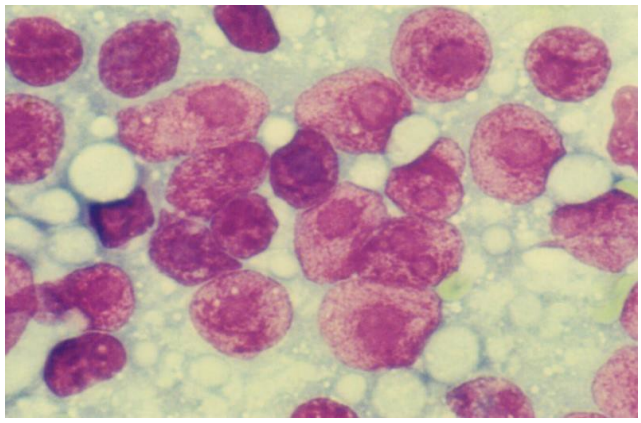


Fig. 1.

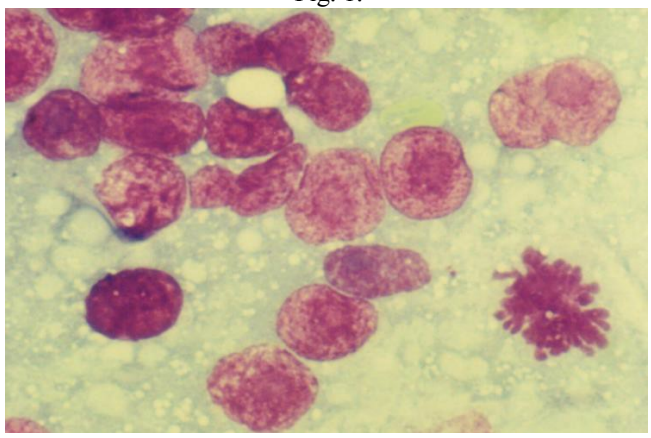


Fig. 2.

Fig. 1,2 - histiocytic blast cells from quasi-pure cell culture, describing large amfophilic cytoplasm with certain intracytoplasmic inclusions, large nuclei, relatively homogenous, with 1 or 2 nucleoli with lax chromatin

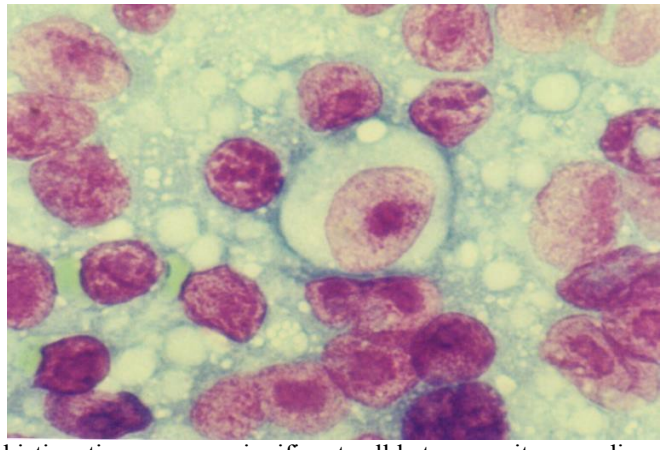


Fig.3 - histiocytic sarcoma - significant cell heterogeneity regarding size and shape and monster cells in a case of malignant histiocytic proliferation

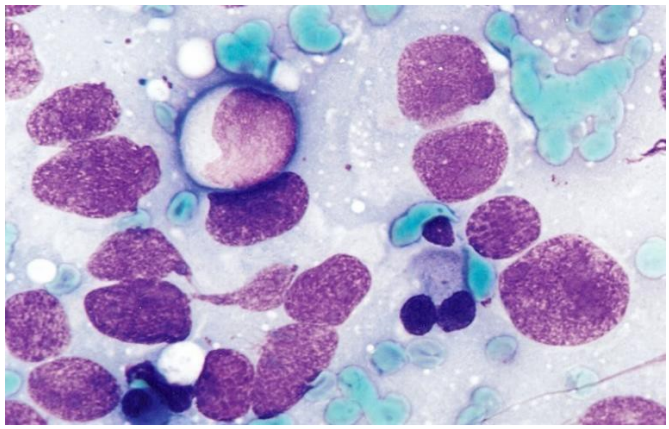


Fig. 4

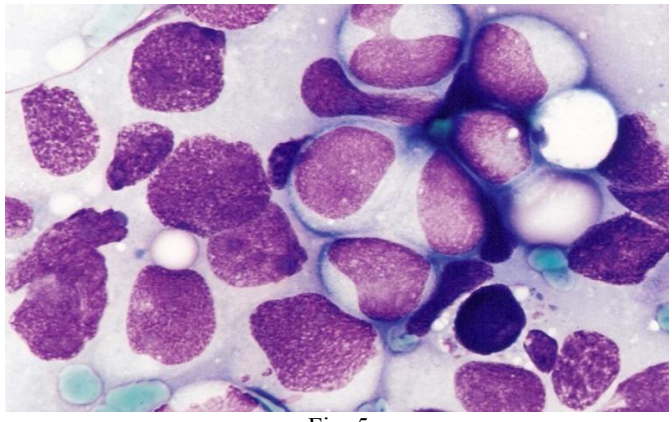


Fig. 5

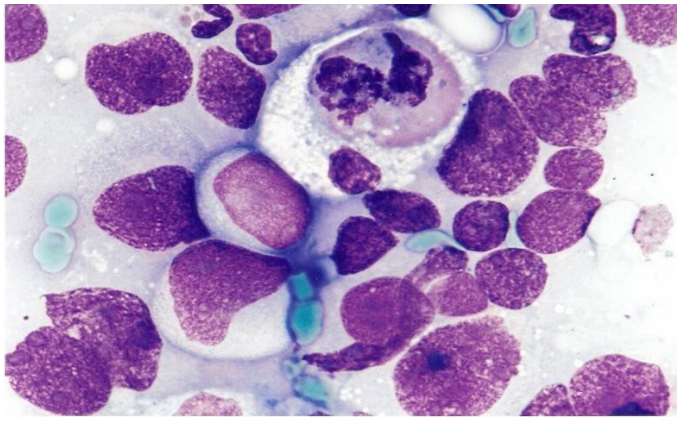


Fig.6

Fig. 4,5,6 - histio-monocytic leukemia; numerous atypical histiomonocytes (nulear and cytoplasmic criteria to include into malignant histiocytic proliferations)

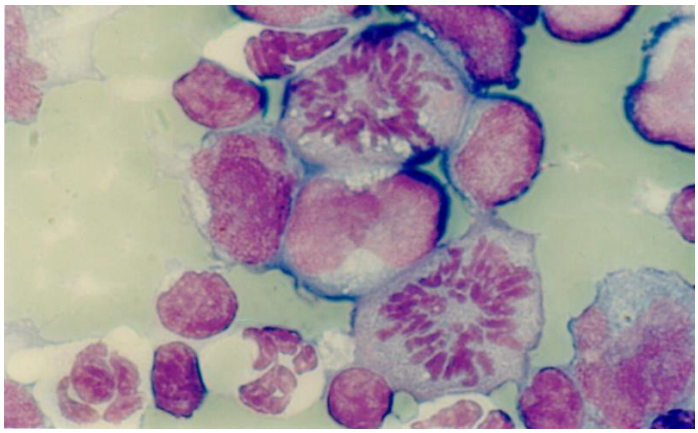


Fig. 7

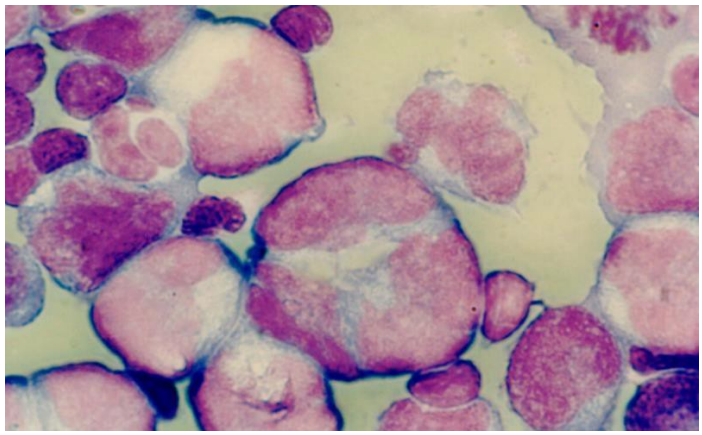


Fig. 8

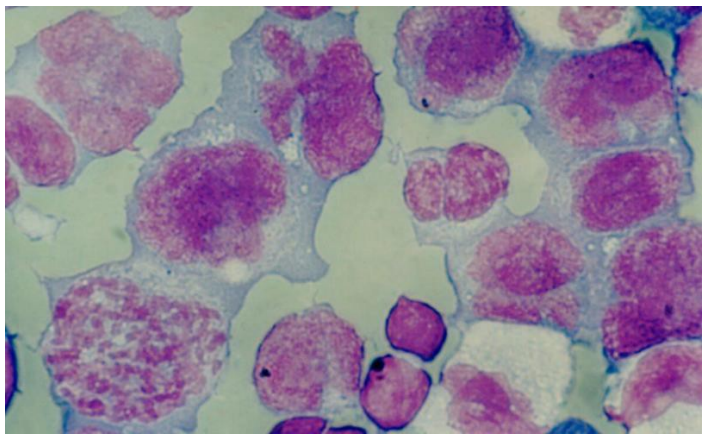


Fig. 9

Fig. 7,8,9 - dendritic sarcoma - cellular proliferation significantly different from histiocytes, marked by intense basophilic cytoplasm with multiple prominences, with large nuclei with numerous mitotic figures, frequent monster cells and sponge-like aspect chromatin.

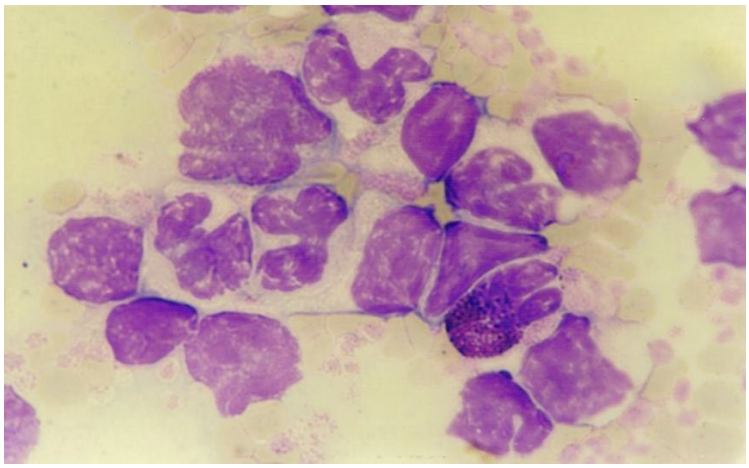


Fig.10 – Histio-monocytic leukemia

Conclusions

1. Cytomorphological exam is a great diagnostic tool for tumoral pathology of the histiocyte.
2. The cytmorphological exam can differentiate both histiocytic proliferative disease as well as non-tumoral histiocytic pathology.
3. We can differentiate the histiocytic sarcoma and the dendritic sarcom on the cytomorphological exam solely.
4. The histio-monocytic leukemia must be included within the histiocytic tumoral proliferative diseases.

References

1. A. R. Coomer, J.M. Liptak - Canine Histiocytic Diseases, Compend Contin Educ Vet. 2008 Apr;30(4):202-4, 208-16;
2. Amanda K. Fulmer and Glenna E. Mauldin - Canine histiocytic neoplasia: An overview, Can Vet J. 2007 Oct; 48(10): 1041–1050.
3. D. J. Argyle, M. J. Brearley, M. M. Turek; - Decision Making in Small Animal Oncology, Blackewell, 2008
4. R. Sapierzyński, D. Jagielski, I. Dolka, M. Fabisiak -Cytopathological diagnosis of visceral histiocytic sarcoma in five dogs, Polish Journal of Veterinary Sciences Vol. 15, No. 4 (2012), 751-758
5. Susan North, Tania Banks - Introduction to Small Animal Oncology, Saunders, Elsevier, 2009
6. V. K. AFFOLTER AND P. F. MOORE - Localized and Disseminated Histiocytic Sarcoma of Dendritic Cell Origin in Dogs, Vet Pathol 39:74–83 (2002)
7. WITHROW AND MACEWEN'S SMALL ANIMAL CLINICAL ONCOLOGY, Saunders Elsevier, 2007.