



Original Contribution

CORRELATION BETWEEN TUMOUR DIAMETER AND PRESENCE OF METASTASES TO THE REGIONAL LYMPH NODES IN SPONTANEOUS CANINE HEPATOID ADENOCARCINOMAS

G. Simeonova¹, R. Simeonov^{2*}

¹Department of Veterinary Surgery, Faculty of Veterinary Medicine, Trakia University, Stara Zagora, Student's Campus, 6000 Stara Zagora, Bulgaria

²Department of General and Clinical Pathology of Animals, Faculty of Veterinary Medicine, Trakia University, Stara Zagora, Bulgaria

ABSTRACT

The aim of the present study was to investigate the correlation between tumour diameter and presence of metastasis to regional lymph nodes in spontaneous canine hepatoid adenocarcinomas. The study was performed on 18 spontaneous canine hepatoid adenocarcinomas. On gross examination at the time of tumour excision, 10 had no metastases and 8 had metastasized to the local lymph nodes. The tumour diameters were determined as > 5 cm or < 5 cm after the surgical removal of neoplastic formations. The 87.5 % of all affected animals that had tumour diameters > 5 cm, were already lymph node positive. A significant positive correlation ($p=0.66$) was found between tumour diameter and metastases to the regional lymph nodes. The results of our investigations demonstrated that the diameter of the neoplastic growth is an important prognostic factor for the presence of metastases in canine hepatoid adenocarcinomas.

Key words: *canine hepatoid adenocarcinoma, tumour diameter, metastases, correlations.*

INTRODUCTION

Hepatoid gland adenocarcinomas are malignant tumours arising from the circumanal glands, which are modified sebaceous glands (1, 2) These glands occur only in Canidae and are referred to as hepatoid glands because morphologically the cells resemble hepatocytes. The tumour incidence amounts to 3-21 % of all canine neoplastic formations in this region. Dogs between 4 and 15 years of age are affected, with peak incidence between 8 and 12 years of age. The rate of growth of hepatoid gland adenocarcinoma is variable. Metastasis occurs via the lymphatic route to the sacral and internal iliac lymph nodes with subsequent spread to lung and other organs. Criteria to predict metastases of these tumours are lacking (2).

The aim of the present study was to

investigate the correlation between tumour diameter and metastasis to regional lymph nodes in spontaneous canine hepatoid adenocarcinomas.

MATERIAL AND METHODS

The study was performed on 18 spontaneous canine hepatoid adenocarcinomas. The tumour samples were collected at the time of surgical removal from dogs presented to the Department of Surgery, Faculty of Veterinary Medicine, Trakia University, Stara Zagora, Bulgaria. On gross examination at the time of tumour excision, 10 were well-circumscribed and 8 had metastasized to the local lymph nodes (**Figure 1**). The tumour diameters were determined as >5 cm or <5 cm after surgical removal of neoplastic formations. Several tissue blocks from each tumour were formalin fixed and paraffin wax embedded, and sections (4 μ m) were stained with hematoxylin and eosin (HE). Subsequently all diagnoses were histopathologically confirmed according to the WHO International Histological Classification of Tumours of Domestic Animals (3). The correlation between tumour diameter and metastases in

* **Correspondence to:** R. Simeonov, Department of General and Clinical Pathology of Animals, Faculty of Veterinary Medicine, Trakia University, Stara Zagora, Student's Campus, 6000 Stara Zagora, Bulgaria; Tel.: +359 42 699565, Fax: +359 42 670624, E-mail: rsimeonov@uni-sz.bg

the regional lymph nodes was evaluated using the Pearson's correlation test (Statistica 6.0, StatSoft, Tulsa, OK, USA) at a $p < 0.05$ level of significance.

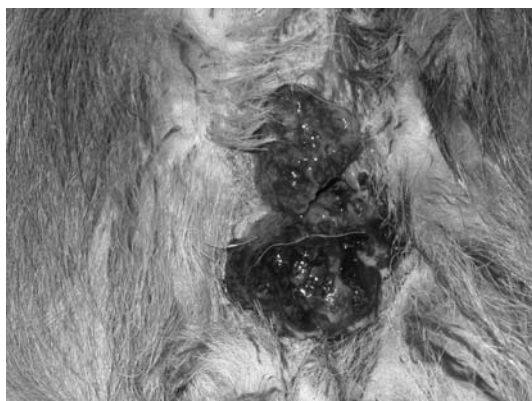


Figure 1. Macroscopic view of hepatoid adenocarcinoma. Note the haemorrhages and necrotic tissue on the neoplastic surface

RESULTS

The signalment and clinical data for each of investigated tumours are presented on **Table 1**. Eleven dogs with hepatoid

adenocarcinomas in this study (61.12 %) were male and 7 (38.88 %) were female. Their age at the time of surgical excision ranged from 7 to 14 (mean 10.33) years and the distribution of the breeds was as follows: Mixed (6), Bulldog (2), Poodle (2), Rottweiler (2), Boxer (2), Collie (1), German shepherd (1), Cocker Spaniel (1) and Doberman pinscher (1). A significant positive correlation ($p = 0.66$) was found between tumour diameter and the presence of metastases to the regional lymph nodes.

DISCUSSION

The majority of dogs affected by malignant neoplasm in our study were male, that corresponded to the findings of Vail et al., (4) but was in contrast to the finding of Berrocal et al., (1). At the time of the diagnoses, 8 (44.44 %) of affected dogs had metastases in the regional lymph nodes. Moreover, 87.5 % of affected animals with tumour diameter over 5 cm had already lymph node positive (**Table 1**).

Table 1. Signalment and clinical data of dogs with hepatoid adenocarcinomas

Tumours Canine hepatoid adenocarcinomas	Breeds	Age (years)	Sex	Tumour diameter	Metastases in the regional lymph nodes
1	Mixed	11	M	>5 cm	yes
2	Mixed	14	M	>5 cm	yes
3	Collie	14	F	>5 cm	yes
4	Mixed	8	F	>5 cm	no
5	Boxer	7	M	>5 cm	no
6	Bulldog	13	M	>5 cm	yes
7	Bulldog	10	F	>5 cm	no
8	Mixed	10	M	>5 cm	no
9	Mixed	9	M	>5 cm	no
10	German shepherd	12	F	>5 cm	yes
11	Rottweiler	11	F	>5 cm	yes
12	Cocker Spaniel	9	M	>5 cm	no
13	Mixed	8	F	>5 cm	no
14	Boxer	12	M	>5 cm	yes
15	Doberman Pinscher	10	M	>5 cm	no
16	Poodle	7	F	>5 cm	no
17	Poodle	10	M	>5 cm	yes
18	Rottweiler	11	M	>5 cm	no

In human medicine, and from a clinical point of view, the parameters of prognostic value are the diameter of the neoplastic growth and the presence or absence of metastases in regional lymph nodes (5, 6). In veterinary medicine there are some reports, which proved the positive correlation between tumour size and metastases in different types of tumours (7, 8, 9, 10, 11), but at the same

time there are no publications related to these parameters in canine hepatoid adenocarcinomas. The recent investigations in a series of 41 dogs with canine anal sac apocrine adenocarcinoma showed that tumours with diameters less than 5 cm were associated with 2-year tumour control rates in excess of 60 %, suggesting that surgical removal of these masses at an early stage is

relatively successful with respect to disease control (12). Fifteen percent of dogs had evidence of metastasis at the time of diagnosis, which related negatively to survival. The median survival time for dogs with lymph node or distant metastasis was 7 months.

In conclusion, the results of our investigations demonstrated that the diameter of the neoplastic growth is a prognostic factor for the presence of metastases in canine hepatoid adenocarcinomas. That way, our results support the prognostic value of these parameters in oncology. Additional studies are under way in our faculty to establish relationships between signalment, clinical, postoperative follow-up data and nuclear morphometric parameters in canine hepatoid adenocarcinomas.

REFERENCES

1. Berrocal, A., Vos, J., van den Ingh, T., Molenbeek, R. and van den Sluijs., Canine perineal tumours. *Zbl Vet Med*, 36:739-749, 1989.
2. Goldshmidt, M. and Hendrick, M., Tumours of the Skin and Soft Tissue. In: Meuten, D (Ed.), *Tumors in Domestic Animals*, 4th edition, Iowa State Press, pp. 68-70, 2000.
3. Goldschmidt, M., Dunstan, R., Stannard, A., von Tscharner, C., Walder, E. and Yager, J., *Histological classification of Tumours of the Skin of Domestic Animals, World Health Organization International Classification of Tumors in Domestic Animals*, Second Series, Vol III. Washington D.C.: Armed Forces Institute of Pathology, American Registry of Pathology, 1998.
4. Vail, D., Withrow, S. and Shwartz, P., Perianal adenocarcinoma in a canine male: a retrospective study of 41 cases. *J Am Vet Med Assoc*, 192:326-334, 1990.
5. Baak, J., Kurver, P., De-Snoo-Niewlaat, A., De Graef, S., Makkink, B., Boon, M., Prognostic indicators in breast cancer-morphometric methods. *Histopathology*, 6: 327-339, 1982.
6. Wolberg, W., Street, W., Mangasarian, O., Importance of nuclear morphology in breast cancer prognosis. *Clinical Cancer Research*, 5: 3542-3548, 1999.
7. Viste, J., Myers, S., Singh, B., Simko, E., Feline mammary adenocarcinomas: tumor size as a prognostic indicator. *Can Vet J*, 43: 33-37, 2002.
8. Williams, L., Gliatto, G., Dodge, R., Johnson, J., Gamblin, R., Thamm, D., Lana, S., Szymkowsky, M., Moore, A., Carcinoma of the apocrine glands of the anal sac in dogs: 113 cases (1985-1995). *J Am Vet Med Assoc*, 223 (6): 825-831, 2003.
9. Chang, S., Chang, C., Chang, T., Wong, M., Prognostic factors associated with survival two years after surgery in dogs with malignant mammary tumors: 79 cases (1998-2002). *J Am Vet Med Assoc* 227 (10): 1625-1629, 2005.
10. Mullins, M., Dernell, W., Withrow, S., Ehrhart, E., Tham, D., Lana, S., Evaluation of prognostic factors associated with outcome in dogs with multiple cutaneous mast cell tumors treated with surgery with and without adjuvant treatment: 54 cases (1998-2004). *J Am Vet Med Assoc*, 228:91-95, 2006.
11. Simeonov, R., Simeonova, G., Nuclear cytomorphometry in feline mammary gland epithelial tumours. *The Veterinary Journal*, in press, corrected proofs, available on-line october 2007 - http://www.sciencedirect.com/science?_ob=ArticleListURL&_method=list&_ArticleListID=675803172&_sort=d&view=c&_acct=C000050221&_version=1&_urlVersion=0&_userid=10&md5=2b2cebbb0a9d50235cc05b3a9cf346be), 2007
12. Williams, L., Gliatto, G., Dodge, R., Johnson, J., Gamblin, R., Thamm, D., Lana, S., Szymkowsky, M., Moore, A., Carcinoma of the apocrine glands of the anal sac in dogs: 113 cases (1985-1995). *J Am Vet Med Assoc*, 223 (6): 825-831, 2003.