

A RETROSPECTIVE STUDY OF ORAL NEOPLASMS IN DOGS: A SURVEY FROM 1941 TO 1986

JOSÉ LUIZ GUERRA

Professor Assistente Doutor
Faculdade de Medicina Veterinária e
Zootecnia da USP

MARIA LÚCIA ZAIDAN DAGLI

Professor Auxiliar de Ensino
Faculdade de Medicina Veterinária e
Zootecnia da USP

LUZIA FIORI GOODY

Cirurgião Dentista Estagiário
Faculdade de Odontologia da USP

ESTHER GOLDENBERG BIRMAN

Professor Associado
Faculdade de Odontologia da USP

GUERRA, J.L.; DAGLI, M.L.Z.; GOODY, L.F.; BIRMAN, E.G. A retrospective study of oral neoplasms in dogs: a survey from 1941 to 1986. *Rev. Fac. Med. Vet. Zootec. Univ. S. Paulo*, 26(2): 207-212, 1989.

SUMMARY: The authors present a survey of benign and malignant neoplasms of the canine oral cavity observed at the Department of Pathology of the "Faculdade de Medicina Veterinária e Zootecnia da Universidade de São Paulo", from 1941 to 1986. The slides of all the cases were reviewed by at least two pathologists individually: clinical data were recorded whenever possible. The squamous cell carcinoma was the most frequent malignant neoplasm, and the papilloma the most prevalent benign neoplasm. Sex, age and breed findings, as well as other aspects are discussed and compared with the literature data.

UNITERMS: Oral neoplasms; Squamous cell carcinoma; Neoplasms of dogs

INTRODUCTION

The study of oral neoplasia of domestic animals is justified for many reasons. Besides its importance for the animal health, a comparative study between these lesions in men and animals would bring valuable information about the etiopathogeny of these processes,

moreover when these species are exposed to the same environmental conditions. For this purpose the dog is a more suitable animal in comparison to larger species such as cattle, sheep and goat, due to its greater longevity, larger population, and due to its situation as a companion animal^{9,22,18}.

The oral cavity of the dog presents various lesions, among which outstand numerous benign and malignant neoplasms. These lesions often require the confirmation of a histopathological diagnosis, since their clinical features not always indicate the true nature and behaviour of the tumour, rendering difficult the choice of the most suitable surgical or therapeutic management, as well as a prognostic appreciation²⁵.

The benign and malignant oral neoplasms comprise 6.57% of all neoplasms of the dog¹⁹, being the oral plus pharyngeal regions the fourth site for the development of malignant neoplasms in this species²⁴. So the malignant tumours represent 5.4% and the benign ones 3.4% of all neoplasias of the dog⁷.

In our country, there are no data about the frequency of oral neoplasms in domestic animals, so giving us an open field for investigation.

The varied types of tumours found in the oral cavity of dogs, as well as in other sites of the body, permit the statement that almost every cellular lineage is potentially capable of originating benign and malignant tumours. Cotchin⁶ study reported 53.2% of oral malignant neoplasms in the dog, with a prevalence of sarcomas. In other studies, epulides were considered the most frequent benign lesions, and the melanoma the most important malignant neoplasia of the dog's oral cavity^{9,5,7}.

Other authors refer the squamous cell carcinoma as the most prevalent lesions of the mouth^{3,24,25}. These data may also vary according to the geographic location where they have been surveyed¹.

This study was carried out in order to obtain information about the types and frequency of oral neoplasms in dogs among us.

MATERIAL AND METHOD

Oral lesions of dogs were surveyed from the archives of the Department of Pathology of the "Faculdade de Medicina Veterinária e Zootecnia da Universidade de São Paulo" (Brasil). Among the 20.765 registers consulted, including biopsy or necropsy cases, collected from 1941 to 1986, 233 cases were selected. The lesions of the gums, lips, palates, tongue, and jugal mucosa were collected. Lesions of the skin, bones, and salivary glands were not included. Clinical data were recorded whenever possible.

Slides and paraffin blocks were available from 178 of the 233 selected cases. The slides were stained in hematoxylin-eosin, and other specific staining methods, such as Masson, Toluidin Blue and PAS, were used when necessary.

Each case was reviewed by at least two pathologists individually, being the results compared and discussed.

RESULTS

After histopathological examination, it was possible to place the lesions in three large groups: inflammatory, neoplastic, and epulis, the latter being a group of lesions of indefinite nature and considered distinctly (Tab. 1).

Inflammatory lesions - These were represented by either acute or chronic inflammatory processes, e.g. parasitary granulomas, pyogenic granulomas and non-specific inflammatory lesions. These lesions deserve a separate study, since the few available clinical data rendered it impossible a more accurate evaluation.

Epulides - These common oral lesions of dogs, probably histogenetically related to the periodontal ligament, have been considered nonneoplastic or benign neoplastic lesions^{13,2}. In our sample, they were diagnosed in 40 cases, and their histological characteristics will be reported elsewhere.

Neoplastic lesions - The diagnosis of neoplasms was made in 104 cases, comprising benign and malignant tumours. The most prevalent benign tumour was the papilloma, followed by other benign tumours of mesenchymal origin, such as neurofibromas, fibromas and one hemangioma. The squamous cell carcinoma was the most frequent malignant neoplasia, followed by melanoma, fibrosarcoma, mastocytoma, and other malignant mesenchymal tumours (Tab. 2).

SITE - Gums were the most frequent site where neoplasms were found in the dog oral cavity, in a total of 37 cases, being 27 malignant and 10 benign tumours.

Lips were the second site in prevalence of lesions, with 14 malignant and 10 benign tumours. Palate and the indetermined site referred as "mouth" were the third and fourth sites where benign and malignant neoplasms were seen. The floor of the mouth and the tongue were compromised in only two and one case respectively (Tab. 3).

Sex, age, and breed - This information was available in 36 cases, among the 104 tumours surveyed. They

represented 13 benign and 23 malignant neoplasms. In our sample tumours were more frequent in male dogs, which comprised 21 cases (9 benign and 12 malignant tumours), while 3 benign and 3 malignant tumours were found in female dogs. Most tumours were seen in dogs under three years of age but both benign and malignant tumours were seen in dogs of all ages, including a 20 year old dog (Tab. 4).

Breed was specified in only 29 cases. Mongrel dogs were the most affected by lesions, with 11 tumours in the oral cavity, being 7 malignant and 4 benign. Pekingese dogs were affected by 7 malignant and 1 benign tumours. In both German Shepherd and Boxer dogs 2 malignant and 1 benign tumours were seen (Tab. 5).

Histopathological findings - Papillomas were characteristic benign proliferations of epithelial tissue, projecting out of the surface its fingerlike or papillary formations. They were generally accompanied by hyperkeratosis, epithelial vacuolizations, and sometimes some acidophilic cytoplasmic inclusion bodies were present. A scarce connective tissue, without significant inflammatory process sustained the neoplastic epithelium.

The benign mesenchymal neoplasms were composed mostly by spindle cells arranged in parallel bands or in whorls, without anaplasia or atypia, and diagnosed as fibromas or neurofibromas. Only one case of hemangioma was observed, with its small vessels forming an organoid aspect.

There were no difficulties in the diagnosis of squamous cell carcinoma, as the malignant epithelial proliferation was markedly characteristic, presenting variable degrees of anaplasia, undifferentiation, numerous atypical mitosis, and the presence of horny pearls. A prominent feature was the degree of invasion of the epithelial cells into the subjacent connective tissue, always using PAS staining to detect the basal membrane.

Histologically, the melanomas diagnosed in our sample were composed by the proliferation of melanocytes presenting many aspects, from spindle or epithelioid forms to an alveolar arrangement. Most part of the melanomas were pigmented, and only one case was of the amelanotic type.

The fibrosarcoma observed was composed by a malignant proliferation of fibroblasts, with variable degrees of anaplasia and undifferentiation, besides numerous atypical mitosis. Among these spindle cells, variable amounts of collagen fibres could be seen, by using Masson staining.

Histologically, mast cell tumours were malignant proliferations of round large cells with cytoplasmic basophilic granulations. These cells may be found scattered through the connective tissue, or grouped in dense masses that grow invasively. In the great majority

of the mastocytomas, the presence of eosinophils accompanying the proliferations was found. The Toluidin Blue was used to distinguish this neoplasia from others like lymphomas, histiocytomas and undifferentiated carcinomas.

DISCUSSION

Since no other reports on this subject are available in our country, a retrospective survey like the present one undoubtedly brings valuable information for veterinary practice, and gives many perspectives for future studies.

Other authors have already stated that men and dogs share the same types of tumours in oral cavity^{9,15,22}. The difference lies in the frequency of the types of tumours in both species, according to the geographic location where they have been surveyed, suggesting the influence of environmental conditions¹.

The incidence of oral tumours in this survey is greater in male than in female dogs. These data are in accordance with other reports^{24,12,11}. On the contrary, in our survey tumours were mostly found in young dogs below three years of age, which is in disagreement with other reports, in which oral tumours were found most frequently in middle-aged or older dogs^{10,24,12,11}. Our cases have shown that mongrel dogs were most frequently affected by tumours. In our opinion, this is related to the great number of those dogs in the population studied, and not to a predilection for breed.

In relation to the tumour localization, the literature refers the tongue as a common site for development of neoplasms^{24,12,8}. In this survey, this local was rarely affected in comparison to the man, where the tongue is also a common site for the development of tumours, mainly the squamous cell carcinoma^{23,14}.

Papillomatosis are common benign lesions of human and canine oral cavity. In dogs they are surely of viral etiology, transmissible, and found frequently in young animals^{16,4}. In man, there is no confirmation for their viral etiology²³. Their true incidence in dogs is unknown. Due to their easily identifiable gross features, these lesions are not always biopsied, and regress spontaneously after 4 or 8 weeks⁸.

The squamous cell carcinoma was the most frequent neoplasm of the canine oral cavity, and it is noteworthy that this malignant neoplasia is the most frequent in human oral cavity too, representing more than 90% of all oral neoplasias in this species^{23,20}. In our cases, this neoplasm was found in dogs of different ages, but some authors have shown that they appear after six years of age, or at a mean age of 8.4 years^{15,11}. In man, they occur around 50 years of age. These findings lead us to

wonder about which factors would be responsible for the development of these tumours.

Melanomas were most frequently found in gums, as well as in other reports^{10,21,12}. The high frequency of this tumour may be justified by the presence of large amounts of melanocytes in the gums of dogs. Melanomas are highly invasive, metastasizing easily, resulting in a poor prognosis.

Mast cell tumours rarely affect mucous membranes, being most frequently found in the skin of dogs. GORLIN & PETERSON¹⁰ (1967) described 27 cases of mast cell tumours in oral cavity of dogs, with 19 located in lips and three in gums, but in our study most of the cases were localized in gums. Other authors do not even mention mast cell tumours in their surveys^{6,15}.

This report permits only limited conclusions, due to the paucity of clinical data, and the faulty follow-up of the cases. For this purpose, we suggest the establishment of a standardized clinical staging, using the WHO's TNM classification¹⁷, that includes the examination of the lymph nodes and of distant metastasis, a suitable treatment protocol, and an efficient follow-up. Biopsy procedure must be adopted in every case, accompanied by detailed description of the case. So, it will be possible to apply statistical evaluations, and help to obtain a better knowledge of the biology of these tumours.

ACKNOWLEDGMENTS

The authors are grateful to Professor Dr. R.A.-M. Saliba for his collaboration in the histopathological diagnosis, and to Mrs. V.Z. Dagli, for the English revision.

GUERRA, J.L.; DAGLI, M.L.Z.; GODOY, L.F.; BIRMAN, E.G. Neoplasias da cavidade bucal de cães: casuística. *Rev. Fac. Med. Vet. Zootec. Univ. S. Paulo*, 26(2): 207-212, 1989.

RESUMO: Os autores apresentam uma casuística das neoplasias benignas e malignas da cavidade bucal de cães, coletadas nos arquivos do Departamento de Patologia da Faculdade de Medicina Veterinária e Zootecnia da Universidade de São Paulo, desde 1941 até 1986. Os dados clínicos foram registrados quando presentes, e todos os casos foram revistos e confirmados por pelo menos dois patologistas individualmente. A neoplasia maligna mais frequente foi o carcinoma epidermóide, sendo o papiloma a neoplasia benigna mais diagnosticada. Dados clínicos como sexo, idade, raça e outros aspectos são discutidos e comparados com a literatura disponível.

UNITERMOS: Boca, neoplasias; Carcinoma epidermóide;
Neoplasias, cães

TABLE 1 – Oral lesions in dogs. Department of Pathology, FMVZ/USP, from 1941 until 1986.

TYPE OF LESION	NUMBER OF CASES	FREQUENCY (%)
Inflammatory	34	19.10
Epulides	40	22.47
Neoplastic	104	58.43
TOTAL	178	100.00

TABLE 2 – Oral tumours of dogs. Department of Pathology, FMVZ/USP, from 1941 until 1986.

TUMOURS	NUMBER OF CASES	FREQUENCY (%)
BENIGN TUMOURS		
Epithelial origin (papillomas)	19	18.27
Mesenchymal origin	16	15.38
MALIGNANT TUMOURS		
Squamous cell carcinoma	32	30.77
Melanoma	15	14.42
Fibrosarcoma	12	11.54
Mastocytoma	7	6.73
Fibrohistiocytoma	1	96
Lymphoma	1	96
Angiosarcoma	1	96
TOTAL	104	100.00

TABLE 3 - Site and type of lesion in the oral cavity of the dog. Department of Pathology, FMVZ/USP, from 1941 until 1986.

SITE	BENIGN TUMOURS	MALIGNANT TUMOURS	TOTAL
GUMS	10	27	37
LIPS	10	14	24
PALATE	4	15	19
INDETERMINATED	10	8	18
FLOOR OF MOUTH	1	1	2
TONGUE	0	1	1
TOTAL			104

TABLE 4 - Age and the incidence of tumours in oral cavity of the dog. Department of Pathology, FMVZ/USP, from 1941 until 1986.

TUMOURS	(AGE IN YEARS)				
	< 3	3 TO 6	6 TO 9	9 TO 12	> 12
BENIGN	7	2	1	1	1 (20 YRS)
MALIGNANT	5	3	5	5	3
TOTAL	12	5	6	6	4

TABLE 5 - Breed and the finding of neoplasia in dog's oral cavity. Department of Pathology, FMVZ/USP, from 1941 until 1986.

BREED	BENIGN TUMOURS	MALIGNANT TUMOURS	TOTAL
MONGREL	4	7	11
PEKINGESE	1	7	8
GERMAN SHEPHERD	1	2	3
BOXER	1	2	3
ST. BERNARD	1	1	2
PINSCHER	-	1	1
POINTER	1	-	1
TOTAL			29

REFERENCES

- 01-BOSTOCK, D.E. & CURTIS, R. Comparison of canine oropharyngeal malignancy in various geographic locations. *Vet. Rec.*, 114:341-342, 1984.
- 02-BOSTOCK, D.E. & WHITE, R.A.S. Classification and behaviour after surgery of canine "epulides". *J. comp. Path.*, 97:197-206, 1987.
- 03-BRODEY, R.S. A clinical and pathologic study on 130 neoplasms of the mouth and pharynx in the dog. *Amer. J. vet. Res.*, 21:787-812, 1960.
- 04-CHEVILLE, N.F. & OLSON, D.V.M. Cytology of the canine oral papilloma. *Amer. J. Path.*, 45:849-863, 1964.
- 05-COHEN, D.; BRODEY, R.S.; CHEN, S.M. Epidemiologic aspects of oral and pharyngeal neoplasms in the dog. *Amer. J. vet. Res.*, 25:1776-1779, 1964.
- 06-COTCHIN, E. Neoplasms in small animals. *Vet. Rec.*, 63:67-72, 1951.
- 07-DORN, C.R.; TAYLOR, D.O.N.; FRYE, F.L.; HIBBARD, H.H. Survey of animal neoplasms in Alameda and Contra Costa Counties, California. I. Methodology and description of cases. *J. nat. Cancer Inst.*, 40:295-305, 1968.
- 08-EMMS, S.G. The management of oral tumours in dogs and cats. *Aust. vet. J.*, 64:22-25, 1987.
- 09-GORLIN, R.J.; CLARK, J.J.; CHAUDRY, A.P. The oral pathology of domesticated animals. *Oral Surg.*, 11:500-535, 1958.
- 10-GORLIN, R.J. & PETERSON, W.C. Oral diseases in man and animals. *Arch. Derm.*, 96:390-402, 1967.
- 11-HARVEY, H.J. Oral tumours. *Vet. Clin. N. Amer. Small anim. Pract.*, 15:493-500, 1985.
- 12-HOYT, R.F. & WITHROW, S.J. Oral malignancy in the dog. *J. Amer. Anim. Hosp. Ass.*, 20:83-92, 1984.
- 13-JUBB, K.V.F.; KENNEDY, P.C.; PALMER, N. The alimentary system. In: *Pathology of domestic animals*. 3. ed. Florida, Academic Press, 1985. v.2, p.17-19.
- 14-LUCAS, R.B. *Pathology of tumours of the oral tissues*. 3. ed. London, Churchill Livingstone, 1976.
- 15-MULLIGAN, R.M. Comparative pathology of human and canine cancer. *Ann. N. Y. Acad. Sci.*, 108:642-690, 1963.
- 16-OLAFSON, P. Oral tumours of small animals. *Cornell Vet.*, 29:222-237, 1939.
- 17-OWEN, L.N. *TNM classification of tumours in domestic animals*. Geneva, World Health Organisation, 1980.
- 18-PIERRENPOINT, C.G. Possible benefits to veterinary medicine of considering the dog as a model for human cancer. *J. small Anim. Pract.*, 26:43-47, 1985.
- 19-PRIESTER, W. & MANTEL, N. Occurrence of tumours in domestic animals. Data from 12 United States and Canadian College of Veterinary Medicine. *J. nat. Cancer Inst.*, 47:133-144, 1971.
- 20-RICHARDSON, R.C.; JONES, M.A.; ELLIOT, G.S. Oral neoplasms in the dog: a diagnostic and therapeutic dilemma. *Compend. contin. Educ. pract. Vet.*, 5:441-446, 1983.
- 21-SCHLUMBERGER, H.G. Comparative pathology of oral neoplasms. *Oral Surg.*, 6:1078-1094, 1953.
- 22-SHAFER, W.G.; HINE, M.K.; LEVY, B.M. *A textbook of oral pathology*. 3. ed. Philadelphia, W.B. Saunders, 1974.
- 23-SPOUGE, J.D. Clinical features of oral cancer. *J. Canad. Dent. Ass.*, 49:207-210, 1974.
- 24-TODOROFF, R.J. & BRODEY, R.S. Oral and pharyngeal neoplasia in the dog. A retrospective survey of 361 cases. *J. Amer. Vet. Med. Ass.*, 175:567-571, 1979.
- 25-WHITE, R.A.S.; JEFFERIES, A.R.; FREEDMAN, L.S. Clinical staging for oropharyngeal malignancies in the dog. *J. small Anim. Pract.*, 26:581-594, 1985.

Recebido para publicação em 01/12/88
Aprovado para publicação em 05/04/89