

INCIDENCE OF CANINE NEOPLASMS –
A RETROSPECTIVE HISTOPATHOLOGICAL STUDY.
IV. OROPHARYNGEAL TUMOURS

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Summary

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A histopathological study of 65 specimens from spontaneous tumour growths localized in the oropharyngeal region in dogs was performed at the Faculty of Veterinary Medicine, Trakia University – Stara Zagora. The tumours were classified according to the criteria of the World Health Organization. Twenty nine tumours (44.62%) were classified as epulides, 16 (24.62%) as malignant melanomas, 8 (12.31%) – as squamous cell carcinomas, 5 (7.69%) – as liposarcomas, 3 (4.62%) – as fibrosarcomas, 3 (4.62%) – as osteosarcomas and 1 (1.54 %) – as benign melanoma. The incidence of oral tumours depending on dog's breed, gender and age was also studied.

Key words: dogs, incidence of oral neoplasms

INTRODUCTION

The tumours, localized in the oral cavity are commonly encountered in dogs. According to some studies, the incidence of oral neoplasms in dogs is lower than that of mammary, skin and genital tumours (Dorn and Priester, 1976; Tzvetkov, 1998). The majority of studies revealed that the gingiva and the labial mucosa were the commonest predilection sites (Yoshida *et al.*, 1999; Ramos–Vara *et al.*, 2000).

This neoplastic type is generally encountered in older dogs (Kraft *et al.*, 1990; Ballinari *et al.*, 1998). The average age with the highest risk towards oral tumour development is over 11 years (Ramos–Vara *et al.*, 2000) or about 8 years (Tzvetkov, 1998; Yoshida *et al.*, 1999).

The results about affected breeds are contradictory. A study of 469 oropharyngeal tumours (Dorn and Priester, 1976) showed an increased risk in Pointers, Boxers and Cocker Spaniels. According to other investigators (Tzvetkov, 1998; Ramos–Vara *et al.*, 2000) there is not a breed predisposition. The neoplasms are more frequently encountered in male dogs and there is not a significant difference of their incidence in small and large settlements (Brodey, 1970; Dorn and Priester, 1976).

The incidence of the various types of tumours is variable. In some histological studied, melanoma was the commonest oropharyngeal tumour (Dorn and Priester, 1976; Bollon *et al.*, 1991; Ballinari *et al.*, 1998; Ramos–Vara *et al.*, 2000). Other

studies state that epulides are the predominant oral neoplasms (Cohen *et al.*, 1974; Gardner, 1996; Tzvetkov, 1998; Yoshida *et al.*, 1999). There are reports where both types are said to have a similar incidence (Bastianello, 1983). Next to them, the squamous cell carcinoma, the fibrosarcoma, the osteosarcoma etc. are indicated as the commonest histological types (Strafuss *et al.*, 1976; Gardner, 1996; Vrieling *et al.*, 1999).

The histogenesis, the development and the prognosis of oral neoplasms could be determined mainly via morphological criteria (Misdorp, 1976; Harvey *et al.*, 1981). In previous retrospective histopathological studies of ours, carried out at the Trakia University, Stara Zagora, we described the incidence of mammary, skin and genital tumours in the dog for the period 1991–2000 (Dinev, 2002; Dinev *et al.*, 2002; Dinev, 2003).

The aim of the present study was to determine histopathologically the type and the incidence of canine oral neoplasms depending on the age and breed of the host with regard to the utilization of data to facilitate tumour diagnostics.

MATERIALS AND METHODS

The studies were performed in 1991–2000 at the Department of General and Clinical Pathology, Faculty of Veterinary Medicine, Trakia University – Stara Zagora. Four hundred and sixty eight samples of spontaneous tumour growths in dogs were studied. The specimens were obtained via biopsy or excision. The material for the histological investigation was fixed in 10% neutral formalin and processed by the routine histological technique (Diakov *et al.*, 1989). The cross sections were stained with haematoxylin-eosin (H/E). Histologically, oral neoplasms were clas-

sified according to the criteria of the World Health Organization (WHO) (Weis, 1974).

RESULTS

From the total number of studied specimens from spontaneous tumour growths (468), 65* (13.89%) originated from the oropharyngeal region. The neoplasms were most commonly located in gingivas – about 40%, the labial and buccal mucosa – about 30%, the palate – about 20% and the maxillar, mandibular bones and the pharynx – about 10%. In more than 60 of all cases, the growths were in the maxillar region. The years of peak tumour incidence in both genders were from 1996 to 1999 (Fig. 1).

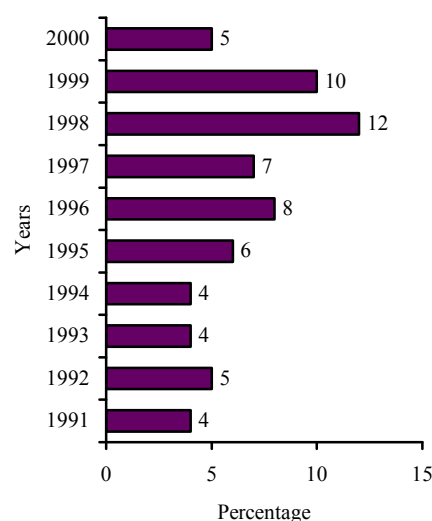


Fig. 1. Incidence of oropharyngeal neoplasms in dogs over the period 1991–2000: number of cases out of 468 studied tumour growths.

* The cases of oral papillomatosis are not included because of the character of their etio-genesis

Table 1. Incidence of oropharyngeal tumours of dogs in 65 out of 468 specimens studied during 1991–2000 depending on the breed, gender and age

Breed	Average age, years	Gender				Total	
		Male		Female			
		n	% *	n	% *	n	% *
Boxer	6	8	12.31	-	-	8	12.31
Bolognese	11	-	-	4	6.15	4	6.15
Dachshund	4	1	1.54	1	1.54	2	3.08
Dogue	8	3	4.62	1	1.54	4	6.15
Drathaar	1	1	1.54	-	-	1	1.54
Cocker Spaniel	8	1	1.54	4	6.15	5	7.69
Collie	9	2	3.08	4	6.15	6	9.23
German Sheepdog	7	10	15.38	2	3.08	12	18.46
Pekingese	4	2	3.08	3	4.62	5	7.69
Pointer	4	2	3.08	-	-	2	3.08
Irish Setter	6	3	4.62	1	1.54	4	6.15
Mixed-breed	7	8	12.31	4	6.15	12	18.46
All breeds	6.25	41	63.08	24	36.92	65	100.00

* vs the overall number of samples (65), accepted as 100%.

The dogs originating from Southeastern Bulgaria were the most numerous (> 80%).

Table 1 presents the data about the incidence of oral tumours depending on the breed, gender and age of hosts. The affected male dogs were 63.08% and females – 36.92%. The most commonly affected breeds were German Sheepdogs and mixed-breed dogs – each with 18.46%, followed by Boxers (12.31%), Collies (9.23%), Pekingeses and Cocker Spaniels (7.69%), Bologneses, Dogues and Irish Setters (6.15% each). The incidence of oropharyngeal tumours in Dachshunds, Drathaars and Pointers varied between 1.54% and 3.08%. The average age of affected dogs from both genders was 6.25 years.

The observed neoplastic types are listed in Table 2. The commonest oral tumour for the period of the study was the epulis (44.62%), followed by malignant

Table 2. Incidence of oropharyngeal tumours of dogs in 65 out of 468 specimens studied during 1991–2000 depending on the histological diagnosis

Types of tumours	Total	
	n	% *
Epulis	29	44.62
Malignant melanoma	16	24.62
Benign melanoma	1	1.53
Squamous cell carcinoma	8	12.31
Liposarcoma	5	7.69
Fibrosarcoma	3	4.62
Osteosarcoma	3	4.62
Total of observed neoplasms	65	100.00

* vs the overall number of samples (65), accepted as 100%.

melanomas (24.62%), squamous cell carcinomas (12.31%) and liposarcomas (7.69%). The other neoplastic types (benign melanoma, fibrosarcoma and osteosarcoma) were between 1.53% and 4.62% of all types.

Macroscopically, epulides appeared as irregular masses with diameter between 1–2 and 8–10 cm. They grew from gingivas in all cases. Melanomas were visible as single, sometimes segmented nodular formations attached most frequently to the labial mucosa (Fig. 2). The squamous cell carcinomas were located in the region of the soft palate and infiltrated the adjacent tissue. Sarcomas (lipo-, fibro- and osteosarcomas) appeared as distinct masses with diameter of 7–8 cm. Those neoplasms were associated with the palate, the pharynx and the jaw bones and in some cases impeded the swallowing reflex and the respiration. Often, the larger tumours, especially melanomas, were accompanied by inflammation and surface necrosis.

Histologically, 62.06% of epulides were determined as peripheral odontogenic tumours and 37.94% – as reactive lesions. The parenchyma of the commonest odontogenic tumour – the acanthomatous epulis – consisted of islets and bands of epithelial cells enveloped by connective tissue stroma (Fig. 3). The parenchyma of the fibromatous epulides or odontogenic fibromas consisted of fibroblastic cells, remnants of odontogenic epithelium and a high-degree vascularization (Fig. 4). The most frequent type of reactive lesions – giant cell epulis, had a parenchyma consisting of a well vascularized fibroblastic tissue with multinuclear giant cells among (Fig. 5). The parenchyma of the other lesions of this type – fibrous epulis and pyogenic granuloma, was characterized with focal fibrous hyperplasia for the for-



Fig. 2. Malignant melanoma to the labial mucosa in the left commissure in a mixed-breed dog.

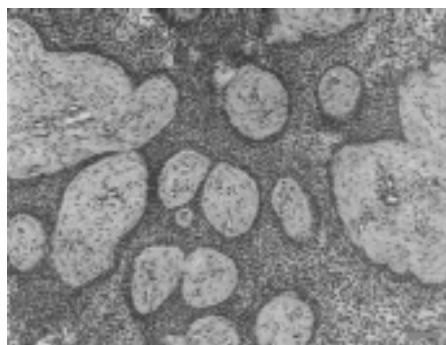


Fig. 3. Acanthomatous epulis. Islets of epithelial cells enveloped by a connective tissue stroma. H/E, bar $\approx 3 \mu\text{m}$.

mer and marked granulation tissue for the latter type.

The malignant melanomas could be histogenetically divided into epitheloid, with spindle-shaped cells and mixed type. The parenchyma of the first type (4 cases or 6.15%) consisted of polygonal cells

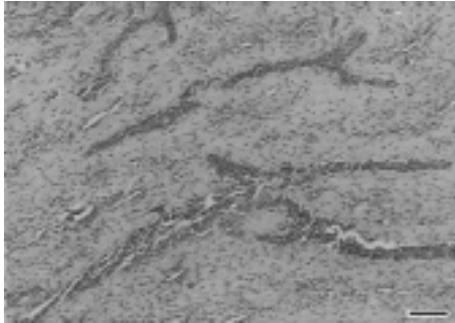


Fig. 4. Fibromatous epulis. A fibroblastic, well vascularized tissue building the neoplastic parenchyma. H/E, bar $\approx 3 \mu\text{m}$.

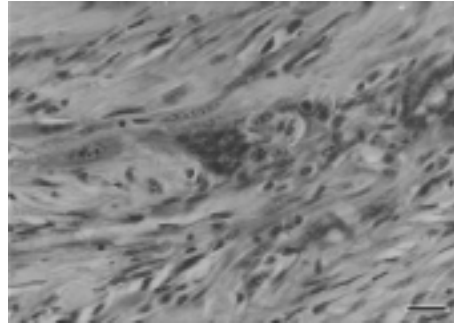


Fig. 5. Giant cell epulis. Multinuclear cells among the parenchyma. H/E, bar $\approx 4 \mu\text{m}$.

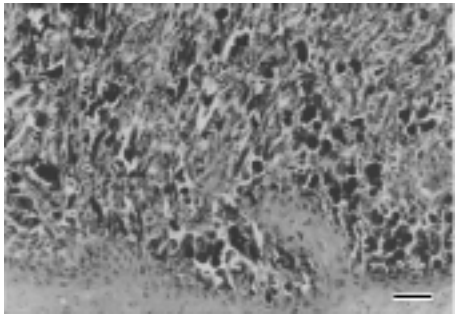


Fig. 6. Malignant melanoma – mixed type. Parenchyma, consisting of polygonal and spindle-shaped cells with abundant melanin content. H/E, bar $\approx 4 \mu\text{m}$.

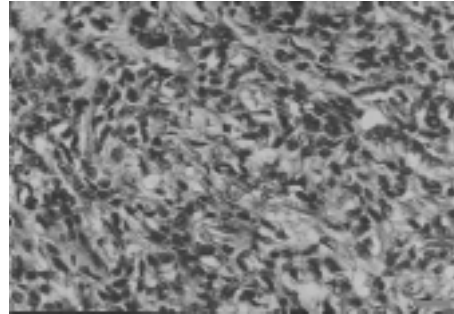


Fig. 7. Liposarcoma. Pleiomorphic parenchymal structure. H/E, bar $\approx 4 \mu\text{m}$.

that were not always intensively pigmented. The second type of melanomas (2 cases or 3.08%) were arranged by typical bipolar spindle-shaped cells with various dimensions. The parenchyma of the most frequently encountered mixed type (10 cases; 15.38%) consisted of polygonal and spindle-shaped cells together with abundant melanin content (Fig. 6).

The parenchyma of the squamous cell carcinoma consisted of flat polymorphic, non-keratinous epithelial cells, forming clusters. Liposarcomas were predomi-

nantly of a polymorphic type, often undergoing myxoid changes (Fig. 7).

All other neoplasms – benign melanomas, fibro- and osteosarcoma showed the characteristic for the respective type histological structure.

DISCUSSION

The results of our retrospective histopathological studies on the incidence of canine neoplasms for the period 1991–2000

showed that oropharyngeal tumours were at the 4th place (13.88%) after mammary tumours (26.5%; Dinev *et al.*, 2002), skin tumours (22.2%; Dinev, 2002) and genital tumours (18.16%; Dinev, 2003). The results of other authors reported a similar rank for oropharyngeal tumours (Zhelev *et al.*, 1966; Dorn and Priester, 1976; Bastianello, 1983, Tzvetkov, 1998). Our data evidenced a significant increase in oral neoplasms incidence within the period of the study with 1998 and 1999 being the peak years. Those data correlated with the general tendency for a progressive increase of this neoplastic class and the neoplasms as a whole in the dog (Rostami *et al.*, 1994; Tzvetkov, 1998; O'Brien *et al.*, 2000).

Our results about the average age of onset of tumours (6.5 years) were similar to those of Tzvetkov (1998) and Yoshida *et al.* (1999) reporting 8 years as average age and differed from Ramos-Vara *et al.*, (2000) that indicated 11 years as the average age for the period 1992–1999. All those data confirmed our observation from previous studies of ours about decrease in the average age of neoplastic formations in the dog during the last decade (Dinev, 2002).

The data about the localization of neoplasms were similar to already reported (Yoshida *et al.*, 1999; Ramos-Vara *et al.*, 2000). Therefore, we confirm that the gingivas and the labial mucosa are the commonest predilection sites.

We observed a higher predisposition towards tumour formation in male dogs, corresponding to already known facts (Brodey, 1970; Dorn and Priester, 1976; Tzvetkov, 1998).

On the basis of our observations it could be assumed that German Sheepdogs were somewhat predisposed to oropharyngeal tumour development. Those re-

sults differed from the data of Dorn and Priester (1976) who reported an increased risk in Boxers and Cocker-Spaniels or from those of Tzvetkov (1998), Ramos-Vara *et al.* (2000) who did not observed any breed predisposition. The fact that dogs originating from South-eastern Bulgaria were the most numerous could be attributed to the location of our laboratory in this region. The type of observed canine oral tumours was similar to that registered in the Sofia region in earlier studies (Zhelev *et al.*, 1966; Tzvetkov, 1998) but the domination of malignant variants* must be emphasized. According to our results, the share of epulides in this neoplastic type was significant – 44.62%. In this connection, our data were different from those of Dorn and Priester (1976) and Straßfuss *et al.* (1976) who reported melanomas and squamous cell carcinomas as the commonest neoplastic type.

The incidence of pigmented tumours – melanomas – both malignant (24.62%) and benign (1.53%) was considerably higher, especially for the malignant variant compared to other data (Frese, 1978; Tzvetkov, 1998). Despite the variance in the incidence, our data confirmed a relatively constant ratio of generally encountered oral tumours.

Our results also affirmed the leading role of histological analysis for the determination of the diagnosis and prognosis of canine oropharyngeal tumours.

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* Data for metastases and recurrence are not available because of the lack of observations in the postoperative period.

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