

PRIMARY SALIVARY GLAND TUMORS IN CARNIVORES*

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INTRODUCTION

KOESTNER AND BUERGER (3) recently reviewed the literature on primary neoplasms of the salivary glands in animals and added 30 cases to the 46 already reported. This paper adds eight additional cases of these rare tumors and discusses their incidence in various breeds of dogs.

MATERIALS AND METHODS

In all cases except one, the material used represented biopsies. All tissues were fixed in 10% neutral buffered formalin, embedded in paraffin, sectioned at 6 μ and stained with hematoxylin-eosin. Selected sections were stained with PAS reagent and with Mayers mucicarmine stain.

RESULTS

Case 1 (F 3177) was a 12-year-old, male, Siamese cat.

The gross findings consisted of a growth in a portion of the parotid gland ($2 \times 1 \times 1$ cm.). The lungs were mottled with 1-2 mm. islands of light, solid tissue.

Histologically the tumor cells formed irregular nests which were separated by a fibrous, occasionally hyalinized stroma. The cell type varied between cells with marked mucin formation and those of the epidermoid type (Figure 1), which did not form epithelial pearls. Shrinkage of cell groups took place in nearly all parts of the tumor, leaving a false impression of lymphatic edema. The infiltrative growth and the presence of mitotic figures indicated malignancy which was proved by

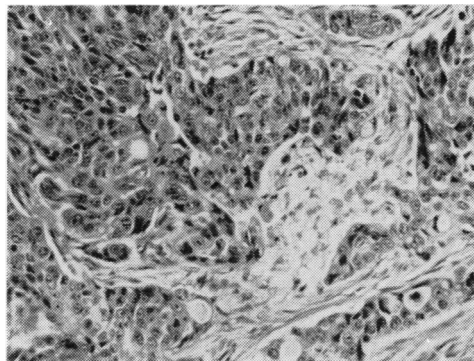


FIGURE 1. Mucoepidermoid carcinoma in a cat. H and E, high power magnification.

metastasis of the tumor to the lung. PAS and mucicarmine stains demonstrated the presence of mucin.

A diagnosis of mucoepidermoid carcinoma was made.

Case 2 (H 10781) was a spayed, female mixed Irish terrier, 10 years of age.

One month prior to surgery, a growth of unknown duration was observed in the left tonsillar area.

Though the tumor appeared to involve the left tonsil, surgery revealed a tumor adjacent to, rather than associated with the tonsil. The enlarged left cervical lymph node was also removed.

Histologically, infiltrating cords of rather polyhedral cells tended to mimic an inverted form of normal stratified squamous epithelium with little keratinization. In the gland, however, it was difficult to determine whether some glandular structures belonged to degenerative glandular tissue or to the tumor tissue itself. Metastases were present in muscle and the regional lymph node.

The diagnosis was squamous cell carcinoma.

Case 3 (D 5015) was a female cocker spaniel, 15 years of age.

The gross findings were thickening in the parotid gland area ($8 \times 3 \times 3$ cm.).

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SALIVARY GLAND TUMORS

Histologically the tumor consisted of acinar cells in groups which were divided by sparse stroma. The cytoplasm of the cells appeared to be transparent throughout, or in part (Figure 2); the nuclei were also

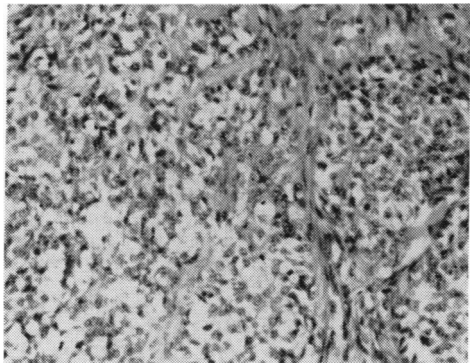


FIGURE 2. Acinic carcinoma in a Cocker spaniel. H and E, high power magnification.

vesicular in appearance and contained one or more dark-staining nucleoli. PAS and mucicarmine stains failed to demonstrate positive substances within the tumor cells.

Acinic adenocarcinoma was diagnosed.

Case 4 (F 429) was an 11-year-old male, cocker spaniel.

An enlarged parotid gland, measuring $3 \times 3 \times 3$ cm. was noted. Histologically the tumor showed a marked ductular architecture (Figure 3). Low cuboidal cells



FIGURE 3. Ductular adenocarcinoma in a Cocker spaniel. H and E, low power magnification.

with rare papillary projections lined the ductules. The tumor started to form larger clusters of undifferentiated cells. The pro-

nounced malignancy was also demonstrated by the frequency of mitotic figures.

A diagnosis of ductular adenocarcinoma was made.

Case 5 (E 7967) was a male cocker spaniel, 12 years of age.

A tumor, measuring $2.5 \times 1.5 \times 1$ cm. was noted. The histologic appearance of this tumor resembled the previous case, however, the ductular structure was more obvious. Malignancy was indicated by the high rate of mitotic figures and by infiltrative growth. Areas of necrosis within the tumor suggested rapid growth. Invasion of small vessels, and acute as well as chronic hemorrhages were considered signs of malignancy.

Ductular adenocarcinoma was diagnosed.

Case 6 (E 5193) was a male, cross-bred canine, nine years old.

A tumor of the submaxillary gland, $6 \times 6 \times 5$ cm., was observed. Histologically the diagnosis of a trabecular adenocarcinoma was based on the fact that the

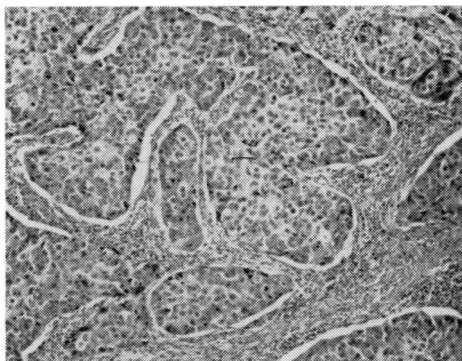


FIGURE 4. Trabecular adenocarcinoma in a cross-bred dog. H and E, low power magnification.

tumor was growing in solid trabecula with various amounts of stroma (Figure 4). The cells and especially the nuclei varied in shape and size.

Trabecular adenocarcinoma was diagnosed.

Case 7 (D 3900) was a male cockerspit, 13 years old.

A tumor of the right submaxillary gland measuring $8 \times 6 \times 6$ cm. was well encapsulated.

Histologically, this tumor represented a stage between trabecular and ductular adenocarcinoma. There were some areas where the tumor consisted mainly of ductular structures. In the overall picture, the tendency to form trabecular structures was more pronounced (Figure 5). Cells were

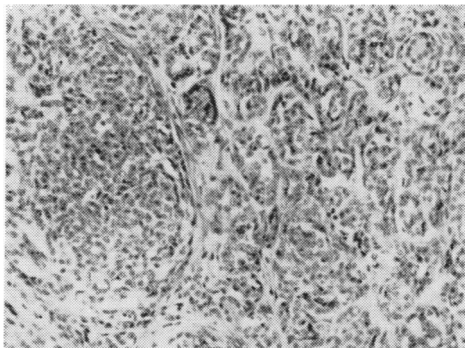


FIGURE 5. Trabecular adenocarcinoma in a Cocker-Spitz. H and E, low power magnification.

more uniform in shape and size when compared with Case 6 and always contained one nucleus. The mitotic rate was low.

Trabecular adenocarcinoma was diagnosed.

Case 8 (D 1557) was a spayed, female Boston terrier, 13 years old.

Seven months prior to euthanasia an enlargement in the left submandibular space had been removed surgically. Investigation of this surgical specimen revealed a highly malignant mixed salivary gland tumor. At necropsy metastatic tumors were observed in the lung and liver. Histologically, sheets of small undifferentiated epithelial cells were seen with a minimum of stroma.

A diagnosis of undifferentiated carcinoma was made.

DISCUSSION AND CONCLUSIONS

In this study it was possible to group the first six salivary gland tumors according to the classification used by Koestner and Buerger (3); however, the variation in histologic appearance within the tumor of Case 7 made such a grouping difficult.

It should be emphasized that all tumors included in this study were malignant.

With regard to squamous cell carcinoma

(Case 2) the authors agree with Koestner and Buerger who questioned the salivary gland origin of such tumors, which may very well derive from the oral (pharyngeal) mucosa or the palatine tonsil (3).

In the material available for this study no mixed salivary gland tumors were diagnosed, thus confirming the conclusion of these same authors (3), that the mixed tumor of the canine salivary gland has a relative low incidence when compared with mixed tumors of the canine mammary gland and of salivary glands in man.

Fifty papillary cystadenomata lymphomatosa among 766 parotid salivary gland tumors in man have been reported (1). This tumor, however, was not recognized in animals by Koestner and Buerger (3) and was not present in the authors' material. This is not surprising if the origin of this tumor in man is considered. Neisse (5) was the first to observe inclusions of heterotopic parotid salivary gland tissue within parotid lymph nodes in man regularly, and it is believed that the papillary cystadenoma lymphomatousum derives from such aberrant parotid inclusions (7). In the dog, parotid inclusions in lymph nodes could not be detected and the developmental relationship between cranial lymph nodes and salivary glands does not facilitate the formation of such inclusions (2). Since the basic condition for the formation of the papillary cystadenoma lymphomatousum appears to be lacking in the dog, the tumor does not occur.

The breeds of 22 dogs with primary salivary gland tumors are known. These include the cases from Ohio which have been reported (3) but exclude mixed breeds. It should be pointed out that seven of the 22 dogs were spaniels. Furthermore, it is of interest to note that 19 of the 22 dogs belong to breeds of British ancestry, whereas other breeds are only represented by three dogs (one Boxer, one Poodle and one St. Bernard). This is surprising, because dogs of ancestry other than British are rather common in Ohio and Connecticut. Boxers, Dachshunds, and German Shepherds comprise 25.1% of the dogs submitted to the Department of Veterinary Pathology in Columbus, Ohio (6) and 29.2% of licensed dogs in Connecticut are Boxers, Dachshunds, German Shepherds and Poodles, disregarding mixed breeds (4).

SALIVARY GLAND TUMORS

SUMMARY

The pathology and histology of the following primary tumors of salivary gland origin have been described: one mucoepidermoid carcinoma in a cat; one squamous cell carcinoma, one acinic adenocarcinoma, two ductular adenocarcinomas, two trabecular adenocarcinomas and one undifferentiated carcinoma in dogs. The incidence of primary salivary gland tumors appeared to be rather high in dogs of British ancestry and especially high in spaniels.

RÉSUMÉ

Exposé pathologique et histologique de tumeurs primaires originant des glandes salivaires: un carcinome mucoépidermoïde chez un chat; un carcinome à cellules pavimenteuses, un adénocarcinome acineux, deux adénocarcinomes des canaux salivaires, deux adénocarcinomes trabéculaires et un carcinome indifférenciés chez des chiens. L'incidence des tumeurs primaires des glandes salivaires semble plutôt élevée

chez les races canines d'origine britannique, particulièrement chez les épagneuls.

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ANALYSE DE VOLUME

Encyclopédie en couleurs de l'anatomie animale. Par Jacqueline Steyaert. Volume de la Collection Marabout Université. Prix \$2.10. Distributeur: D. Kasan, 226 est, Christophe-Colomb, Québec.

Compendium de 168 pages dont 106 sont consacrées aux invertébrés et 62 aux vertébrés. "L'anatomie animale" est avant tout un traité de morphologie. L'anatomie externe et interne de représentants types de chacun des embranchements y est décrite d'une manière succincte mais précise. Des dessins précis et en couleurs, enrichis d'une légende sobre, complètent la compréhension d'un texte déjà bien accessible au débutant.

Les embranchements qui comportent un grand nombre de classes sont exposés plus longuement; des représentants typiques de quatre ou cinq classes y sont décrits et illustrés.

L'ordre logique, qui est toujours suivi, offre l'aspect d'une scolastique rangée et bien amenée. Le sujet d'étude est d'abord placé dans son contexte, on le décrit dans sa morphologie externe, puis selon sa morphologie interne en traitant chaque système s'il y a lieu et enfin on énumère, sous le titre "systématique", les ordres communément rencontrés ou d'intérêt pour le lecteur un tant soit peu curieux.

C'est un livre que "monsieur tout le monde" peut parcourir avec énormément d'intérêt et d'avantages. Les jeunes étudiants épris de sciences naturelles devraient apprécier cet ouvrage.

Certains animaux types ne sont pas du Québec mais nous pouvons voir presque tous les jours des espèces, ou tout au moins des genres, très voisins de ceux qui sont décrits. *Olivier Garon, D.M.V., M.Sc., Ph.D.*