

Clinico-pathological characteristics of canine gingival squamous cell carcinoma

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Abstract

In the present study, a case of gingival squamous cell carcinoma is described in a 9-year-old sheepdog with a swelling of the left mandible. Plain radiographs of the head revealed a soft tissue mass behind the ventral border of the left mandible. At necropsy, the tumor presented as reddish-brown ulcerated and irregular tumoral masses of the gingiva. In the cytology smear, there were oval to angular-shaped squamous epithelial cells with varying immaturity and variable staining and nuclear to cytoplasmic ratios (N:C). Some of the cells showed dyskeratosis. Histopathologically, the tissue sections were composed of the cords and islands of squamous epithelial cells with an abundant eosinophilic cytoplasm, large and ovoid nuclei with a prominent nucleolus. The mitotic figures were moderate. Based on the histopathological findings, the tumor was diagnosed as a moderately differentiated gingival squamous cell carcinoma.

Introduction

Squamous cell carcinoma is, by far, the most important skin tumor affecting most external sites, but is less reported affecting the internal organs. Oral cancers constitute approximately 2-4% of all malignant tumors in humans.¹ Malignant tumors of the oral cavity, approximately 6% of all malignant neoplasms, are one of the most common cancer types in dogs.² Approximately 85 to 90% of all oral cancers are squamous cell carcinomas in humans,³ whereas they account for approximately 20% of oral tumors in dogs.⁴ The prevalence of tumor increases with advancing age, and there is no gender and breed predilection.⁵

Squamous cell carcinomas have localized neoplastic invasion into the adjacent stroma or subepithelium including local bone invasion and only 10% of tumors spread to regional lymph nodes and 3% metastasize to the lungs.⁶

Squamous cell carcinoma arising from internal sites such as tonsils, gastric epithelium, and urinary bladder does not share the relatively innocuous behavior of those initiated by sunlight, which are slow to metastasize, usually only to local lymph nodes.⁷

The clinical forms of gingival squamous cell carcinomas are quite variable, exhibiting an ulcerated area or an exophytic, granular or verruciform growth, easily leading to misdiagnosis with benign tumors or other inflammatory responses.⁸

This report describes the clinical signs and histopathological findings of moderately differentiated gingival squamous cell carcinoma in 9-year-old sheepdog.

Case Report

A 9-year-old male sheepdog was referred for clinical evaluation of an asymmetrical swelling of the mandibular region. The dog had a clinical history of lethargy, poor appetite and weight loss. At clinical examination, there was a firm mass behind the ventral border of the left mandible. The dog had a rectal temperature of 38.2°C and was depressed. Complete blood count (CBC), biochemical analysis and radiography from head and thorax were performed. CBC and serum biochemical results and thoracic radiographs were normal. Plain radiographs of the head revealed a soft tissue mass behind the ventral border of the left mandible.

Because of very poor clinical condition, the possibility of severe bleeding during the operation and possible post operative complications, including injury to salivary duct, lingual dysfunction and probability of the lifelong necessity of tube feeding, the owner elected to euthanize the dog.

Grossly, a reddish-brown ulcerated and irregular mass of approximately 5×5×5 cm in diameter was observed within the gingiva and demonstrated a firm consistency. Some enlarged lymph nodes were observed and removed.

The tissue samples were fixed in 10% neutral buffered formalin, embedded in paraffin, sectioned at 5 µm and stained with Hematoxylin & Eosin for light microscopic examination.

In the cytology smear, oval to angular-shaped squamous epithelial cells with varying immaturity and variable staining and nuclear to cytoplasmic ratios (N:C) were seen. Some of the cells showed dyskeratosis. Histopathological features revealed the cords and islands of squamous epithelial cells, which extended into the submucosal layer. The tumor cells were large and had an abundant eosinophilic cytoplasm, large and ovoid nuclei

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with a prominent nucleolus. Keratin tonofibers were seen to some degree. The mitotic figures were moderate (Figure 1). Similar neoplastic cell islands were also detected in the regional lymph nodes. Hence, the mass was found to be a moderately differentiated squamous cell carcinoma.

Discussion and Conclusions

The tissue sections from this case revealed a malignant tumor of epidermal cells in which the cells showed differentiation of keratinocytes with an abundant eosinophilic cytoplasm and large nuclei. With the exception of the tonsillar tissue, the gingiva are more often affected than the other soft tissues and most frequently affected at the maxilla. In the present case, the neoplastic mass was found to originate from the gingiva of the ventral border of the left mandible.

Squamous cell carcinoma is, by far, the most important skin tumor, but less reported affecting the internal organs. Squamous cell carcinoma in dogs infrequently involves the eye.⁹ Occurrence on multiple digits simultaneously or consecutively is seen in dogs in a low percentage of cases.¹⁰ A single squamous cell carcinoma is reported arising from the pyloric gland mucosa in a dog.¹¹ Squamous cell carcinoma occurs most often in the urethra of bitches.¹² Squamous cell carcinoma of the thyroid is an infrequent tumor in animals, but only occasionally encountered.⁷

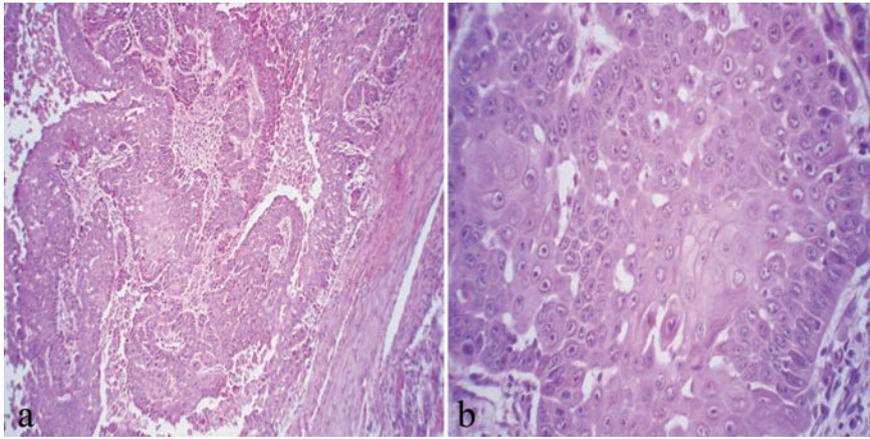


Figure 1. a) The cords and islands of squamous epithelial cells, H&E ($\times 180$). b) The neoplastic cells consisted of large cells with abundant eosinophilic cytoplasm, ovoid nuclei and a prominent nucleolus, H&E ($\times 720$).

Gingival squamous cell carcinoma is the second most common malignant neoplasm of the canine oral cavity. Only 10% of tumors spread to regional lymph nodes and 3% metastasize to the lungs.^{13,14} Despite the low percentage of metastasis of squamous cell carcinomas, the present neoplastic cells were also seen in the regional lymph nodes.

There are several factors associated with the development of a squamous cell carcinoma, including prolonged exposure to ultraviolet light, lack of pigment within the epidermis at the sites of tumor development.¹⁵ The etiology of oral squamous cell carcinoma is unclear in dogs.¹⁶ In humans, induction of cyclo-oxygenase-2 has been implicated in the oncogenesis of various cancers, including squamous cell carcinomas. Oral squamous cell carcinoma in dogs can also be associated with overexpression of cyclo-oxygenase-2.¹⁷ In addition, poor oral hygiene associated with chronic inflammation may promote the development of oral cancer.⁸

Based on histopathological findings, a gingival squamous cell carcinoma was diagnosed.

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