Braz J Vet Pathol, 2018, 11(1), 19 – 23
DOI: 10.24070/bjvp.1983-0246.v11i1p19-23

BJVP
Brazilian Journal of Veterinary Pathology
ISSN 1983-0246

Case Report

Metastatic submandibular acantholytic squamous cell carcinoma in a dog

Isabella C. Silva[1], Thais B. Sarandy[1], Natalia V. Tamiasso[1], Karina P. Aptekmann[2], Paulo S. C. Andrade Junior[3], Jankerle N. Boeloni[1*]

[1]Laboratório de Patologia Animal, Departamento de Medicina Veterinária, Centro de Ciências Agrárias e Engenharias da Universidade Federal do Espírito Santo, Espírito Santo, Brazil.
[2]Hospital Veterinário, Departamento de Medicina Veterinária, Centro de Ciências Agrárias e Engenharias da Universidade Federal do Espírito Santo, Espírito Santo, Brazil.
[3]Instituto Federal do Espírito Santo, Campus Alegre, Espírito Santo, Brazil.
***Corresponding author:** Departamento de Medicina Veterinária, Centro de Ciências Agrárias e Engenharias da Universidade Federal do Espírito Santo, Alto Universitário, S/Nº, Guararema, Caixa Postal 16, CEP: 29500-000, Alegre, ES, Brazil. E-mail: jankerle@gmail.com.

Submitted October, 12th 2017, Accepted October 31st 2017

Abstract

A seven-year-old female mixed-breed dog was diagnosed with an uncommon histological variant of squamous cell carcinoma (SCC) with lymph node metastases. Therefore, the objective of this report was to describe the gross and microscopic findings of this uncommon SCC histological variant. Fine-needle aspiration cytology of the mass revealed a squamous cell carcinoma. On necropsy, the submandibular region revealed nodular, multifocal to coalescing, ulcerated masses with firm and fluctuant areas. Furthermore, enlarged submandibular and cervical lymph nodes with loss of normal architecture suggestive of metastasis were present. A definitive diagnosis of submandibular acantholytic squamous cell carcinoma was made upon histopathological evaluation. This variant is rare in humans and animals.

Key words: canine, epidermoid cell carcinoma, metastasis, pseudoglandular carcinoma.

Introduction

Squamous cell carcinoma (SCC), also known as epidermoid cell carcinoma, is a malignant epidermal tumour with squamous differentiation (7). It is common in cats, cattle, horses and dogs (2, 3, 7, 14) and relatively uncommon in sheep, goats, and pigs (5, 17, 21).

Microscopically, there are several subtypes of SCC that include well-differentiated, poorly differentiated, acantholytic, spindle cell, and verrucous (7, 16). Specifically, acantholytic squamous cell carcinoma (ASCC), also known as pseudoglandular carcinoma, is an uncommon histological variant of SCC (12, 13) (7). In humans, this variant is rare, but it has been reported in the oral cavity (9, 13), nasal cavity (1, 9), vulva (6), palate (9), maxilla (19), cecum (10) and breast (11). ASCC is also rare in animals, with only a few reports that have described ASCC in the mammary region (8) and oral cavity of dogs (4). Thus, the purpose of this report is to describe the gross and microscopic characteristics of submandibular acantholytic squamous cell carcinoma with metastases in a female dog.

Case report

A seven-year-old, mixed-breed, intact female dog with light brown fur, exhibiting abnormal behavior, and a clinical history of swelling of the submandibular region and face was referred to the Veterinary Hospital of the Center of Agricultural Sciences and Engineering at the Federal University of Espírito Santo (HOVET-CCAE-UFES), campus of Alegre - ES, Brazil. The owner reported that two verrucous nodules had been present in the submandibular region of the dog, since six years of age.

Following a year of progression, the lesions became ulcerated with concomitant haemorrhagic exudate. The animal had a history of exposure to the sun while in dorsal or lateral recumbency. There was no history of dermatopathies or complaints associated with systemic diseases.

Clinical examination of the animal revealed lethargy, dysphagia, hyporexia, facial edema and multifocal to coalescent, ulcerated nodules in the submandibular region (Fig. 1A) suggestive of malignant neoplasia. To confirm the hypothesis, fine-needle aspiration cytology (FNAC) of the submandibular region was performed, and the aspirated material was sent to the Animal Pathology Laboratory at HOVET-CCAE-UFES.

The cytological samples were fixed with methanol and stained with Giemsa stain (Laborclin, Paraná, Brazil). Microscopic analysis revealed oval to polyhedral cells with moderate anisocytosis and basophilic cytoplasm, with some cells showing vacuolization close to the nucleus, discrete emperipolesis, nuclei with loose chromatin, and prominent nucleoli. Furthermore, rare mitotic figures and a high number of neutrophils were observed (Fig. 1B). The cytological findings were indicative of squamous cell carcinoma. Due the unfavorable prognosis, the owner opted for the dog euthanasia.

On necropsy, gross findings included multifocal to coalescent, firm, ulcerated nodules in the submandibular region with fluctuant areas, purulent exudate (Fig. 2A) and a fetid odor. The mandibular molar teeth were absent, and there was displacement of the incisor teeth with softening of those teeth. Edema was present in the dorsal cervical region, as was subcutaneous edema of the right and left lateral maxilla. Submandibular and cervical lymph nodes were enlarged and edematous, with a loss of normal architecture and whitish discoloration, suggestive of metastasis (Fig. 2B). Moderate diffuse pancreatic congestion, moderate congestive splenomegaly, moderate pulmonary edema with diffuse congestion and moderate bilateral renal congestion were present.

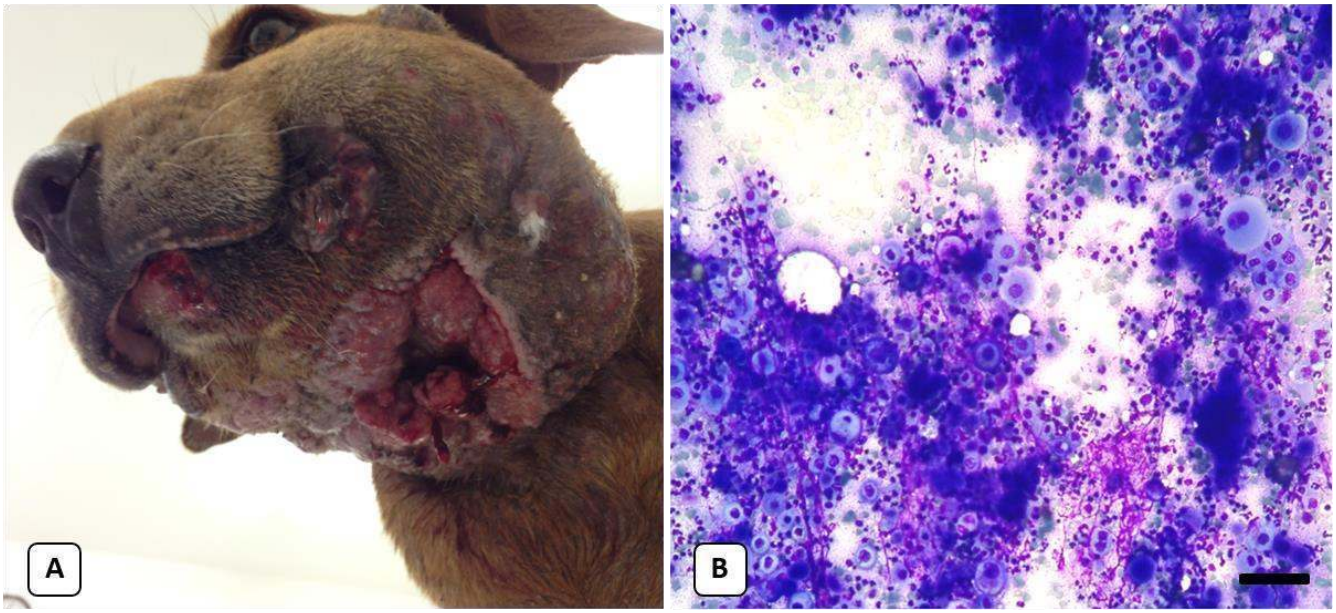

Figure 1. Gross necropsy (A) and cytology (B) of the submandibular region of a female dog with acantholytic squamous cell carcinoma. **A.** Multifocal to coalescent, ulcerated nodules with purulent and haemorrhagic exudate of the submandibular region. B. Fine-needle aspirate demonstrating oval to polyhedral cells with moderate anisocytosis, basophilic cytoplasm, a nucleus with loose chromatin, moderate anisokaryosis, and large numbers of neutrophils. Giemsa staining. Bar = 68.89 µm.

Samples of the submandibular and cervical nodules and the submandibular lymph nodes were collected for histopathological evaluation. The samples were fixed in 10% buffered formalin and subsequently processed for paraffin embedding, sectioned at 4 µm, and stained with haematoxylin and eosin stain (HE stain). The animal's head underwent a radiographic examination that revealed no bone infiltration by the neoplasia.

On microscopic examination, a fragment of fur-covered skin demonstrated moderate focally extensive acanthosis and severe focally extensive ulceration. Furthermore, the dermis exhibited non-delimited and infiltrative neoplastic epithelial proliferation, forming predominantly alveolar formations delimited by round or oval to polyhedral neoplastic cells with marked pleomorphism. These formations contained individual or clustered acantholytic or dyskeratotic cells. The neoplastic cells exhibited severe anisocytosis; nuclei that were round, oval or elongated; moderate anisokaryosis with predominantly loosely aggregated chromatin; and

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prominent nucleoli. Pronounced multifocal emperipolesis, rare keratin pearls and three to four mitotic figures per high field magnification were observed, including atypical mitotic figures and a marked multifocal neutrophilic inflammatory infiltrate (Fig. 3A and 3B). Furthermore, the cervical and submandibular lymph nodes exhibited evidence of metastasis on microscopic examination (Fig. 3C and 3D).

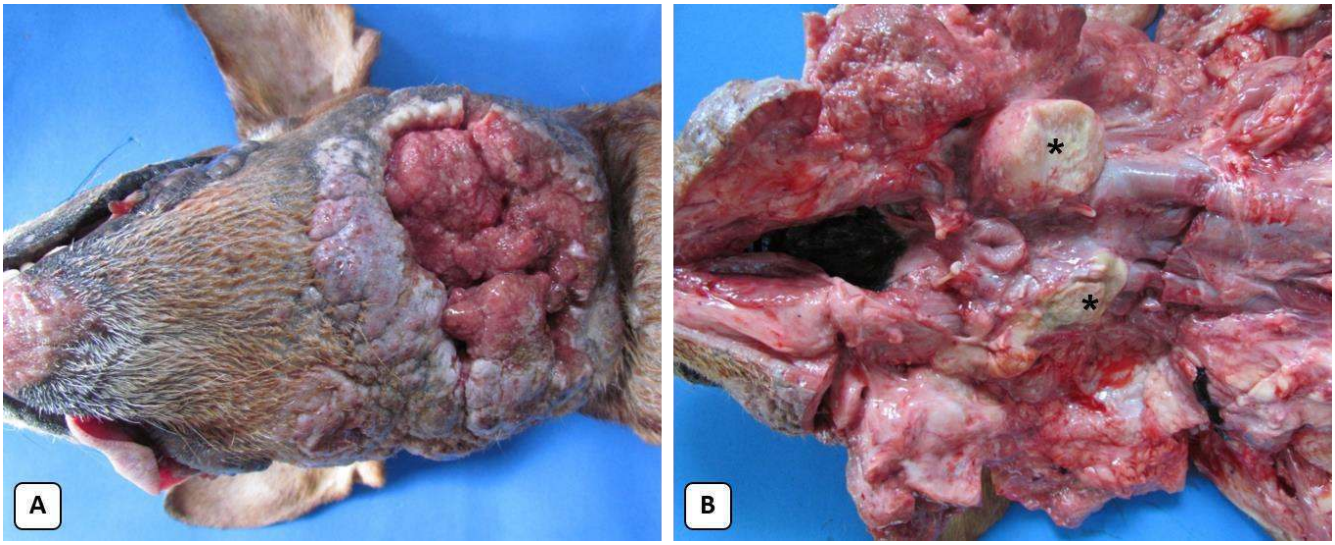

Figure 2. Macroscopy of the submandibular region (A) and submandibular lymph nodes (B) of a female dog with acantholytic squamous cell carcinoma. **A.** Multifocal to coalescent, ulcerated nodules in the submandibular region. **B.** Enlarged submandibular lymph nodes with whitish discolouration and loss of normal architecture (asterisks).

Discussion

ASCC is a rare neoplasm in animals and humans (4, 6, 9, 20). Therefore, the clinical and epidemiological characteristics of this tumor are not well-known.

The animal of the present study had a history of prolonged exposure to the sun while in dorsal and lateral recumbency, thereby receiving a large load of ultraviolet (UV) radiation. This observation offers a probable aetiology for the neoplasia, since known risk factors for SCC include prolonged exposure to sunlight (UV), depigmented areas of skin, and an absence or scarcity of hair (16).

In the present case, the SCC was classified as belonging to the acantholytic subtype. The microscopic findings observed in the present case are compatible with those observed in other reports, where the histological characteristics observed included the formation of pseudoglandular to pseudocystic structures delimited by a layer of neoplastic cells containing individual or clustered acantholytic or dyskeratotic cells (6) or cell debris (19).

Due to the rarity of ASCC, the metastatic behavior of this subtype is unknown. However, it is known that SCC has greater potential for invasiveness than for metastasis, and in cases where metastasis occurs, the most common sites are the regional lymph nodes (16). Two of the cases of ASCC reported in the veterinary literature to date have not reported evidence of metastasis (4, 8), while one case had features consistent with lymph node metastasis (20). In the current report, we observed invasive behavior as well as metastasis of the neoplasia to the regional submandibular lymph nodes, with an increase in size and an alteration of the normal cellular architecture. Thus, to the best of our knowledge, the present study is the second reported case of metastatic ASCC.

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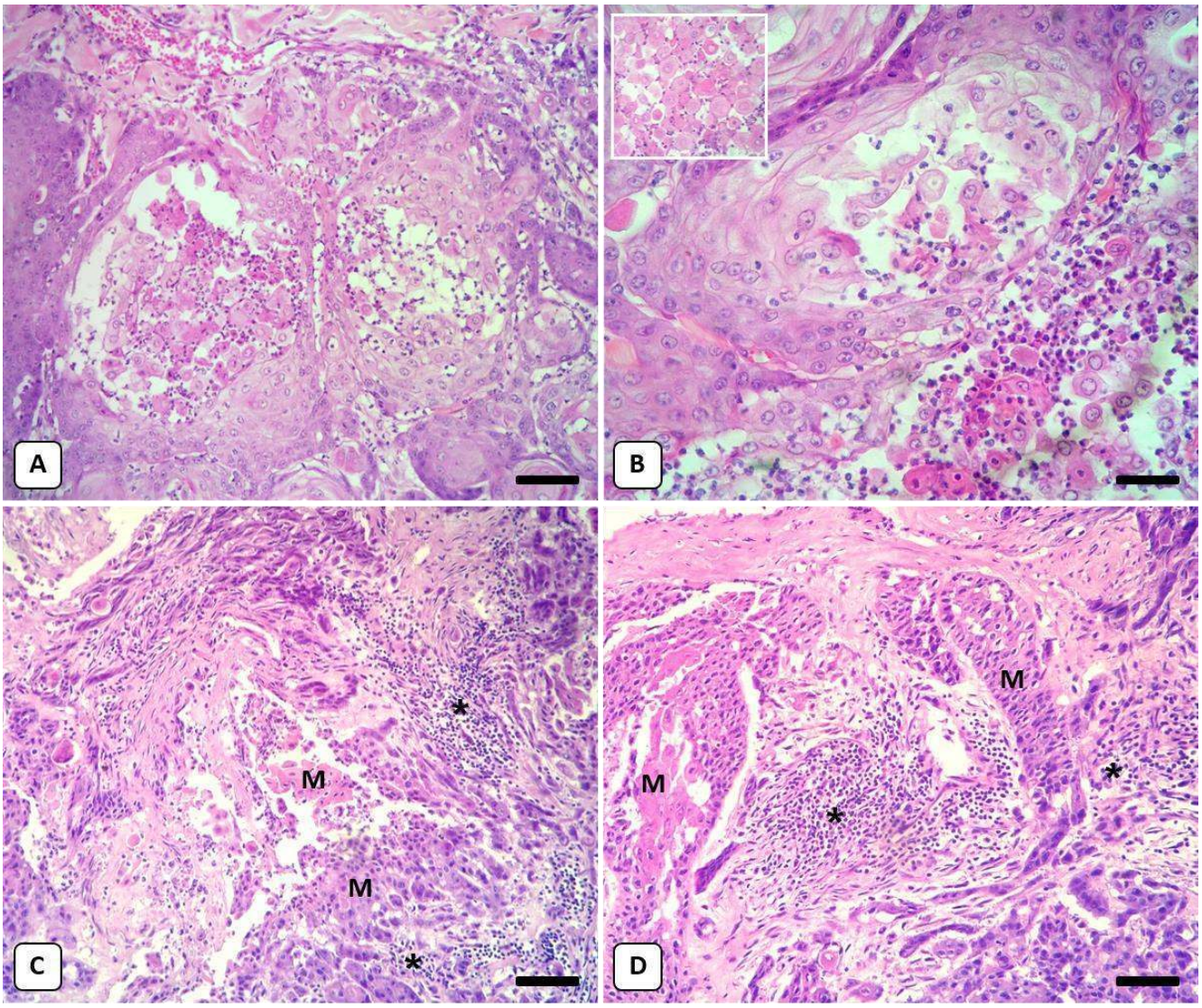

Figure 3. Histologic pattern of the ulcerated nodules in the submandibular region (A and B) and the cervical (C) and submandibular (D) lymph nodes of a female dog with acantholytic squamous cell carcinoma. **A.** Submandibular region biopsy with dermis containing neoplastic epithelial proliferation forming alveolar structures delimited by round or oval to polyhedral neoplastic cells containing individual or clustered acantholytic or dyskeratotic cells. HE. Bar = 137.80 µm. **B.** Submandibular region biopsy with evidence of the alveolar structure containing individual or clustered acantholytic or dyskeratotic cells, nuclei ranging from round or oval to elongated with predominantly loose chromatin, and prominent nucleoli, as well as a neutrophilic inflammatory infiltrate. Inset demonstrates the detail of the acantholytic and dyskeratotic cells. HE. Bar = 68.90 µm. **C.** Cervical lymph node biopsy with metastasis (M) and remnants of lymphoid tissue (*). HE. Bar = 137.80 µm. **D.** Submandibular lymph node biopsy with metastasis (M) and remnants of lymphoid tissue (*). HE. Bar = 137.80 µm.

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