Oral Squamous Cell Carcinoma in a Free-Ranging Roe Deer (Capreolus capreolus)

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Objective: We describe a case of squamous cell carcinoma (SCC) in a free-ranging roe deer (Capreolus capreolus).

Methods and Results: Subject of this paper is an adult male of roe deer (Capreolus capreolus), found in Aosta Valley Region (North-west Italy), with an evident swelling at the right mandibular region. By applying routine histological (Haematoxylin and Eosin staining) and immunohistochecmical (antibodies detection by diaminobenzidine DAB and counterstaining by Mayer’s Haemotoxylin) techniques, the tumor appeared to be formed by trabeculae and islands of squamous epithelial cells, growing from the oral mucosa, involving soft and bone tissues and surrounded by a desmoplastic reaction; it was also observed a pseudo-glandular pattern due to the formation of cysts filled with acantholytic keratinocytes; strong anisokaryosis and anisocytosis, with a quite low mitotic activity (about 1 division per high-power – 400x - field), characterized the neoplastic cells. Epithelial trabeculae were positive for cytokeratin and negative for vimentin, last one well expressed by the fibroblasts in the desmoplastic stroma. By routine bacteriological examination (Blood Agar and MacConkey agar incubated over 48 h at 37 °C in aerobic and anaerobic atmosphere) overlapping infection of neoplastic mass by Trueperella pyogenes was found. Based on microscopical features the tumor was classified as acantholytic SCC.

Discussion and conclusions: SCC is a malignant tumor of epidermal origin well known in domestic animals, especially in cats where it’s the most prevalent oral neoplasm, and wild fauna, such as fish, birds, reptiles and various classes of mammals. To our knowledge, this is the first report of a similar neoplasia in roe deer; adding SCC to the list of tumors that can affect the alpine wild ruminants contributes to the study and knowledge of neoplastic processes in all wildlife.

Keywords: Squamous cell carcinoma; Roe deer; Capreolus capreolus

Introduction

Squamous cell carcinoma (SCC) is a malignant tumor of epidermal origin well known in domestic animals, especially in cats where it’s the most prevalent oral neoplasm, generally found at mandibular, maxillary or sublingual regions. As it happens for other types of neoplasia, it’s reported sporadically in different wild animals, free-ranging or captive, as fish [1,2], birds [3], reptiles [4,5] and various classes of mammals: cetaceans such as *Tursiops truncatus* [6], marsupials such as *Isoodon macrourus* [7], rodents such as *Agouti paca* [8], rhinocerotids, such as *Rhinoceros unicornis* [9], felids, such as *Leopardus pardalis* [10], *Panthera tigris* [11], *Panthera tigris altaica* [12], *Panthera leo* [13], *Panthera pardus pardalis* [14] different species of Lynx [15-17] and ruminants; among these, it has been observed in different species of cervidae, such as *Cervus elaphus* [18], *Elaphurus davidianus* [19], *Odocoileus virginianus* [20], *Cervus nippon pseudaxis* [21] and *Rangifer tarandus tarandus* [22]. Aim of this work is to describe the gross and microscopic findings observed in the first case, to our best knowledge, of an oral squamous cell carcinoma in a free-ranging roe deer (*Capreolus capreolus*).

Case details

Subject of this report is an adult male of roe deer (it was not possible to define exactly the age due to the abnormal consumption of the teeth) found by the rangers in Aosta Valley Region (North-west Italy), at 1100 m of altitude; due to cachexia and an evident swelling at the right mandibular region without skin ulcers or fistulas (Fig. 1A), the animal was recovered in a wildlife recovery center and subsequently euthanized for the poor conditions and prognosis. At the necropsy, a globular mass of about 15 cm in diameter, involving the intermediate portion (Figure 2). of the right mandibular body (Fig. 1B), a loosing of teeth, vegetables fragments and ulcers at the surface of the neoformation (partially removed from mandibular body). Bacteriological examination highlighted coryneform bacilli, partially hemolytic, Gram positive, catalase and oxidase negative, later identified as *Trueperella pyogenes*.

Histologically, a non-capsulated and ulcerated soft tissue neoplasia has been observed. Neoplastic cells were arranged in nests and anisocytosis and anisokaryosis, with the presence of giant cells with huge nuclei, mitotic index of about 1 division per high-power (400x) field (Fig. 3); it were also observed large lytic areas with bacterial aggregates, superficial ulcers covered by serocellular crusts with abundant neutrophils and numerous protozoan cysts (*Sarcocystis* spp.) in the annexed muscle layers.

The cellular elements were characterized by abundant eosinophilic cytoplasm, oval nuclei with small clumped chromatin, high anisocytosis and anisokaryosis, with the presence of “giant” cells with huge nuclei, mitotic index of about 1 division per high-power (400x) field (Fig. 3); it were also observed large lytic areas with bacterial aggregates, superficial ulcers covered by serocellular crusts with abundant neutrophils and numerous protozoan cysts (*Sarcocystis* spp.) in the annexed muscle layers.
The cytoplasm of neoplastic cells was strongly positive for cytokeratin (Fig. 4A) and negative for vimentin (Fig. 4B), last one well expressed by the cells of desmoplastic connective stroma.

No metastasis was found in vascular and lymphatic lumen, in regional lymph nodes or in thoracic and abdominal organs.

Based on histological features, and particularly on the pseudo-glandular pattern expressing cysts filled with acantholytic keratinocytes, we classified the neoplasia as acantholytic SCC.

Discussion and conclusions

In roe deer (Capreolus capreolus) different types of neoplasia are signaled; in a surveillance performed in Switzerland [23], the authors refer 32 cases of tumors, observed in lymph nodes (lymphosarcoma, histiocytic sarcoma), head (spindle cell sarcoma, melanoma, ossifying fibroma, osteosarcoma, fibrosarcoma, round cell tumor, carcinoma of salivary gland), ovary (carcinoma/teratoma, granulosa cell tumor), skin (fibroma, fibrosarcoma, fibropapilloma), lung (carcinoma) and liver (cholangiocarcinoma, hepatocellular carcinoma), kidney (renal adenocarcinoma, adenoma) other than some neoplasia defined as undetermined. A similar study in Sweden [24] showed 19 cases of tumors, overlapping to those observed in Switzerland and in other words adenoma [25], teratoma [26], lymphosarcoma [27], viral fibropapillomas [28] and many cases of hepatocellular tumor, observed in Britain, probably associated with high levels of spruce needles, buds and twig tips (rich in tannins and terpenes) in the diet [29].

Different hypothesis about the causes of the SCC in roe deer can be advanced considering the various risk factors reported for this type of tumor in people and animals, including sex (male are more affected than females), age (cat and dogs of average 10-11 years old are most affected), chronic inflammations, ultraviolet light, papillomavirus infection, bracken fern ingestion, carcinogens in tobacco, coal tar, soot, arsenic and smegma [30, 31]; further anamnestic information, unfortunately often unavailable in the case of free-living animals, would be necessary to understand the exact pathogenesis of the neoplasia we have described.

Conclusion

In conclusion, to our best knowledge based on the references found, this is the first report of SCC in roe deer; adding this type of cancer to the list of tumors that can affect the alpine wild ruminants contributes to the study and knowledge of neoplastic processes in all wildlife.

References

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