Ocular Squamous Cell Carcinoma in a Black Headed Cow (A Case Report)

Mohajeri Daryoush, 1Doustar Yousef, 2Mehrdad Nazeri

1Department of Pathology, Tabriz Branch, Islamic Azad University, Tabriz, Iran.
2Tabriz Branch, Islamic Azad University, young researchers club.

Mohajeri. Daryoush, Doustar Yousef, Mehrdad Nazeri: Ocular Squamous Cell Carcinoma in a Black Headed Cow (A Case Report)

ABSTRACT

Invasive Bovine Ocular Squamous Cell Carcinoma is reported in an 11-years-old crossbreed black headed dairy cow kept in a roofed area in a garden located in south of Tabriz. The eyelids were involved as ulcerated neoplastic mass. The lesion had covered the globe completely, invaded and destroyed the entire orbital contents internally. In spite of destruction of all surrounding tissue and adjacent bones, the optic nerve was entirely intact. After enucleation, neoplastic tissue specimens were stained with H&E for histopathological study. Macroscopic and microscopic characteristics of the lesion were in agreement with invasive squamous cell carcinoma, without any evidence of damage to optic nerve.

Key words: Dairy cow, Ocular Squamous Cell Carcinoma.

Introduction

Extraocular neoplasms may arise from any of the specialized or supporting tissues of the eyelids, conjunctiva, or orbit [3,4,6]. Malignancy of the third eyelid (membrana nictitans) and the globe is common in cattle worldwide [1,7]. Squamous cell carcinoma (SCC) of the eyelid or conjunctiva is especially frequent in cattle less so in horses and dogs, and is frequent in other species [3]. SCC is seen particularly in white-headed cattle, such as the Hereford, and other breeds with little pigmentation around the eye [1,6,8]. The disease is associated with ultraviolet light [1,2]. Common sites for SCC include the lower lid, the third eyelid and corneoscleral junction of the globe [1]. Bovine ocular squamous cell carcinomas of the globe or circumocular structures have been described in several breeds of cattle including beef types from several continents and countries [2]. The incidence in cattle is greatest in those geographic areas with longest hours of sunlight per year and ultra violet radiation (Jubb et al., 1993; 2]. Exposure to sunlight is a factor in the development of the lesions [2,8].

Material and method

On October 2010, an 11-year-old crossbreed dairy cow (Holstein-Friesian) with a massive ulcerated neoplasm on the right orbit was presented to the veterinary clinic of Tabriz Islamic Azad University.

This animal was being kept in a roofed area in a garden located in south of Tabriz and was of normal appearance, without any preexisting medical conditions. The traumatic and ulcerated neoplastic tissue had covered the globe completely (Fig.1). The cow was euthanized and injured eye
was enucleated. Representative sections of the tumor were fixed immediately in 10% neutral buffered formalin, processed routinely, and embedded in paraffin. Tissue sections were cut to 4 µm thickness and stained with hematoxylin and eosin [5].

**Fig.1:** Macroscopic appearance of Bovine Ocular Squamous Cell Carcinoma. The traumatic and ulcerated neoplastic tissue has covered the globe completely.

**Results:**

Grossly, neoplastic tissue had invaded and destroyed the entire orbital contents, ocular adnexa, other soft tissue and surrounding bones (Fig.2). Interestingly optic nerve among the multiple irregular neoplastic tissues was intact, though it was slightly compressed with tumor mass (Fig.3). Bulbar conjunctiva was unexpectedly very well pigmented. Microscopically, islands and cords of epidermal cells, with their typical structures had invaded the lower tissues. Neoplastic cells showed enlarged and prominent nuclei. Mitotic figures were numerous (Fig.4). Interestingly, optic nerve among the neoplastic tissue was intact (Fig.5).

**Fig. 2:** Macroscopic appearance of Bovine Ocular Squamous Cell Carcinoma. Neoplastic tissue has invaded and destroyed the entire orbital contents internally.

**Fig. 3:** Macroscopic appearance of Bovine Ocular Squamous Cell Carcinoma. Optic nerve (−) among the multiple irregular neoplastic mass is intact.
Conclusion:

It has already been recorded that ocular SCC is common in white-headed cattle with little pigmentation around the eye [8]. 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, and lack of hair or a very sparse hair coat at the affected site [6]. It is postulated that probably actinic rays of the sun are of etiological importance since bullocks are worked in the hot sun and so are exposed to them. Probably the lower incidence in cows is because they are not worked in the sun. That actinic rays do play a part in the genesis of the tumor is supported by the fact that in Hereford breed, in which the eye pigment is deficient, eye cancer, is more common. The pigment filters the actinic rays of the sun [8].

Up to literature review, we propose that this case study is unique, as regardless of the pigment status of the lids and the surrounding area of the animal, it was severely afflicted by ocular SCC. On the other hand, the fact that, highly invasive malignant cells cannot damage the optic nerve remain undetermined and seeking another study. However, it seems that epineuritis with its distinctive characteristic prevent the invasion of malignant cells.

In any way, ocular SCC is of economic importance [2], therefore early diagnosis of ocular SCC is essential, to prevent distant metastasis and development of clinical manifestations. Early lesions are easily removed, but in neglected cases, ten per cent will eventually metastasize to the regional lymph nodes, and a small proportion to the lungs [1].

References