

# **Squamous Cell Carcinoma of the Bovine Eye**

## **About the Disease**

Bovine ocular squamous cell carcinoma is more commonly referred to in the cattle industry as “cancer eye”. Squamous cell carcinoma is by far the most common tumor afflicting the bovine eye, as well as the most frequently diagnosed cancerous tumor in the bovine. The malignant tendencies of this disease make early recognition critical. This disease is of extreme economic importance to the cattle producer as it accounts for nearly 12% of carcass condemnation.

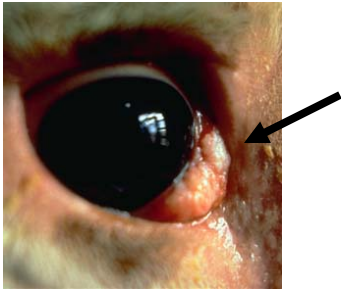
The etiology (cause) of the disease is multifactorial. There is a predisposition towards cattle with non-pigmented eyelids and conjunctiva (white faced cattle). Prolonged exposure to sunlight (ultraviolet light) also seems to be a driving force for the disease. Bovine papillomavirus and infectious bovine rhinotracheitis virus have been isolated from these lesions, but their importance in the disease process is unknown. The tumors generally develop in cattle over the age of seven and rarely in cattle less than three years. The most common areas the tumors are found are: the limbus (junction of the cornea and the sclera), the third eyelid, and on the upper and lower eyelid margins.

## **A Brief Description**

There are four common stages in the development of these ocular tumors. These stages include plaques, keratomas, papillomas, and eventually carcinoma. These first three stages are benign; carcinomas are malignant (ability to spread to adjacent or underlying tissues). A carcinoma can first appear as any of these characterizations or simply arise without any such pre-malignant stages. Plaques will appear as a small, circular, white elevation on the surface of the eye. A keratoma is a hard raised growth on the eyelids coated with ocular secretions and debris. A papilloma will appear as a wart-like growth. The carcinoma will appear nodular and cauliflower-like. The carcinoma commonly is bloody, ulcerated, friable, and foul smelling.

There are many things that can be confused with these lesions. Bovine keratoconjunctivitis (Pink-eye), trauma, and dermoid cysts are examples of common confusion. Scaring can effectively look similar to plaques on the eye. Plaques are generally raised though and scaring is usually not. If unsure, it may be of benefit to monitor the lesions occasionally looking for changes and new growth. At any stage the tumor could effectively regress, but the more advanced the lesion is, the less likely it is to regress on its own. Benign tumors more frequently regress than malignant tumors. The malignant form (carcinoma) will progressively grow and invade the entire orbit, including the eyeball and large portions of the face if left untreated. Invasion of the eyeball will result in blindness. Regional lymph nodes around the head and neck (parotid and submandibular lymph nodes) are common sites of spreading.

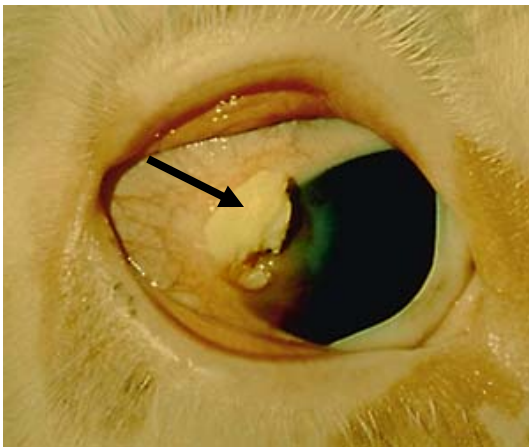
**Figure 1.** Lesion on the third eyelid. (10 K JPG)



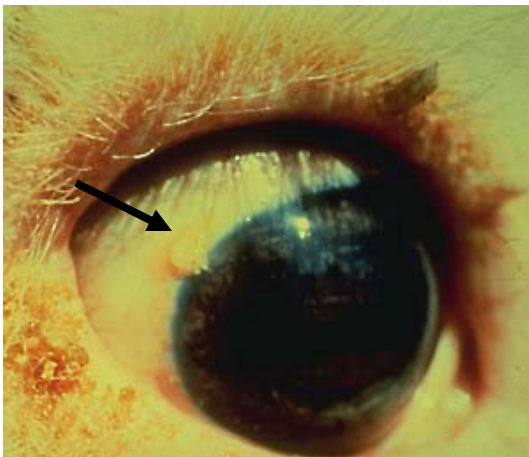
**Figure 2.** Lesion at the limbus. (Corneoscleral junction) (21 K JPG)



**Figure 3.** A Carcinoma showing the characteristic nodular appearance. The lesion is ulcerated. The mass would be friable. This is a stage 4 lesion. (23 K JPG)



**Figure 4.** This is a Papilloma (a pre-malignant stage of cancer eye at the limbus). This would be considered a stage 3 lesion. (11 K JPG)



**Figure 5.** This is a Plaque (a pre-malignant stage of cancer eye at the limbus). This would be considered a stage 1 lesion. (16 K JPG)

### **Treatment and Prevention**

Treatment is highly dependent on the location of the tumor and the degree of invasion of the underlying tissue. Some surgical procedures include eyelid wedge resection, third eyelid resection, or enucleation of the entire globe and lid margins. Surgical treatment methods do not always mean a cure for the disease. A 40 – 50% recurrence rate can be expected using these methods.

If the cancer has spread to regional lymph nodes, these surgical methods will not cure the disease and the tumor will continue to grow at those sites. If the tumor has not invaded underlying and adjacent tissues cryosurgery is a useful therapeutic tool. Cryosurgery is a means by which a tumor can be frozen off. This method works well on small tumors (<1” diameter) that have not invaded underlying tissues. Cryosurgery commonly leaves a scar on the surface of the eye that may interfere with future vision. Using cryosurgical methods, tumor removal has a high success rate (90%). Eyelid tumors are somewhat less successfully removed by these means (60%).

Prevention of the disease should begin with a program that allows for early detection. When cattle (especially over the age of three) are being routinely worked, the eyes should be carefully observed to detect pre-malignant stages of the disease such as papillomas, keratomas, or plaques. These early stages are much easier to treat and have a far better prognosis. It is important when checking cattle for these lesions to be aware that approximately 30% of animals afflicted will have lesions on both eyes and perhaps multiple lesions on one eye.

### **Conclusion**

Early (pre-malignant) lesions can be treated fairly easily and without much complication. Routinely check cattle over the age of three for any lesions in or around the eyes. Early recognition, evaluation, and treatment of these lesions are critical in preserving an animal's value and well being.

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