



Beef Cattle Handbook



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"Cancer Eye"—Its Treatment and Prevention

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"Bovine ocular squamous cell carcinoma, commonly called "cancer eye," is one of the more serious problems faced by ranchers today. Although the disease occurs in several breeds and some cross-bred animals, Herefords are most commonly afflicted. The cause of the disease is unknown. Genetic predisposition of the Hereford breed, together with prolonged exposure to ultraviolet light, appear to be contributory factors, however. Presently, cancer eye comprises about 80 percent of all tumors reported at processing and is the leading cause of carcass condemnation, with losses approaching \$20 million per year in the U.S. alone.

Various forms of therapy have been developed to treat cancer eye including traditional surgery, cryosurgery (freezing the tumor), hyperthermia (heating the tumor), radiation, and immunotherapy. The effectiveness of each of these treatments depends on the location of the tumor and whether it has invaded the underlying structure. Normally, tumors in the eyelid metastasize or spread more quickly than those on the eyeball itself. Tumors on the eyeball tend to grow out from the surface rather than go in.

Traditional surgery, which involves excision of the tumor via lid resection and/or enucleation (removal of the eyeball), does not always cure the disease. Normally, a 40 to 50 percent recurrence can be expected. Additionally, cancer may have spread to the draining lymph nodes of the lesion (under the ear and jaw) before surgery and will continue to grow. A visible lump below the base of the ear usually indicates an invasion of the lymph system. Animals with this condition will be condemned at processing. Thus, a one-eyed cow pre-

sented at processing is always suspect for cancer.

Hyperthermia and cryosurgery can be more useful than traditional surgery if treatment occurs before the tumor has invaded underlying structures. These methods can usually save the eye. If extensive invasion has occurred, traditional surgery should be the treatment of choice. Radiation has not proven to be practical in the treatment of cancer eye, and immunotherapy is still in the experimental stage.

Hyperthermia can be accomplished by two methods. The older method uses a unit that cauterizes or burns off the tumor. This method requires the services of a veterinarian since a Peterson block (injection to anesthetize the eye) must be given. It also usually leaves a scar on the surface of the eye, affecting vision. The second method uses a localized current field (LCF) of radio frequency energy to heat the tumor. Since cancer cells have a large nucleus, they are more susceptible to heat than are healthy cells with a small nucleus. This method heats the cells to the point that the cancer cells are destroyed while leaving healthy cells intact. This method has two advantages. First, little scarring occurs on the eye surface, and the animal normally recovers full sight. Second, no injections are required, allowing a rancher to use the unit with a little training. Results from New Mexico and Texas show that 90 to 95 percent of eyeball tumors are successfully removed by this method provided that the tumors are not too extensive initially. Treatment of eyelid tumors are less successful—about 60 percent.

Cryosurgery (freezing with liquid nitrogen) can be successful on small tumors, but it also leaves a scar on

the surface of the eye and requires a veterinarian to do it.

There are two important considerations about cancer eye treatment: no method is 100 percent sure, and all treatment should be considered a temporary procedure. For example, you may treat a cow with a small calf at her side to allow her to raise the calf, and then sell both in the fall. Heifers should not be kept, because the tendency to have cancer has relatively high heritability. Experience indicates that once a cow has cancer eye, she will probably get it again, although it usually will occur somewhere else or in the other eye.

Early Recognition of Cancer Eye

Many producers are dismayed to find animals afflicted with cancer eye that were clean a few months previously. This unpleasant experience can be avoided by learning to detect early eye tumors, which are not yet cancerous, and treating them before they turn malignant. In other words, producers can practice preventive medicine in the case of cancer eye.

Most people have no trouble recognizing cancer eye, yet few recognize benign or precursor lesions (70 percent of which can become malignant), which are highly treatable. Precursor lesions on the eyeball are known as plaques or papillomas. They are easily recognized as white or pink growths at the edge of the colored part of the eye. On the eyeball itself, almost all tumors are on the corneoscleral junction (the line where white joins black), with about two-thirds of them in front and one-third in the back of the junction. Few tumors originate on other parts of the eye. Lesions in the center of the pupil are usually the result of pinkeye or physical damage and are usually not precancerous.

The third eyelid is the most common site for malignant tumors on eyelids. On the upper and lower eyelids, the precursor lesions are known as keratomas, commonly called "wickers." Usually occurring on the lower lid, these small tumors are often crusted over with scab-like material that resembles the dried eye matter that is always present. If the growth appears to be attached to the eyelash, it is probably merely dried eye matter. If the growth appears to be attached directly to the lid and removal of the "scab" reveals a small growth and perhaps a bit of bleeding, then it is probably a precursor lesion and is highly treatable. Probably the easiest and most effective treatment of these benign lesions is an LCF device or cryosurgery. Remember, these are precursor lesions that have not yet invaded the deeper struc-

tures. Since they are more surface-oriented, they are highly susceptible to treatment. Freezing is particularly damaging to cellular structure and growth.

Multiple tumors or precursor lesions (three or more) have been shown to indicate that a particular cow is prone to have cancer. The tendency to develop cancer eye is a highly heritable trait. This was first reported in 1949 by Dr. John Knox of New Mexico and has been shown by various workers since that time. This heritability level is thought to be about .30, which is about the same as for weaning weight. Thus, selection against cancer eye can be a relatively effective tool. Do not save heifers from cows with cancer eye, particularly if the problem developed when the cow was young. Eliminate bulls with this trait. Brown pigment around the eyes has been shown to decrease the incidence of cancer in eyelids. The brown around the eyes can be selected for as a somewhat heritable trait.

Preventive medicine is important. Early recognition and treatment of benign eye tumors can drastically reduce the incidence of cancer eye in any herd. Close observation and treatment of precancerous lesions, used in conjunction with good culling practices, can lower the incidence of cancer.

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