

Bovine Cancer Eye
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Cancer eye also called Bovine ocular squamous cell carcinoma is the most economically important cancer of cattle. This one disease accounts for 12.5% of all carcass condemnations for all reasons at slaughter. Presently, cancer eye comprises about 80 percent of all tumors reported at processing with losses approaching \$20 million per year in the U.S. alone. Although the disease occurs in several breeds and some cross-bred animals, white faced cattle are most commonly afflicted. It may have more to do with the pigment around the eye than the breed. Ultraviolet rays of the sun are reflected onto the skin around the eye in white faced cattle. This may result in some damage to the DNA of the tissue and lead to cancer eye. In fact studies show a predisposition of white faced cattle, together with prolonged exposure to ultraviolet light, appears to be contributory factors. Cancer eye can occur in non-white faced cattle but at a much lower rate. In one study white faced cattle were exposed to high levels of ultraviolet rays for 16 weeks and 75% of them developed some form of cancer eye.

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 how early we detect the cancer and the how extensive the cancer has become, 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 presented 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. 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 is 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. 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. 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

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 pre-cancerous. 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 structures. 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. 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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