

## Bovine Eye Diseases: Cancer Eye

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Cancer eye, technically known as Squamous Cell Carcinoma, is a common locally invasive tumor of the eyes and eyelids of older cattle. Like pinkeye, its occurrence is associated with exposure to sunlight and is more common in cattle with white eyelids and conjunctiva. As a result, cancer eye is very common in Colorado dairy cattle.

The third eyelid appears to be the most common site of cancer eye in dairy cows, followed in frequency by the lower lid and then by the limbus (junction of the clear cornea with the sclera or colored portion of the eye). Cancer eye may exist in a "pre-malignant" form as a flat white plaque or as a wart-like growth on the lower lid. The malignant form is not well-circumscribed, and its surface is ulcerated. Malignant squamous cell carcinoma will grow steadily and will invade adjacent tissues including the eyeball itself, conjunctiva, and eventually the bony orbit. Once the eyeball is invaded, blindness in the affected eye will soon follow. Metastasis to distant sites is uncommon; the tumor is more likely to extend to local lymph nodes such as those below the ear and behind the mandible.

Failure to identify and treat cancer eye leads to the growth of large, unsightly, foul smelling tumors. Cattle with these tumors may continue to eat and produce milk reasonably well, but tend to lose weight. They are condemned at slaughter (by some estimates cancer eye is responsible for 12% of all carcass condemnation) and are refused by auction markets in Colorado. Furthermore, the presence of such tumors in clear view on a dairy farm may lead the general public to question the humane treatment of cattle on that farm and in the dairy industry in general. Therefore, Colorado dairy farmers should check their cattle frequently when cattle are held in lockups or as they enter the milking parlor. Early lesions are successfully treated by veterinarians and are much less likely to recur.

Treatment of cancer eye depends on its location and the degree of involvement of ocular structures. Veterinarians easily remove lesions on the third eyelid by cutting out the free border of the third eyelid using local anesthesia and tranquilization. Lesions removed in this way are very unlikely to recur. On the lids, small lesions (< 1 inch) are managed by cutting out the bulk of the tumor and then applying hyperthermia (high temperature) or cryotherapy (freezing) to kill the remaining tumor cells in the tissue of the lids.

Instruments to accomplish either hyperthermia or cryotherapy are commonly available to veterinarians. Larger lesions on the lids may require surgical removal and radical reconstructive surgery, although in some advanced cases the lid cannot be repaired and the eye must be removed. Cancer eye lesions on the eyeball itself are somewhat tricky to treat if sight is to be preserved. The bulk of the tumor is cut off carefully to avoid puncture of the eyeball, and the lesion is treated with hyperthermia. Removal of the entire eyeball is indicated when tumors have spread to the extent that the eyeball is blind; the tumor has invaded deeper structures surrounding the globe; or the eyelid is involved to the extent that it cannot be repaired after removal of the tumor. It may appear to be a drastic procedure, but trained veterinarians can accomplish it quickly and humanely. At slaughter, one-eyed cattle are not condemned as long as the local lymph nodes are not involved. Such cattle are accepted in Colorado auction markets, although the price paid may be discounted.

Cattle with epithelioma are condemned if the affected eye has been destroyed, there is extensive infection, the animal is in poor condition, or there is evidence of the cancer spreading to other parts of the body, including the bony structures around the eyes.<sup>27</sup> Cattle with small, localized lesions may pass inspection after condemnation of affected parts and completion of a thorough inspection. Reduction in condemnations as a result of epithelioma also requires a program for early detection and treatment. The incidence of ocular neoplasia can be reduced by selecting breeding stock with dark pigmentation or color around the eyes; checking eyes whenever cattle are gathered for other routine procedures, especially breeds known to be commonly affected and cattle > 2 years old; treating or reexamining cattle with early lesions every 2 to 6 months; and separating cattle with lesions for veterinary evaluation and treatment. Evaluation of the eyes of dairy cattle is easily accomplished when they are in lockups or other holding facilities. Treatments include surgery, cryosurgery (freezing), hyperthermia (heating), or combinations of these.<sup>28</sup>

## Conclusions

Inspection of cattle at packing plants represents one of the steps to ensure a safe and high-quality food supply. On the basis of condemnation data, there appear to be a number of opportunities for veterinarians to work with cattle producers and have an impact on animal welfare, the number of cattle condemned at slaughter, and losses to the beef industry. In all cases, early detection and intervention could help reduce condemnations for many of the major reasons. It requires a focus on disease prevention, education, and creative forms of monitoring success. It has been stated, "There is an ongoing challenge for prevention of many diseases; although there is still much to learn, information already exists to substantially reduce or prevent the disease altogether—the challenge is in effectively and consistently implementing the required management practices."<sup>13</sup> Providing veterinary guidance to producers for animals sold for beef may be the easy part—the difficulty for the beef and dairy industries is in addressing incentives or disincentives to change producer attitudes about sending potentially unfit cattle to market.

a. Microsoft Excel 2007, Microsoft Corp, Redmond, Wash.

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