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G93-1184 Bovine Ocular Neoplasia

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Bovine Ocular Neoplasia

This NebGuide will aid in the early identification and proper management of bovine ocular neoplasia, commonly known as cancer eye, including appropriate veterinary care.

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The common name for bovine ocular neoplasia, also known as ocular squamous cell tumors, is cancer eye. The term cancer eye is not entirely accurate and carries negative connotations. As we will explain in this NebGuide not all of these growths are cancerous. The scientific term for a cow is "bovine," the medical term for the eye is "ocular," and the medical term for these new and abnormal growths is "neoplasia." Thus, the term bovine ocular neoplasia or BON is more accurate and less objectionable.

Bovine ocular neoplasia (BON) includes a variety of benign and malignant skin tumors of the eyeball and eyelids. Benign tumors are growths that do not spread to other parts of the body and do not tend to grow into surrounding tissues. They can cause local problems with eye function, but do not affect the rest of the body. Malignant tumors are growths of cells that spread to other parts of the body and tend to invade surrounding tissues. Because cancerous tissue (tumor) is not acceptable for human consumption, any affected part of the animal's body will be condemned and an animal with evidence of a tumor that has spread to another part of the body is totally condemned.

Cattle with BON are condemned if the eye has been destroyed, if there is extensive infection, if the animal is in poor condition, or if there is evidence of the cancer spreading to other parts of the body, including the body structures around the eye. Cattle with small, localized lesions may pass inspection after condemnation of any affected parts and a thorough inspection is completed for any of the aforementioned conditions.

Cattle afflicted with BON represent a management challenge from both an economic and animal care standpoint. Failure to deal with cows with BON in a timely manner can result in economic loss to the owner, unnecessary suffering for the animal, and negative public perceptions. This type of poor

management is inconsistent with sound quality assurance.

Clearly, it is in the cattlemen's best interest from an economic, humane, and public perception standpoint to treat or market cattle with BON as soon as practical.

BON — The Condition

The cause of BON is not known; however factors such as breed and environment have been shown to contribute to the development of BON.

Exposure to ultraviolet light from the sun is a possible contributing factor. Increased incidence of BON is associated with increased annual hours of sunshine, increased altitude, and decreased latitude.

Nearly all breeds are susceptible, however, Hereford cattle are most often affected. Susceptibility to BON is heritable in Hereford cattle. Heritability estimates vary widely, but range from 17 to 66 percent. BON is also seen in Simmentals and occasionally in Holstein-Frisians but rarely in other breeds. BON appears to affect cattle that have non-pigmented skin, especially around the eye.

The peak age for BON is between 7 and 8 years of age. It occurs infrequently in cattle less than 3 years of age, although the condition has been reported to occur in younger cattle.

Other factors associated with BON have been examined. A relationship between a high level of nutrition and an increase in BON has been demonstrated in Hereford cows. Viruses have also been associated with the disease but not proven to be a cause. Infectious bovine keratoconjunctivitis (pink eye) has not been shown to be involved. The tumors occur at an equal rate in males and females.

BON can develop on different parts of the eye with differing frequencies. The most common site (83 percent) is the limbus, or the junction of the clear part of the eyeball (cornea) and the white part of the eyeball (sclera) (*Figure 1 a*). Sixty-seven percent occur at the junction on the outer part of the eye and 16 percent occur at the junction on the nasal side of the eye. The remaining 17 percent occur on the eyelids, including the third eyelid (*Figure 1 b*), particularly at the angle closest to the nose and occasionally at other sites. Nonpigmented (white) regions of the eye are more predisposed to BON because of reduced protection from ultraviolet sunlight. Growths on the clear part of the eyeball (cornea) are less prone to spread to other parts of the body (metastasize) than tumors on the white part of the eyeball (sclera). When checking eyes, you should carefully examine the entire eye, but pay special attention to the more common sites and unpigmented areas.

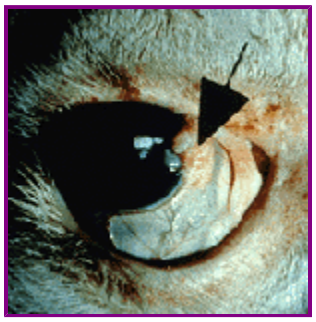

Figure 1a.
Growth at the limbus, or the junction of the clear part of the eyeball (cornea) and the white part of the eyeball (sclera).
(21K JPG)

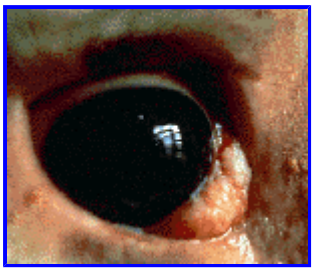

Figure 1b.
Growth on the third eyelid.
(10K JPG)

There are four stages of development for BON as shown in *Figure 2*. These include plaques (stage 1); keratoma, or keratoacanthomas (stage 2); papillomas (stage 3); and carcinomas (stage 4). Plaques, keratomas, and papillomas (stages 1, 2, and 3) are benign. Carcinomas (stage 4) are malignant.

Plaques appear as small, white, elevated areas (*Figure 2a*). Keratomas occur more frequently on the lower eyelid. They are skin growths coated with eye secretions and debris (*Figure 2b*). Papillomas may have a wart-like appearance (*Figure 2c*). Carcinomas are more irregular and nodular and may have a pink color due to an increased blood supply (*Figure 2d*).

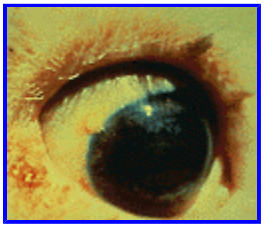

Figure 2a. Plaque (stage 1) (16K JPG)

Figure 2b. Keratomas (stage 2) (11K JPG)

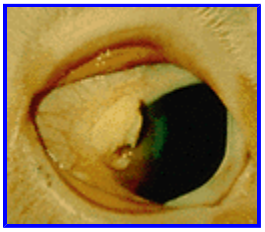

Figure 2c. Papilloma (stage 3) (11K JPG)

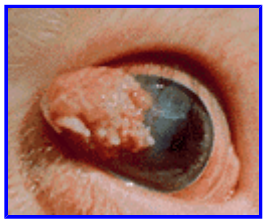

Figure 2d. Carcinoma (stage 4) (11K JPG)

Rapidly growing tumors may be ulcerated and easily damaged (*Figure 3*). These rapidly growing tumors invade the surrounding tissue and/or spread to other parts of the body. Cattle must be treated or marketed before this occurs.

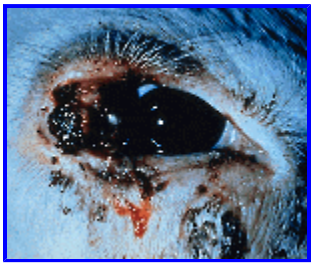

Figure 3. Carcinoma showing irregular, nodular, easily damaged character. (23K JPG)

There are several things that make BON difficult to manage. It is difficult to visually distinguish between benign and malignant tumors early in development. As discussed above, malignant BON may look different than benign, but not always. Dermoid cysts (little patches of skin) may also be confused with tumors. Your veterinarian can conduct further diagnostic tests if the animal's value justifies it.

Also, at any stage, the body may destroy the tumor and it will disappear. This is called regression. Around 30 percent of benign tumors regress completely without any treatment. However, the more advanced the lesion, the less likely that regression will occur and the greater the chance that the animal will be condemned. Malignant tumors rarely regress.

Finally, malignant BON can arise spontaneously without the early stages. In other words, cattle may not develop plaques or papillomas prior to carcinoma formation.

Management / Treatment

You can reduce the incidence of BON in your herd by selecting breeding stock with dark pigmentation or color around the eyes and by culling affected animals and their offspring from the breeding herd.

Check eyes whenever cattle are gathered for other routine procedures, especially breeds known to be commonly affected and cattle over 2 years of age.

Treat or note and recheck cattle with early lesions every two to six months. The earlier the treatment, the better the chance for success.

Sort away cattle with lesions for veterinary evaluation and treatment. Veterinary treatments include surgery, cryosurgery (freezing), hyperthermia (heating), or combinations of these. The success rate, if treated early, approaches 90 percent. Affected animals should be culled from the herd if regression or medical treatment at early stages fails to eliminate the growth. Given the genetic susceptibility of this condition, you may elect to cull affected cattle rather than treating them. Considerations may also be given to culling offspring of animals with ocular neoplasia.

Cattle with advanced lesions that have spread to other parts of the body or invaded the local tissues around the eye should be humanely destroyed and not transported to market. If presented, they will be condemned. Presence of cattle with BON at the market could create negative public perceptions.

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