

calf. The fact that transmission of BLV is more likely to occur in summer has led to the speculation that insect vectors may frequently be responsible for BLV transmission. This idea is supported by the fact that BLV-infected lymphocytes have been recovered from the mid-gut of biting flies which have been allowed to feed on BLV-infected cattle, as well as the fact that BLV has been successfully transmitted by intradermal inoculation of as few as 2,500 lymphocytes. That this number of lymphocytes may be contained in 0.005 ml of blood also points up the risk of transfer of BLV on hypodermic needles.

The other major mode of transmission is *in utero* transmission from dam to fetus across the placenta. Although this is not as frequent as contact transmission, it does occur in 20% of the pregnancies of BLV-infected cattle. It does not appear, however, that cows which produce an infected calf at one pregnancy have an increased likelihood of producing an infected calf at the next. Calves which

become infected *in utero* have BLV antibodies detectable in pre-suckle serum samples. After nursing, as mentioned above, diagnosis of BLV infection in these calves must rely on direct tests of BLV infection, since all calves nursed on BLV-infected dams will have BLV antibodies of maternal origin.

Although infectious BLV can be demonstrated in the milk of up to 50% of BLV-infected cattle, transmission through ingestion of milk is not an important natural route of transmission. This may be due to the protective effect of colostral antibodies present during the nursing period, or due to the failure of infected lymphocytes to cross into the systemic circulation where they may replicate the virus.

Although BLV antigens have been detected in the urine of infected cows, infectious BLV has not been detected, and attempts to transmit the virus by inoculation of urine into susceptible recipients have failed. Neither BLV nor its antigens have been detected in saliva or semen, and neither secretion has been implicated in the natural transmission of the virus.

Viral Diseases Of The Bovine Eye

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Infectious Bovine Rhinotracheitis (IBR)

IBR virus is a Herpes virus which manifests itself in many ways in cattle. These include the respiratory form, infectious pustular vulvovaginitis (IPV) form, abortion form, neonatal septicemic form, and ocular form. These various forms of the disease may be found alone or as any combination within an infected herd. Clinically, the virus seems to appear principally in one form within each affected herd. As with other Herpes viruses, recrudescences have been observed in IBR infected herds during periods of stress for individual or groups of cows.

The ocular form of IBR is a severe conjunctivitis characterized by ocular discharge, chemosis, conjunctival injection, and multiple white foci 1.0-2.5 mm in diameter scattered over the palpebral and bulbar conjunctiva. The lesions may affect one or both eyes. In the most severe cases, peripheral corneal edema and vascularization may be observed due to the tremendous conjunctivitis. This is a non-ulcerative keratitis and leaves the central cornea clear-aiding differentiation between IBR conjunctivitis and infectious bovine keratoconjunctivitis ("pinkeye").

The conjunctival lesions follow a definite pattern as they heal. The first day of infection may only reveal a serous lacrimal discharge. On days 2-5, the typical white focal lesions appear. On days 5-9, the small white focal lesions seem to coalesce and undergo necrosis. During this time, the

conjunctiva demonstrates the most severe chemosis and infection. The lesions resolve 10-20 days following the onset of infection.

The cattle may or may not show systemic signs of fever, depression, inappetance, and decreased milk production. These signs seem to result directly from the febrile response when present. The respiratory form or nasal lesions have been described in conjunction with the ocular form, but the ocular form has been seen in several herds as the only lesion. Pregnant cattle may abort following the ocular form of the disease-especially those in the last half of gestation.

Virus can usually be isolated from the affected eyes during the first 7-9 days of infection. After this time, the virus is generally not found on culture. Fluorescent antibody techniques completed on conjunctival scrapings are the simplest and quickest means of positive diagnosis. Acute and convalescent serology may be helpful to confirm diagnosis if viral culture or FA techniques are unavailable.

Treatment should consist of cleansing away of discharges plus broad spectrum topical antibiotics to discourage secondary bacterial conjunctivitis. In addition, idoxuridine or other anti-Herpes ophthalmic preparations could be utilized to speed healing. However, on a practical basis, most cases resolve fully in 10-20 days without treatment.

The best treatment is prevention by prophylactic vaccination of heifers and cows with IBR vaccines.



Fig. #1 Typical IBR conjunctivitis — note the multifocal white plaques on the palpebral conjunctiva (arrow).

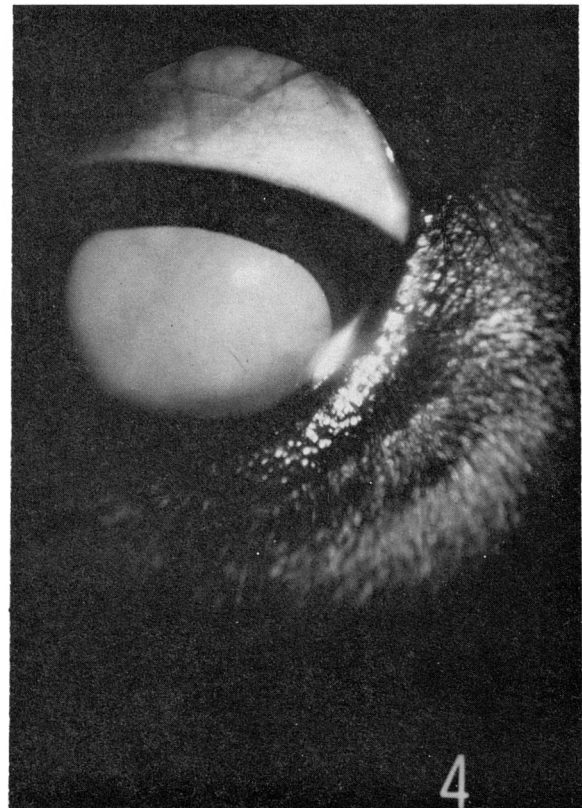


Fig. #2 Complete cataract in a calf infected in utero with BVD-MD virus.

Bovine Virus Diarrhea - Mucosal Disease (BVD-MD)

Ocular lesions have been observed in calves born to cattle infected during days 75-150 of pregnancy with BVD-MD virus. These lesions have been observed in natural disease outbreaks as well as in experimental infections of pregnant cows with the virus. Fetal calves infected during days 75-150 of gestation may also demonstrate cerebellar hypoplasia. Calves infected *in-utero* during this critical period may show cerebellar signs and/or ocular signs, or may show no lesions.

The ocular lesions that have been observed by various authors include cataracts, chorioretinitis, retinal dysplasia, optic neuritis, retinal hemorrhages, and microphthalmia. Any combination of these lesions may be observed in affected calves.

In suspected cases, precolostral serum samples from the calf would reveal titers to BVD-MD virus and allow positive diagnosis. Diagnosis may also be aided by knowledge of past or current BVD-MD signs in the herd as well as the observation of cerebellar hypoplasia in newborn calves.

These lesions usually result in partial or total blindness and are not amendable to treatment.

Herds that experience losses due to BVD-MD virus should be counseled by their veterinarian on the pros and cons of vaccination to prevent further problems.

Malignant Catarrhal Fever (MCF)

Ocular lesions have been observed in the classical "head and eye form" of MCF as well as in more chronic forms of the disease. The lesion is a vasculitis and non-suppurative inflammation in several areas of the eye. A severe conjunctivitis, anterior uveitis, and interstitial keratitis are usually observed. A scleritis is observed with severe vasculitis especially in the limbal and filtration angle region. A retinal vasculitis may be present, but retinal lesions are usually not severe. In addition, the choroid seems to be spared for the most part.

On ophthalmic examination, corneal edema and vascularization, severe conjunctivitis, and uveitis of variable degree are the principal lesions. The cornea does not exhibit ulceration unless corneal edema becomes so severe as to allow bullae formation with subsequent rupture and erosion of the epithelium.

I have observed two chronic cases of MCF with intermittent fever of 2-3 weeks duration (105-107°) that is non-responsive to antibiotic therapy. These animals have a chronic uveitis and keratitis and ultimately develop mucosal lesions. One case lived eight months and experienced three separate recurrences of febrile episodes that extended for weeks at a time.

Bovine Leukemia Virus (BLV)

The most common orbital tumor in cattle is lymphosarcoma which produces a gradual exophthalmos. Since many dairy breeds (Jerseys, some Holsteins and Ayrshires) can have a relative exophthalmos normally, the early detection of this may not be possible. Remember that in cattle the herdsman's observations are the ones that count. If he misses a gradual exophthalmos for several days or weeks, you may be called to attend a grotesque eye suffering from exposure keratitis, etc., that the herdsman believe to have been a sudden onset. Physical examination of other lymph nodes and target organs should be completed. *The eye is hardly ever the only site involved.* An agar-gel immunodiffusion for Bovine Leukemia virus and CBC are in order if the diagnosis is in doubt. The only indication for enucleation is to relieve pain associated with exposure and possible panophthalmitis or orbital cellulitis in an animal that the owner wants to retain for 3-6 months in order to

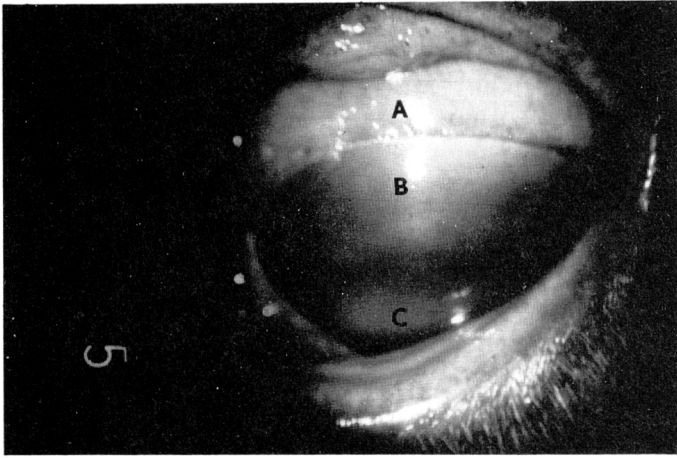


Fig. #3 Severe ophthalmitis in a yearling steer due to malignant catarrhal fever. Note the severe chemosis (A), corneal edema (B), and hypopyon (C) present.

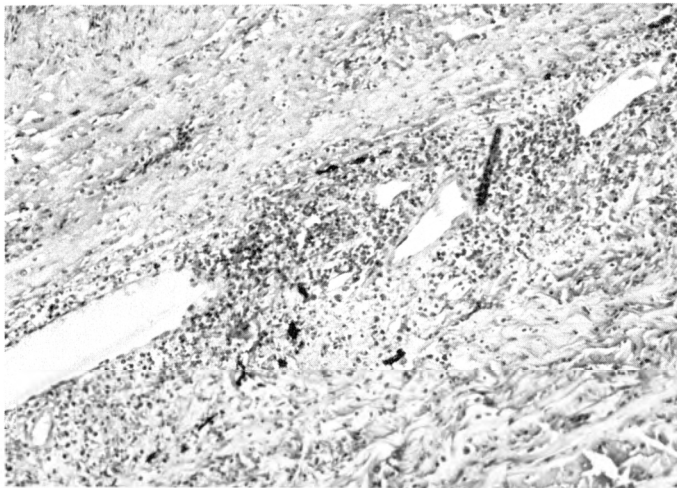


Fig. #4 Severe vasculitis in the sclera of the eye shown in Fig. #3 due to MCF.

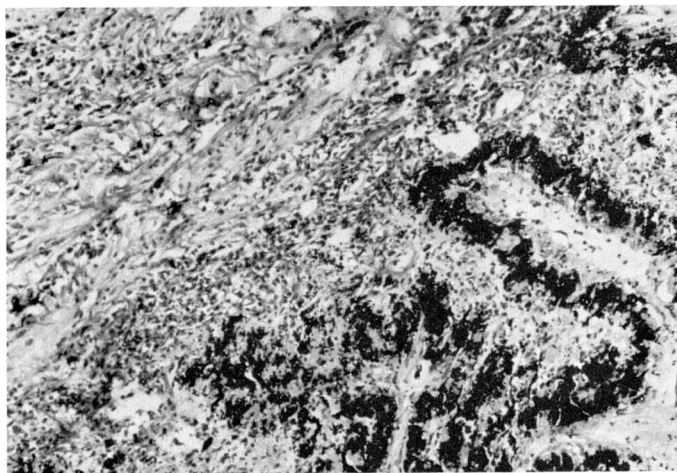


Fig. #5 Extensive infiltration and inflammation of the ciliary body due to MCF uveitis in a cow.

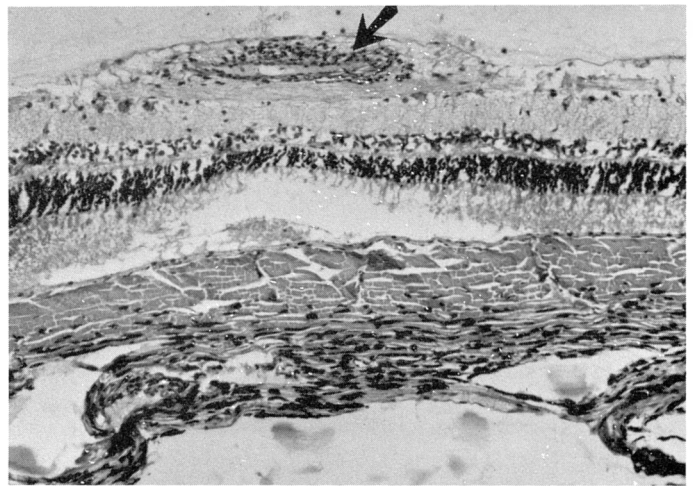


Fig. #6 Retinal vasculitis (arrow) in a cow affected with MCF ophthalmitis.

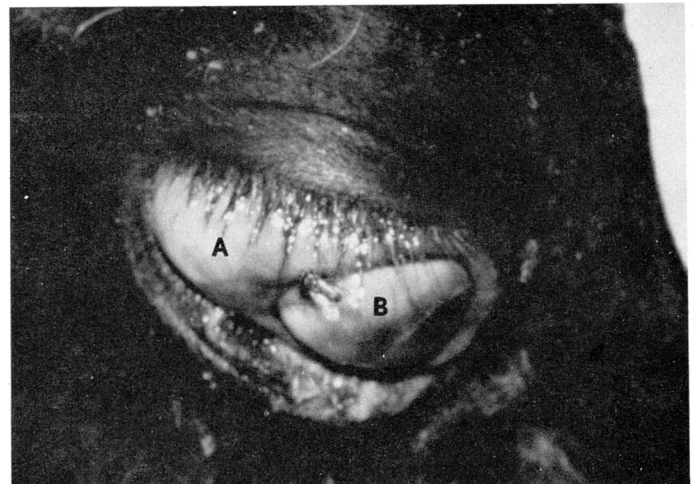


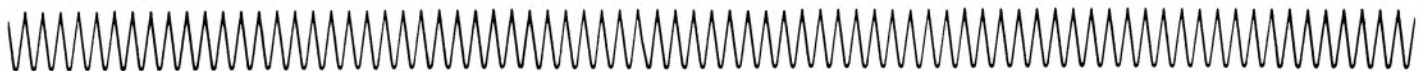
Fig. #7 Exophthalmos due to lymphosarcoma in the orbit of a 5-year-old Holstein cow. Note the severe chemosis (A), and exposure keratitis (B) due to the eyelids being unable to protect the globe.

harvest a calf. Most cases with orbital lymphosarcoma will be dead in 6 months from other lesions. Bilateral exophthalmos carries a guarded prognosis. During enucleation, the lymphoid tumors will be palpated in the retrobulbar area and usually are firmly attached to the periorbita in the caudoventral orbit. Biopsy tissue is easily obtained at this point and should be collected separately from the globe. Total removal of the lymphoid masses is almost impossible. The globe is often free of tumor involvement. We have observed that the conjunctiva and

sclera may have early involvement of tumor in some enucleated eyes.

Selected References

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Practice Methods

A mandrel bit and a 1 inch hole saw for an electric hand drill can be purchased at any hardware store. These make an excellent trephine for draining sinuses in cattle. Using local anesthesia, make a circular skin incision 1" diameter over the area to be drained. After removing the skin, make the trephine opening with the hand drill and hole saw.

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We use the following reminder card to schedule herd and fertility work. They are addressed as postcards and mailed 2 weeks before our visit.



LOGAN COUNTY ANIMAL CLINIC
Herd Health and Vaccination Reminder

cows
calves

On _____ your horses were vaccinated for _____ and _____.

These vaccinations should be repeated in the month listed below.

Dr. Luckett
Dr. Hatchett

On _____ Dr. Britt will be on your farm to do fertility work

on _____ . Please call the clinic to schedule this work. Repeat _____

Jack S. Britt, D.V.M., Russellville, Kentucky