
بسم الله الرحمن الرحيم

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Faculty of Veterinary Medicine

Departement of Animal Medicine and Infectious Diseases

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انك أنت العليم الحكيم

صدق الله العظيم

سورة البقرة- الآية 32

CATTLE INFECTIOUS DISEASES

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Diseases causing enlargement of superficial L.N and/or corneal opacity

Diseases causing enlargement of superficial L.N:

MCF, Theileriosis, EBL, TB

Diseases causing corneal opacity

MCF, Theileriosis, Pink eye

Bovine Malignant Catarrh (BMC) (Malignant Head Catarrh, Malignant Catarrhal Fever)

Definition

Acute generalized highly fatal infection Disease of cattle, buffalo and some wild ruminants characterized by erosive stomatitis, gastroenteritis, kerato-conjunctivitis, encephalitis, erosions in the upper respiratory tract and Lymph nodes enlargement.

Etiology

✧ Family: Herpesviridae

✧ Subfamily: Gammaherpesvirinae

✧ Genus: Alcelaphine herpesvirus 1 Spp. Alcelaphine (beest-associated BA MCF) virus and Ovine herpes virus 2 (sheep-associated -SA MCF)

✧ DNA, enveloped

✧ Produce eosinophilic intranuclear inclusion bodies in T.C.

✧ The virus is Fragile.

✧ The disease is not or rarely transmitted from cattle to cattle (dead end host)

Alcelaphine herps virus

Epidemiology

Geographical distribution

Disease occurs in most countries but most frequently in Africa.

The diseases considered sporadic and almost fatal.

Source of Infection

- Sheep.
- Wild ruminant. The morbidity rate varies. Usually the disease is sporadic but almost fatal.

Morbidity is low and mortality is high

Methods of transmission

- **Inhalation.**
- **Ingestion of food contaminated by**

Sheep-associated (SA-MCF) vaginal discharge from lambing ewes.

(Wild beest-associated) nasal and ocular discharges.

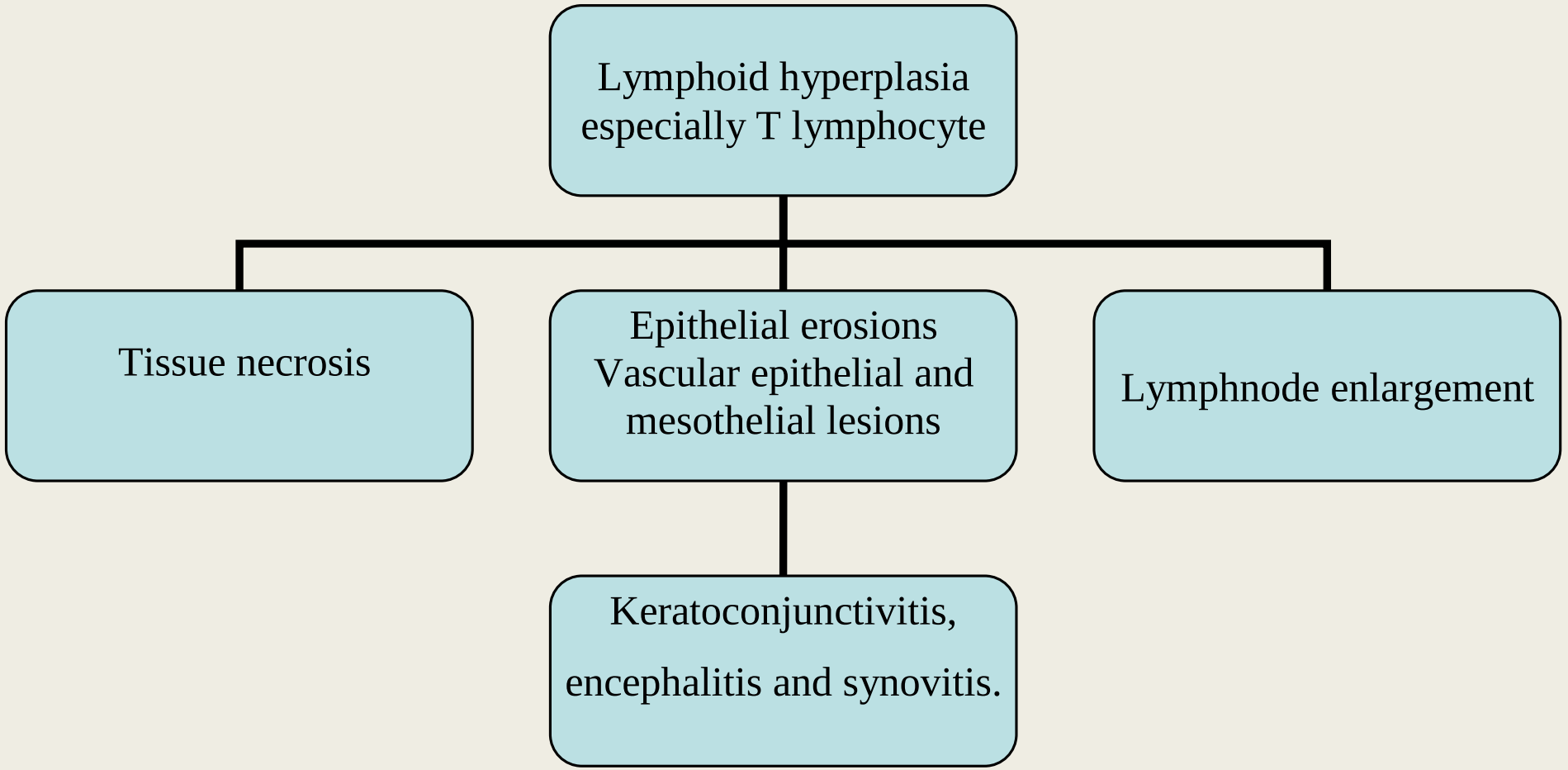
- **Insect vector.**

Economic importance

✧ Losses due to the disease can be catastrophic on rare individual farms.

✧ MCF is almost a fatal disease.

Pathogenesis



Clinical signs

❖ Incubation period: 3-8 weeks

❖ **Forms**

1- Head and eye form

2- Peracute or alimentary tract form

3- Mild form.

1- Head and eye form

- ❖ High fever 41 - 41.5 ºC, Anorexia, Agalactia.
- ❖ Profuse mucopurulent nasal discharge.
- ❖ Severe dyspnea.
- ❖ Ocular discharge.
- ❖ Edema of eyelids, blepharospasm.
- ❖ Congestion of scleral vessels.
- ❖ Superficial necrosis in anterior nasal mucosa

- Patches of necrosis at the nostrils cover the entire muzzle covered by scabs.
- Similar lesions may occur at the skin, Horn junction of the feet, the skin of teats, vulva and scrotum may slough off entirely on touching or covered with scabs.
- **Enlargement of superficial lymph nodes**

❖ Nervous signs

- Early: weakness in one leg
- Final stage: Head pushing, incoordination, muscle tremor, paralysis and convulsions.

❖ The consistency of feces varies from constipation to profuse diarrhea with dysentery. In some cases, there is gross hematuria (marked at the end of urination).

❖ Corneal opacity (narrow, gray ring at the corneoscleral junction spread **centripetally**).

- Hypopyonis observed in some cases (leucocytic infiltration of the cornea).
- The ocular and nasal discharges become profuse and purulent.
- The horns and rarely the hooves may be shed.
- Persistence of the fever (characteristic of MCF) even may persist for several weeks having a fluctuating temperature exceeding 39.5 ºC.
- Animals die 7 - 10 days later of acute encephalitis.

2- **Peracute or alimentary tract form**

- Short course (1 - 3 days)
- Characteristic signs of head and eye form do not appear
- High fever
- Dyspnea
- Acute gastroenteritis
- Marked diarrhea
- Minor eye changes (Conjunctivitis).

2- **Mild form**

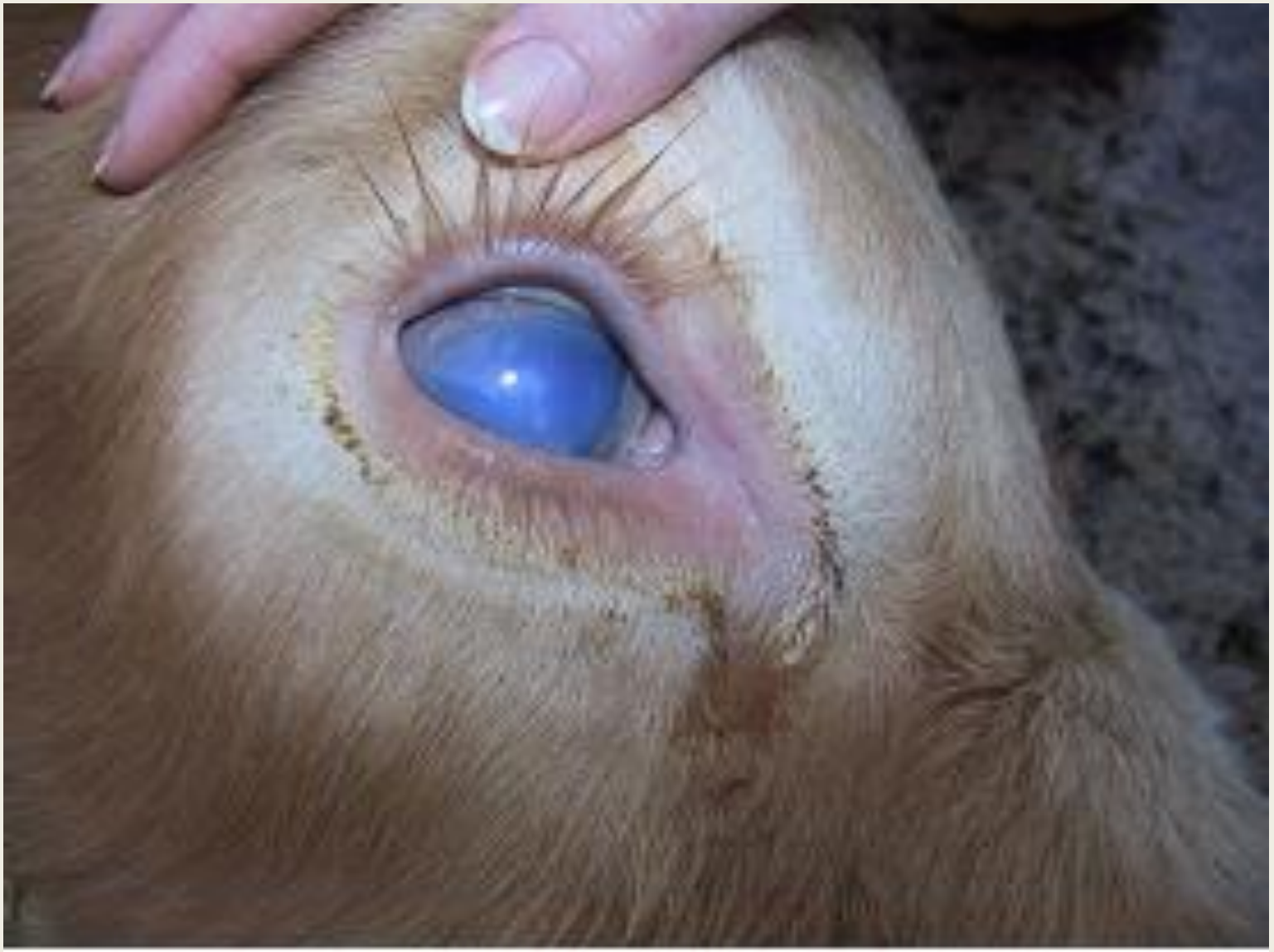
- Usually in experimental animals
- Transient fever.
- Mild erosions on the oral and nasal mucosa.

Nasal discharge with eye Opacity

Tongue erosions

Bubbly-hanging salivation

Ocular discharge with opacity



Corneal opacity causes blindness

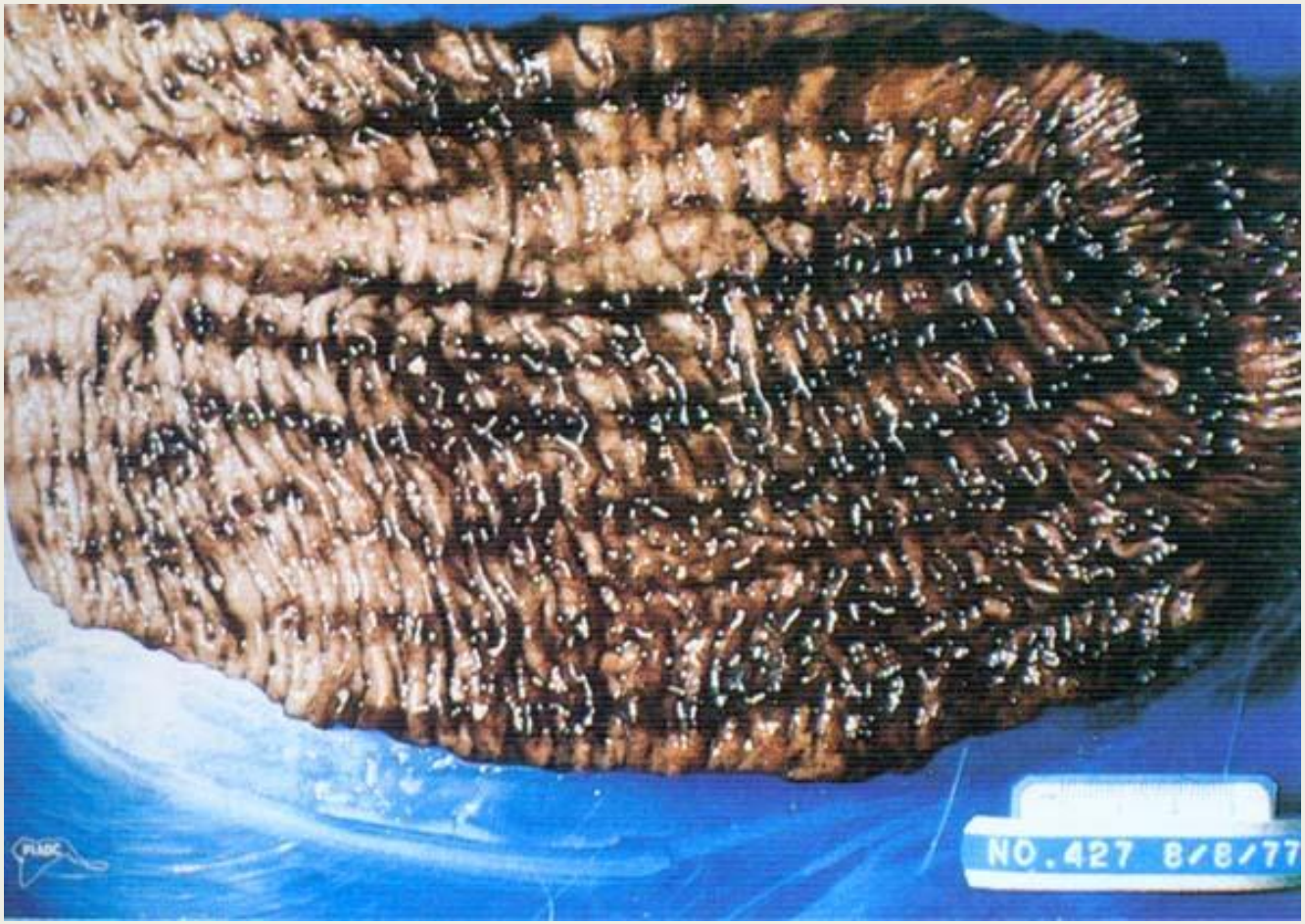
The surface of the muzzle has been sloughed in this animal

The eyes are severely affected with corneal opacity causing blindness. There is copious mucopurulent nasal discharge

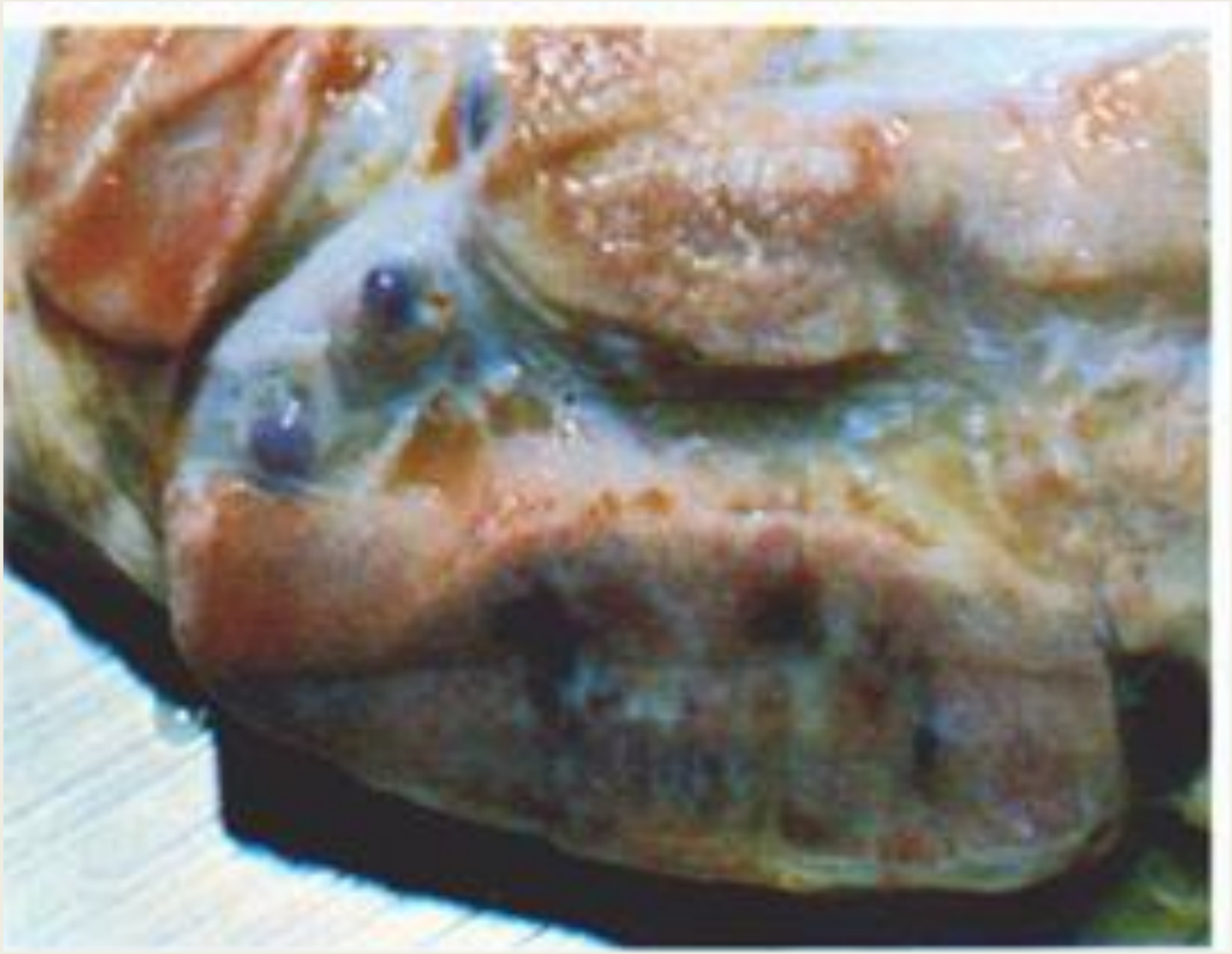
Hypopyonis

Postmortem findings

- Lesions in the mouth, nasal cavities and pharynx, trachea and sometimes in bronchi.
- Erosions of tips of the cheek papillae. Erosions in esophagus
- Erosions in the abomasum with catarrhal enteritis and ulceration of payers patches
- Swollen liver, all lymph nodes are swollen, edematous and hemorrhagic.
- Ocular lesions as described clinically
- Petechial hemorrhages in brain and meningitis



Tiger striping



Lymphnode edema and enlargment

Diagnosis

History: Contact with sheep, low morbidity, and high mortality. -

Clinical signs

Histological findings

Perivascular, mononuclear cell aggregations in most organs.

Laboratory diagnosis

Samples

- Leukocytes (before animal death)
- Tissue suspension (Collected 1 - 2 h. after death).

Identification

- PCR.
- Virus isolation
- Virus neutralization test
- Electron microscopy

Detection of antibodies

- Indirect IFA (disadvantage cross reactivity)
- ELISA (cross reaction)
- Less reliable or suitable tests CF and AGID.

Differential Diagnosis

Mucosal disease: no typical ocular lesions

Diseases causing enlargement of superficial L.N

MCF, Theileriosis, EBL, TB

Diseases causing corneal opacity

MCF, Theileriosis, Pink eye

Treatment: No treatment.

Control

- At present, no effective vaccine.
- Separation of sheep and cattle flocks.
- Before introducing reservoir-shedder (sheep) species to farm with susceptible animals (cattle) VN or IFF testing and exclusion of animals with BMC.
- Sodium or thophenylphenol disinfctant

Theileriosis

(East coast fever-Egyptian fever)

Definition

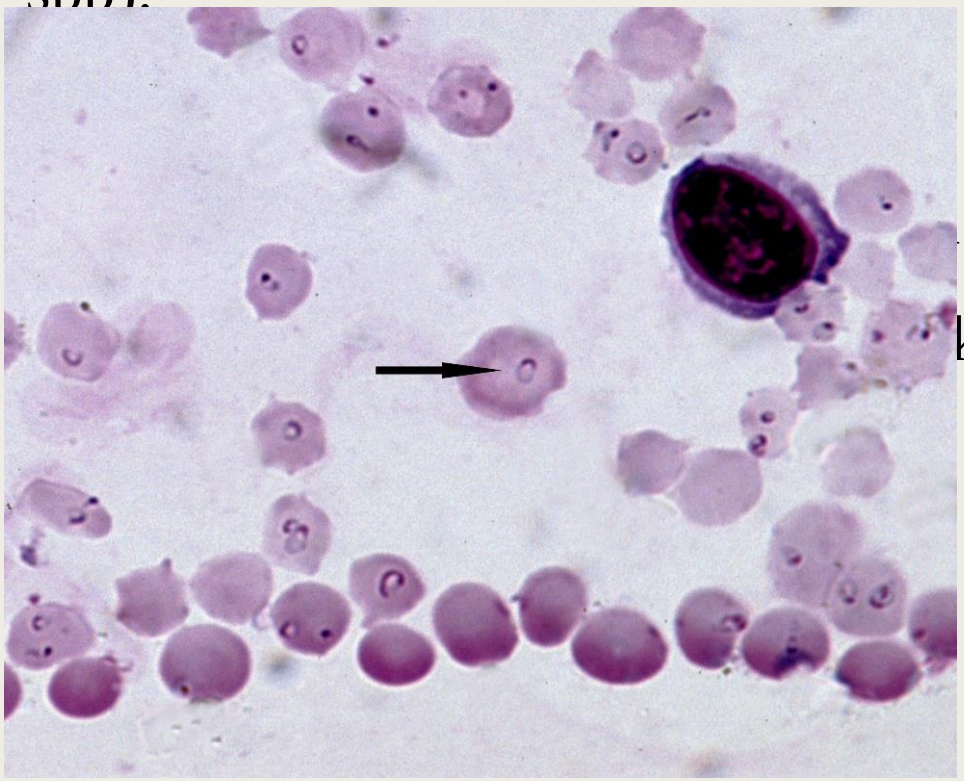
Acute tick born disease of cattle and buffalo caused by theileria spp. Characterized by high fever (dyspnea, weakness, emaciation and high mortality rate), lymphnode enlargement, frothy nasal discharge, eye exudation and corneal opacity

Etiology

Theileria parva

Cause east coast fever in east and central Africa.

Transmitted from cattle to cattle by brown ear tick (Rhipicephalus spp).



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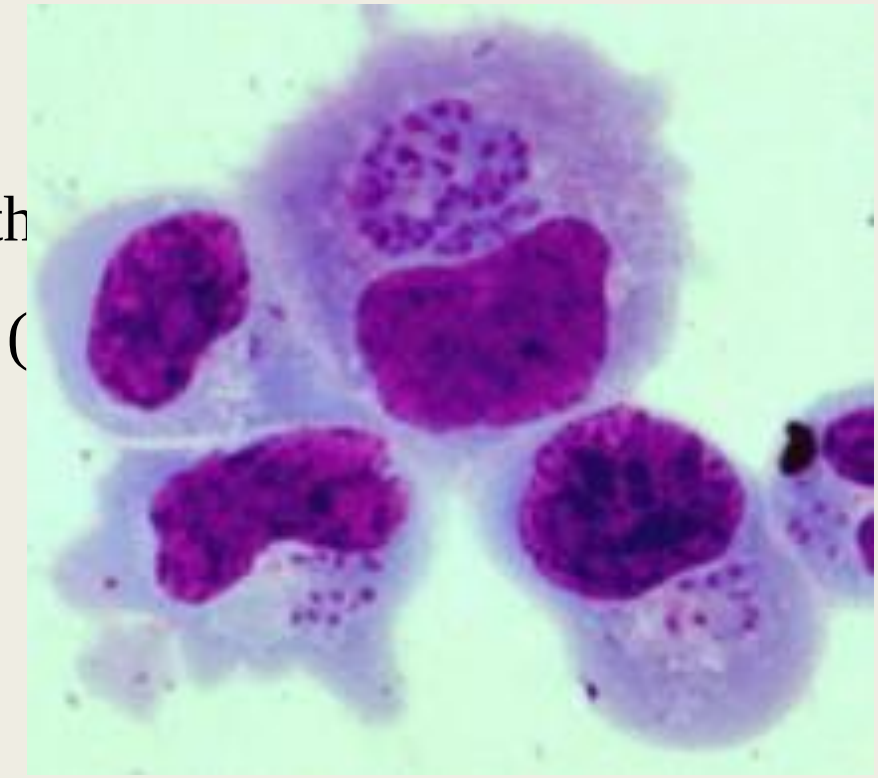


Epidemiology

Geographical distribution

The disease present in Mediterranean basin, Asia and Africa.

Host susceptibility

Cattle and buffalo are susceptible host.

- ✧ Buffalo are less susceptible than cattle but they act as a carrier.
- ✧ The infection is usually benign in African buffalo but the Asiatic water buffalo are fully susceptible.
- ✧ Young animals are less susceptible than adults. Indigenous breeds are less clinically affected than exotic breeds.

Morbidity and case fatality

90-100% in exotic breeds and unexposed indigenous breeds.

Indigenous breeds of cattle in enzootic areas have anatural resistance to the diseases and calf hood mortality about 2%.

Source of infection

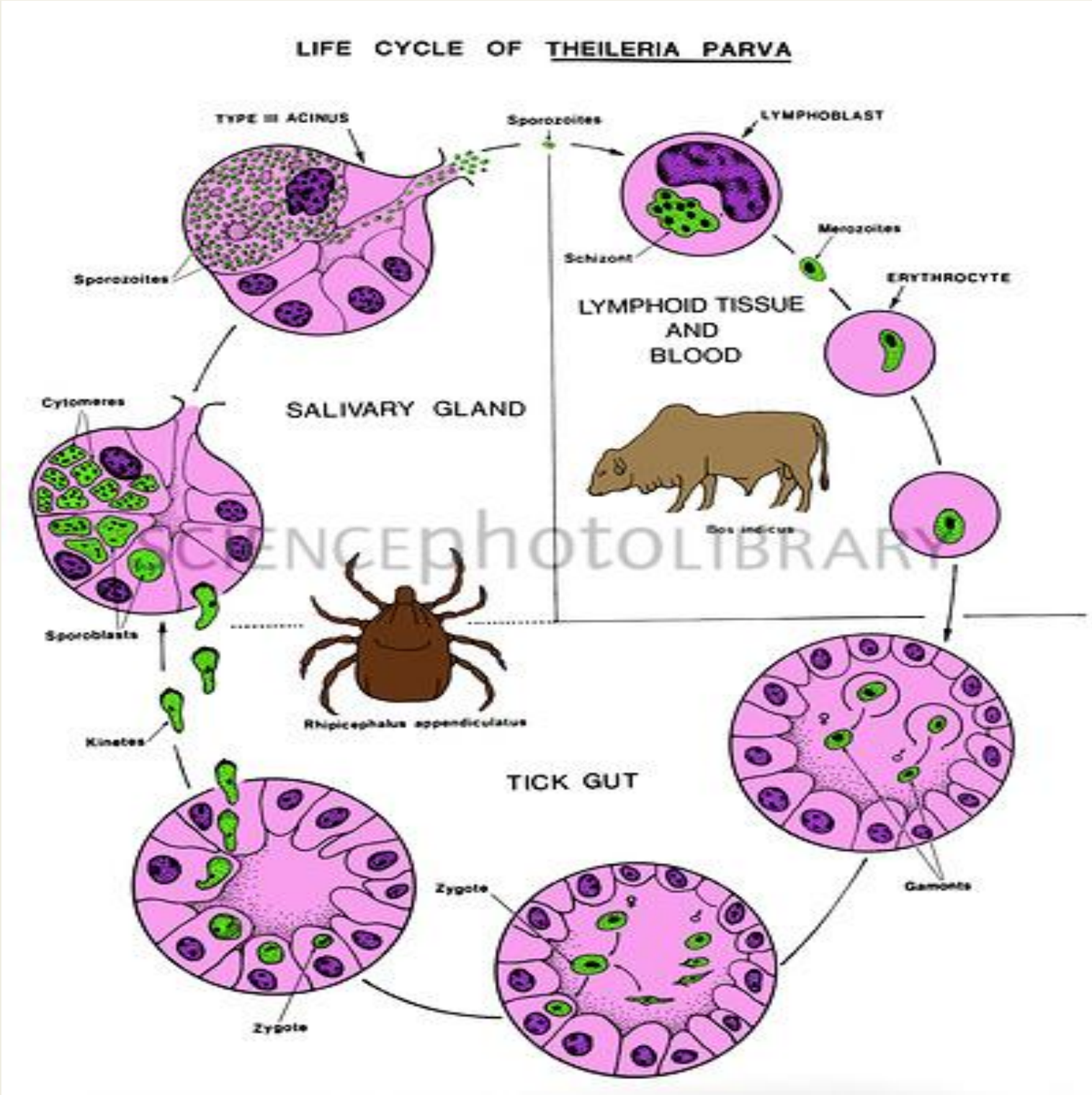
Infected animal and infected ticks are the main source of infection. Ticks may live for 1-2 years but lose their infectivity within 11 months.

Mode of transmission

- Occur by tick either Rhipicephalus or Hyalomma spp.
- Transovarian transmission (larva----- nymph----- adult).'
- Transmission increase when there is favorable condition for tick in its habitat.

Risk factors

- Theileria parva highly virulent for native cattle especially exotic breeds.
- Infection rate in enzootic area is usually low 1-2% and there is high percentage of immune animals.
- Animals survive the infection have a solid immunity by antibody response and cell mediated cytotoxicity.
- The presence of tick vector in a given area and the level of tick burden per animal.
- An average of less than one tick allows sporadic cases.
- Areas that are too high, too cool or too dry will not allow the tick to undergo more than one life cycle in a year this leads to reduce the period of transmission by the nymph or adult.


LIFE CYCLE OF THEILERIA PARVA
TYPE III ACINUS
Sporozoites
LYMPHOBLAST
Schizont
Merozoites
ERYTHROCYTE
LYMPHOID TISSUE AND BLOOD
Sporozoites
Cytomeres
SALIVARY GLAND
Bos indicus
Sporoblasts
Rhipicephalus appendiculatus
Kinetes
TICK GUT
Zygote
Gamonts
Zygote

Clinical signs

- ❖ IP is about 2-3 wks. depending on virulence of the strain and dose of infection.
- ❖ The first clinical sign is the enlargement of the local drained lymph node at the area of tick attachment.
- ❖ Fever, depression, anorexia and drop in milk production.
- ❖ Nasal and ocular discharges, dyspnea, and generalized lymph nodes enlargement.
- ❖ Corneal opacity may be developed.

- Frothy nasal discharge.
- In sever cases there is diarrhea with dysentery.
- Emaciation, weakness and recumbency lead to death from asphyxia (7-10 days).
- Occasional cases develop cerebral theileriosis characterized by circling, localized nervous signs and convulsions with tremor, profuse salivation and head pressing.
- Infection with theileria annulata there is anemia develops with few days and icteric mucus membrane.
- Malignant ovine theileriasis, Fever, inappetence, corneal opacity with enlargement of superficial lymphnodes and there is oculo-nasal discharge with respiratory distress. Animals are anemic and frequently icteric and there is transitory hemoglobinuria.

Postmortem findings

- The carcass emaciated and hemorrhages are evident in a variety of organs.
- Massive pulmonary edema, hyperma and emphysema with hydrothorax and hydropericardium.
- Enlargement of liver, spleen, lymphnodes and ulceration of abomasums and intestine.
- Small lymphoid nodules are present in liver and spleen and kidney and GIT called pseudoinfarct.
- Macroscopically: the nodules characterized by proliferating lymphoblastoid cells and varying amounts of necrosis in lymphoid organs, liver, lung, kidneys and GIT.

Diagnosis

- Clinical signs with tick presence usually suggestive for theileriosis.
- The parasites are evident as schizont sometimes in circulating lymphocyte but mainly in lymph smears
- Piroplasms are also easily visible in RBCS.
- There is panleukopenia and thrombocytopenia with little or no anemia.
- CFT-ELISA-IHA AND FAT.

Differential diagnosis

- Heartwater
- Trypanosomosis
- Babesiosis
- Anaplasmosis
- Malignant catarrhal fever
- Contagious bovine pleuropneumoniae
- The parasites must also be differentiated from other species of Theileria.

Treatment

Control of ticks

- Using acaricides with short interval dipping for two or three host tick will dramatically alter the population of one host tick.
- Regular change of acaricides to ovoid development of resistance by ticks.

Specific treatment

Treatment and control

Parvaquone and, subsequently, its derivative buparvaquone (Butalex) 1 ml Butalex per 20 kg b.w. (2.5 mg buparvaquone per kg). Treatment with these compounds is highly effective when applied in the early stages of clinical disease but is less effective in the advanced stages in which there is extensive destruction of lymphoid and hematopoietic tissues. Chlortetracycline is also effective.

Supportive treatment

Use of anti-inflammatory drugs, antioxidants, and corticosteroids.

Blood transfusions may be life-saving in very anemic animals.

Prevention

Control of ticks

Prevention measures which are currently applied to bovine theileriosis are

- ❖ Immunization of susceptible stock.
- ❖ Treatment of diseased animals.
- ❖ Control of ticks by acaricides.
- ❖ Control of cattle movement.

Medical prophylaxis

- Chemotherapeutic agents such as buparvaquone are available to treat T. parva and T. annulata infections
- Treatments with these agents do not completely eradicate theilerial infections and lead to the development of carrier states in their hosts
- Recovery from one strain of T. annulata confers cross-protection against most other strains
- Complete cross-protection does not occur with T. parva
- Inactivated vaccines None are available
- Live attenuated vaccines

Pinkeye

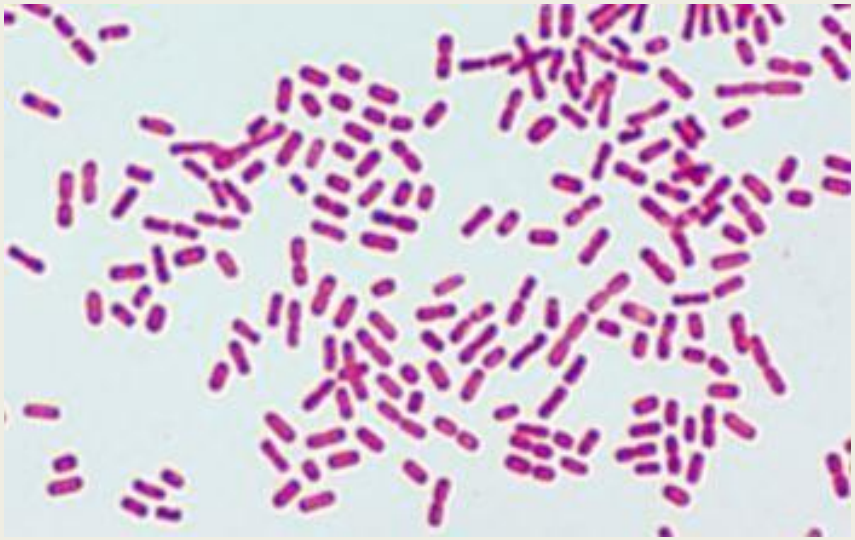
(Infectious bovine kerato-conjunctivitis, Infectious ophthalmia, new forest eye)

Definition

Pinkeye is a highly contagious inflammatory infection of the eye that affects primarily the cornea and sclera of cattle caused by moraxella bovis.

Etiology

The infection caused by the bacteria "Moraxella bovis" Moraxella is a genus of Gram-negative bacteria in the Moraxellaceae family. It is named after the Swiss ophthalmologist Victor Morax.



The infection may also caused by

High UV light

Dust

IBR infection

IBR vaccination

Mycoplasma infection Mycoplasma bovoculi

Trauma

Epidemiology

Distribution: Worldwide

Source of infection: Usually ocular and nasal discharge of infected or carrier animals

Transmission

The disease is transmitted by direct contact with ocular or nasal discharge of an infected animal. Flies such as face fly, horn fly, stable fly, and house fly can serve as mechanical vectors as can contaminated equipment and people. Morbidity rate up to 80 % Mortality due to pinkeye is rare.

Susceptible animals

Only cattle are affected by the bacteria

Epidemiology

Distribution: Worldwide

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The disease is transmitted by direct contact with ocular or nasal discharge of an infected animal. Flies such as face fly, horn fly, stable fly, and house fly can serve as mechanical vectors as can contaminated equipment and people. Morbidity rate up to 80 % Mortality due to pinkeye is rare.

Susceptible animals

Only cattle are affected by the bacteria

Predisposing factors

- Occurs more frequently in early summer when maximum (ultraviolet radiation) and maximum fly population is present.
- The disease is more prevalent in breeds which have less pigment around the eyes (eg. Hereford, Holstein, Shorthorn) than those with completely pigmented eyes. Purebred hump-backed Zebu cattle (Brahma and others) are not affected by the bacteria.
- Young animals are most susceptible.

Genetics

Dam colostral immunity

Pathogensis

M. bovis invades the lacrimal and tarsal glands of the eye

Bacteria adheres to the cells via its fimbriae and pili proteins, and produces β-haemolysin toxins which lyse the corneal epithelial cells.

M. bovis also secretes cytotoxic toxin and pathogenic fibrinolysin

.

Causing keratitis, opacity, aqueous flare and corneal ulcers.

Clinical signs

IP: 2-7 days

- The first signs seen are:

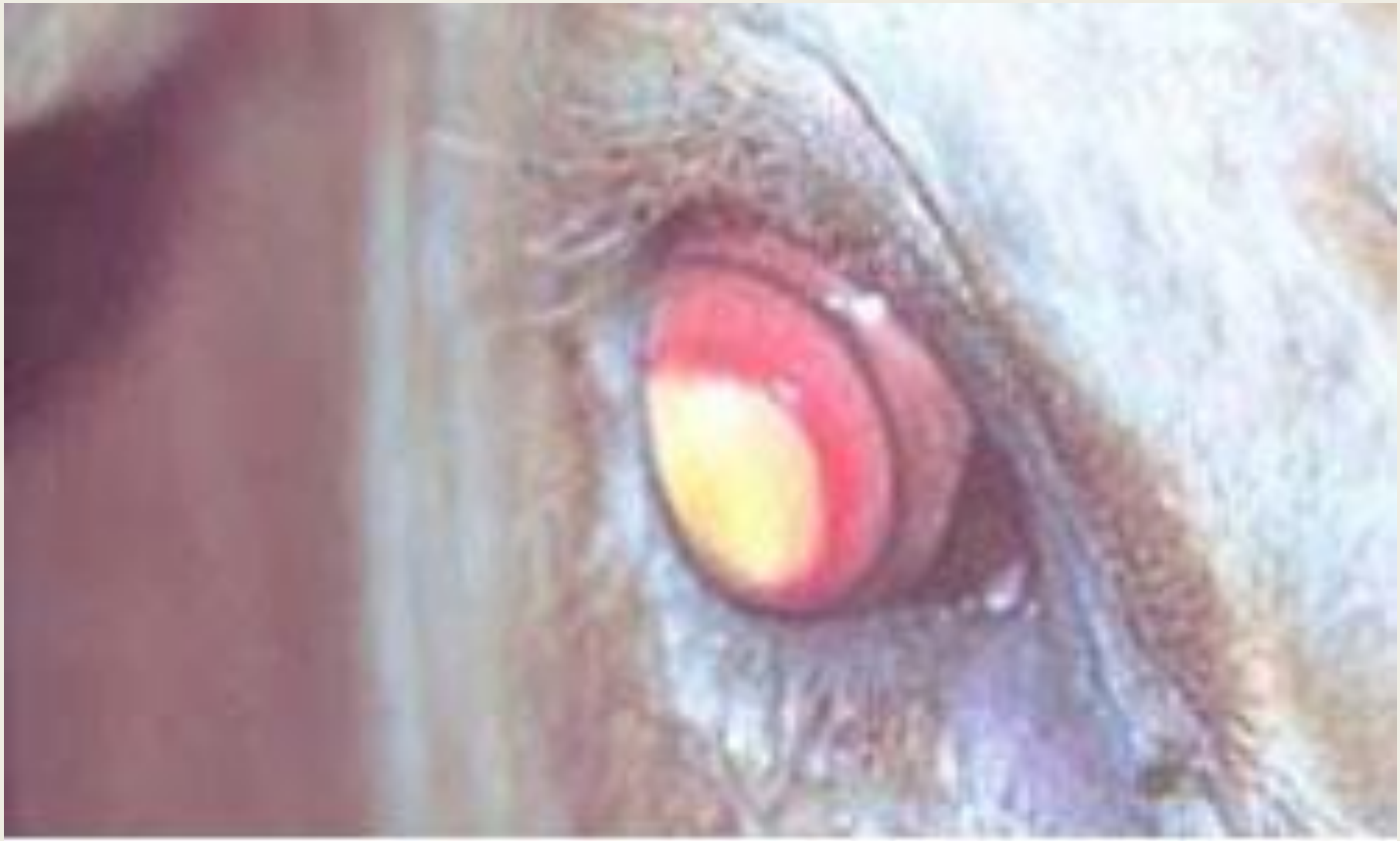
copious watery eye discharge

aversion to sunlight

signs of irritation: for example, excessive blinking

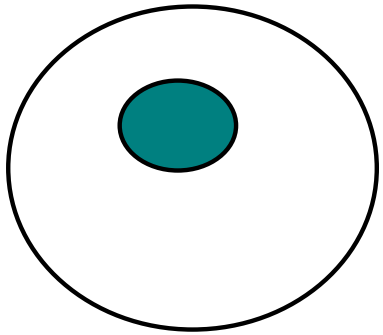
reddening and swelling of the eyelids and the third eyelid.

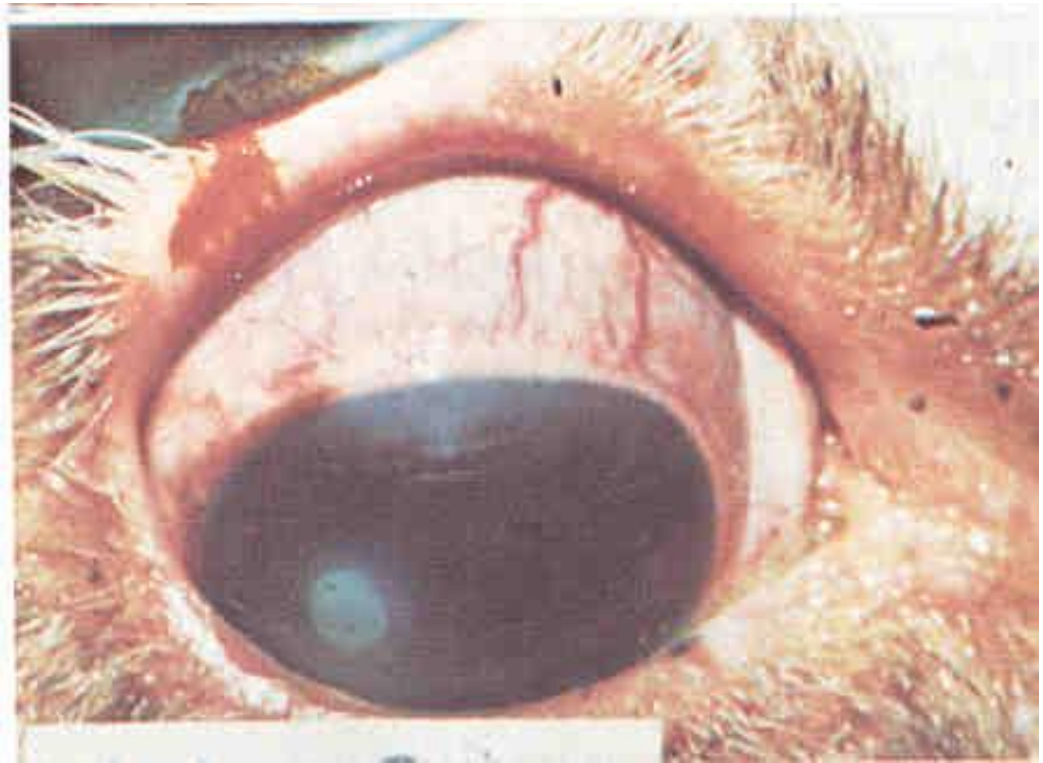
- Increased blinking, streaming and watery eyes
- Ulcers on the surface of the eyes
- Cloudy opaque or white spots in the eye (which is the accumulation of pus and white blood cells)



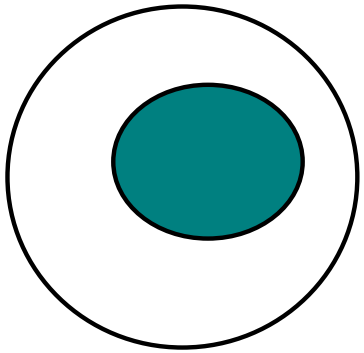
Pinkeye – severe inflammation of the eye

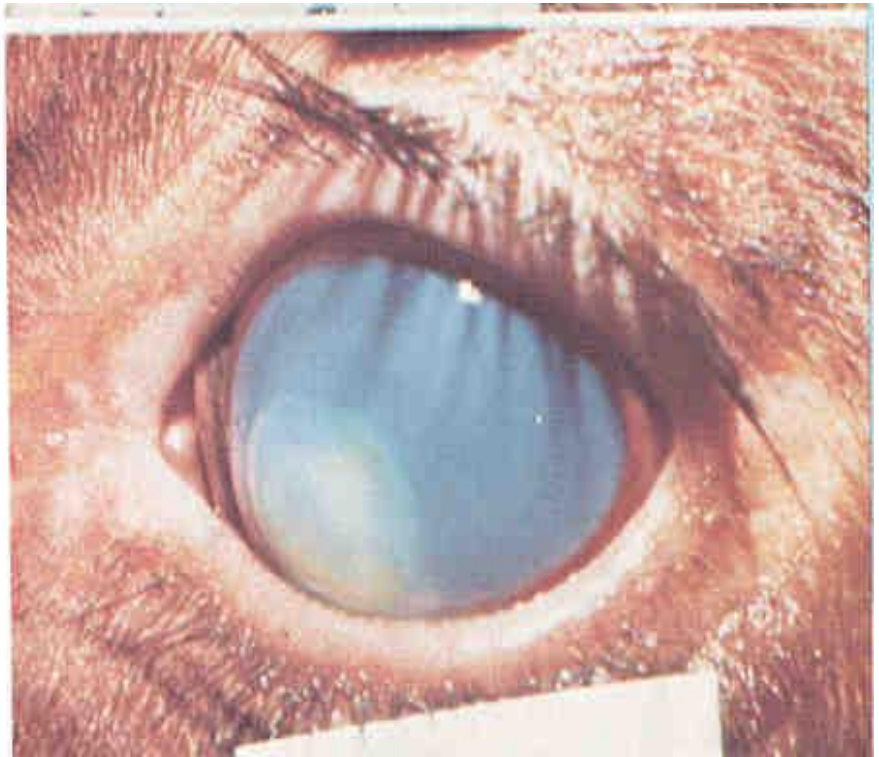
Score 1 – An active lesion involving less than one-third of the cornea.



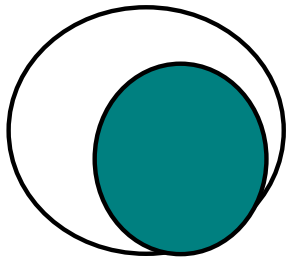


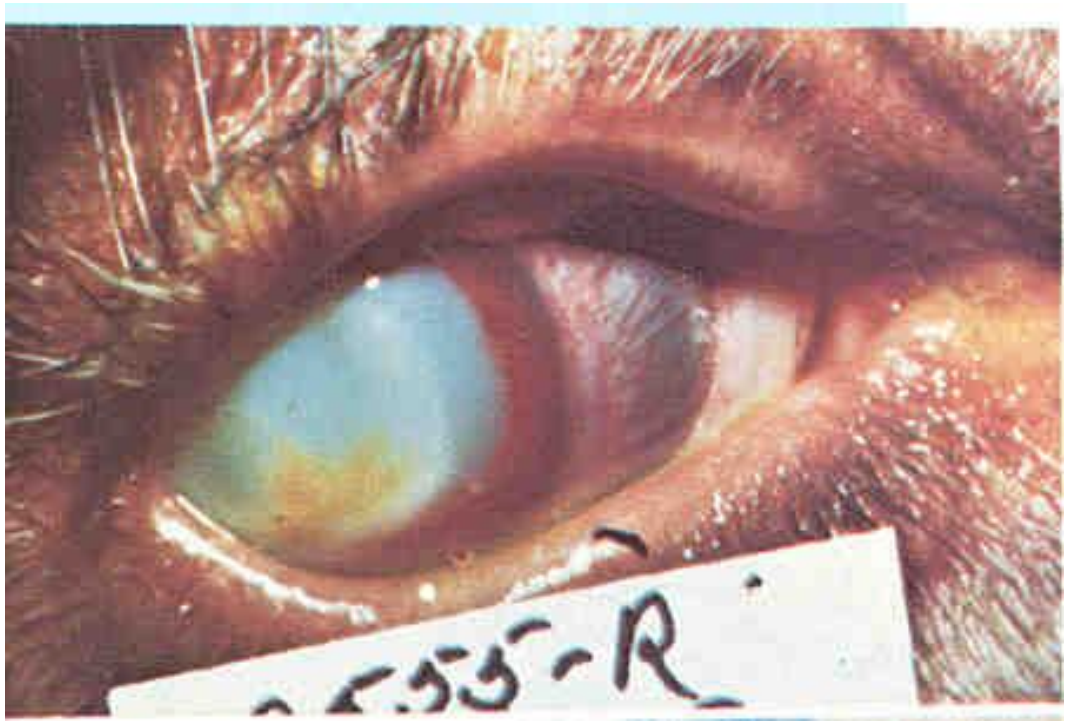
Score 2 – An active lesion involving one-third to two-thirds of the cornea.



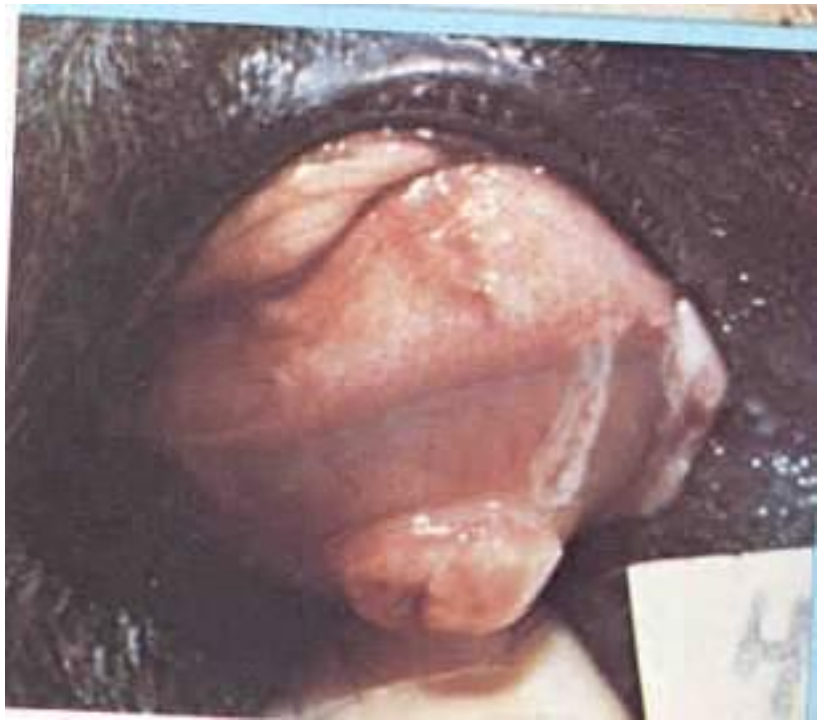


Score 3 – An active lesion involving more than two-thirds of the cornea.





Score 4 – An active lesion with perforation of the cornea



Postmortem lesions

The lesions are confined to the eye hyperemia, edema, opacity and ulcers in conjunctiva and eyeball.

Diagnosis

- Lacrimal swabs can be taken and the bacterium can then be cultured on media impregnated with blood or serum
- Fluorescent antibody testing (FAT) is also available for identification. The bacterium may be visible on smears of lacrimal secretions.

Differential diagnosis

Traumatic conjunctivitis, or IBR, MCF, BVD-MD and thileriosis

Treatment

1. Sub-conjunctival injections of appropriate antibiotics such as procaine penicillin are most effective
2. Treatment can also be given systemically, e.g. oxytetracycline, or florfenicol.
3. Early acute cases may respond to regular application of ophthalmic ointments such as those containing cloxacillin.
4. Anti-inflammatory therapy
5. Recovery time ranges from days to months depending on the severity of infection and ulcer formation.

6. If possible, animals should be housed indoors during treatment so that flies can be controlled and irritation minimised.

7. Severe cases may require surgery such as temporary third eyelid closure or conjunctival pedicle grafts to facilitate ulcer healing.

Prevention

1. Fly control: Use sprays, pourons, or dust bags early in the fly season and use insecticide impregnated ear tags when there is a heavy fly population. A fly control program should focus on egg and larvae control. Multiple methods of control should be employed to achieve good results.
2. Grass, weed, and brush control: Clip or graze pastures. Grazing management, brush beating, mowing, and spraying minimize pollen and mechanical irritation to the eyes.

3. Hay and/or feed bunk management –avoid overhead hay feeders, spread hay out, do not feed hay containing mature seed heads or cheat grass in overhead feeders or in round bales, and increase bunk space to decrease direct contact.

4. Ultraviolet light (sun light) - breed for eyelid pigmentation, provide shade or tree rows with ample room to prevent overcrowding.

5. Disease management – provide proper immunization against viral diseases (IBR and BVD), isolate infected animals, and decrease environmental and nutritional stress.

6. Vaccination – Commercial and autogenous pinkeye vaccines are available. Reported results by producers and veterinarians have been mixed from their use of these products. Because pinkeye vaccines have not proven to be consistently effective in prevention, check with a local veterinarian about the use of these products in a specific geographical area