



Malignant Catarrhal Fever

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MALIGNANT CATARRHAL FEVER (BOVINE MALIGNANT CATARRH, MALIGNANT HEAD CATARRH)

- **Etiology :**
- Really two diseases (clinically and pathologically indistinguishable) associated with two different infectious agents with different ecologies
- 1. **Alcelaphine herpesvirus-1 (AHV-1)**
 - wildebeest-associated MCF virus, transmitted to cattle from blue wildebeest
- 2. **Ovine herpesvirus- 2 (OvHV-2)**
 - sheep-associated MCF virus transmitted to cattle from sheep
 - Neither agent transmit from cattle to cattle
 - neither of the viruses cause any disease in their principal host, the wildebeest and the sheep

Geographic Distribution

- AHV-1 primarily in Africa
 - Carried by wildebeest, antelope
 - Also in zoological and wild animal parks
- OHV-2 worldwide
 - Carried by domestic and wild sheep and goats
 - Major cause of MCF worldwide



Species Affected

- Susceptible species
 - Cattle, bison, elk, reindeer, moose, domestic pigs, giraffe, antelope, red and white-tailed deer, nilgai
- Carrier species
 - Sheep, goats, wildebeest, antelope
 - Morbidity- low
 - Mortality- high (100%)



Transmission

- AHV-1
- Inutero
- Contact with nasal and ocular secretions
- Aerosols during close contact
- OHV-2
 - Respiratory (aerosol)
 - Transplacental rare
 - Contact with nasal secretions

Clinical Signs

1. Peracute form: sudden death
2. Head and eye form
 - Majority of cattle cases
3. Intestinal form
 - Initially like head and eye form, but death occurs from severe diarrhea
4. Mild form
 - Inoculated animals; recovery expected

Head and Eye Form: Early Stages

- Reddened eyelids
- Bilateral corneal opacity
- Crusty muzzle, nares
- Nasal discharge
- Salivation



Head and Eye Form: Later Stages



Erosions on the buccal
mucosa

Erosions on the tongue,
buccal mucosa, necrosis,
ulcer in oral cavity



Clinical Signs in Bovidae

- Swelling of Joints, superficial lymph nodes
- Sloughing of Horn, hoof coverings
- Nervous signs
 - Incoordination, head pressing, nystagmus, hyperesthesia

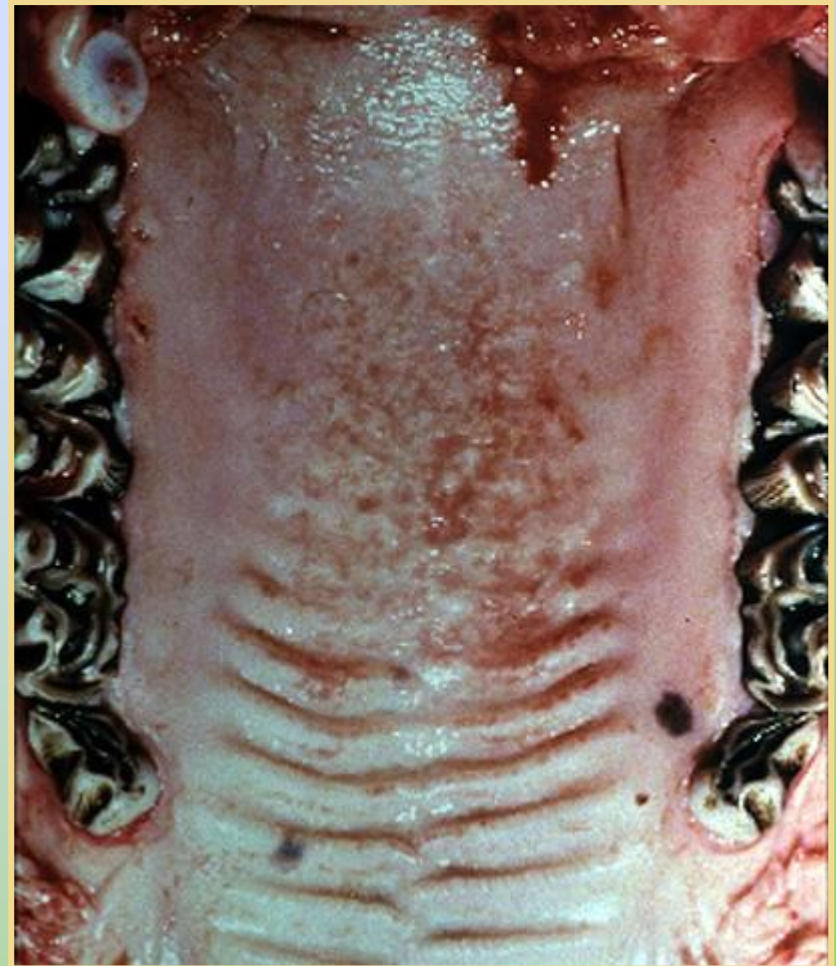
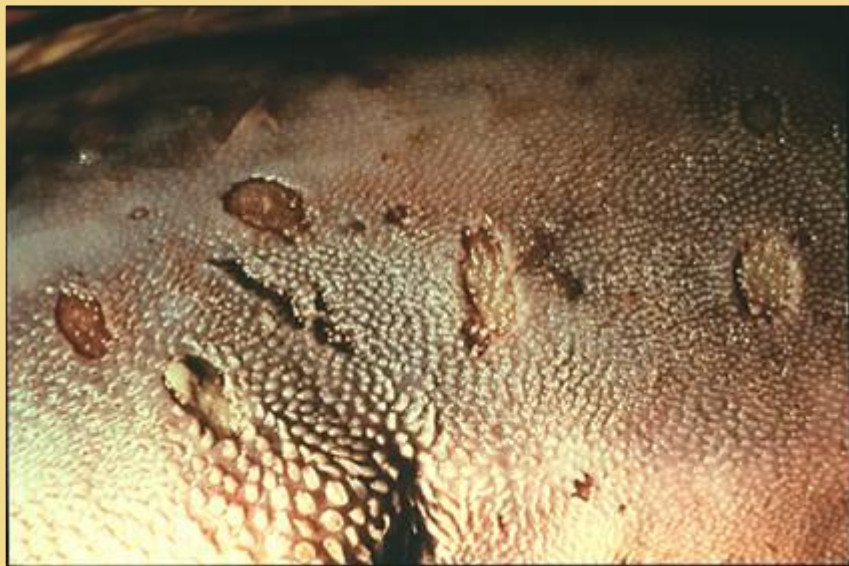


Peracute and alimentary tract forms

- short course of 1-3 d
- high fever
- dyspnoea
- acute gastroenteritis
- resembles the 'head and eye' form except that there is marked diarrhoea
- **Mild form**
- transient fever
- mild erosions -oral and nasal mucosa.
- may be followed by complete recovery

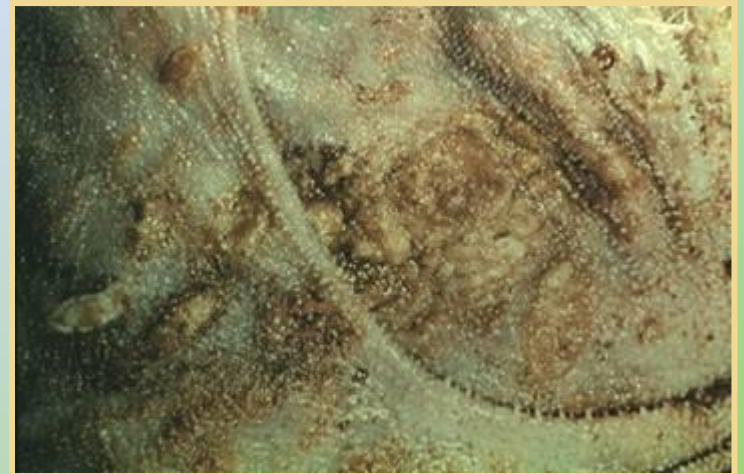
Post Mortem Lesions

- Erosions on the tongue and soft and hard palate



Post Mortem Lesions

- Necrotic areas in the omasal epithelium
- Multiple erosions of intestinal epithelium



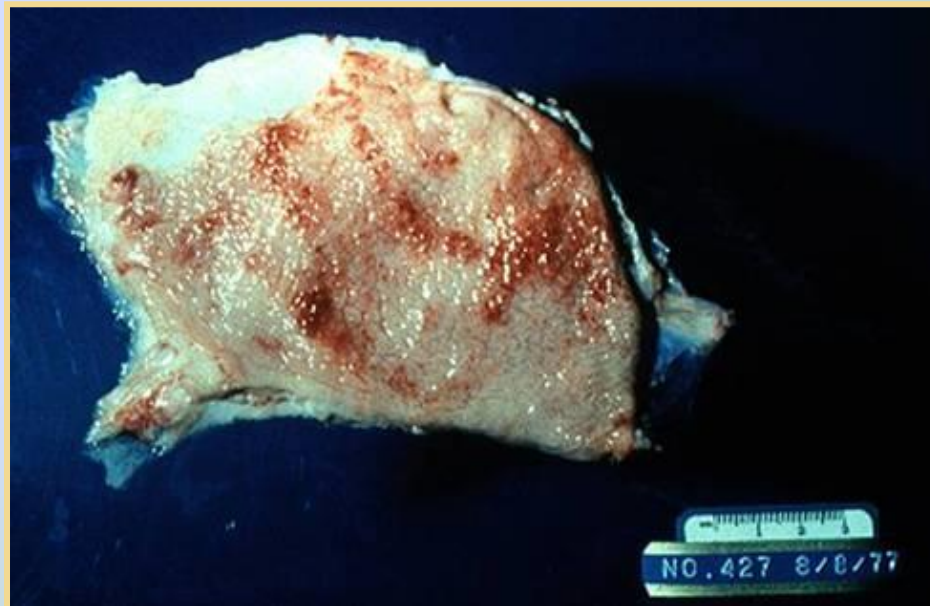
Post Mortem Lesions

- Greatly enlarged lymph node compared to normal
- Necrotic areas in the larynx
 - Diphtheritic membrane often present



Post Mortem Lesions

- Urinary bladder mucosa hyperemic and edematous
- Kidney often has raised white foci on the cortex



Collection of Samples for diagnosis

- **Histology** –
 - Formaline fixed brain, lymph node, alimentary tract mucosa, pharynx, oesophagus, rumen, liver, adrenal gland, kidney, urinary bladder, salivary gland
- **Virology** –
 - lymph node, spleen, lung (PCR)

Differential Diagnosis

- BVD mucosal disease
- Bluetongue
- Rinderpest
- FMD
- Vesicular stomatitis
- Salmonellosis
- Pneumonia complex
- Oral exposure to caustic materials
- Mycotoxins
- Poisonous plants

Laboratory Diagnosis

- Histopathology
- PCR
- Virus isolation (AHV-1)- Madin–Darby bovine kidney cell line (MDBK)
- Serology
 - AHV-1 antibodies in wildebeest
 - Immunofluorescence, immunoblot, VN, ELISA, immunocytochemistry
 - OHV-2 antibodies in sheep
 - Immunofluorescence, immunoblot

B. DIAGNOSTIC TECHNIQUES

Table 1. Test methods available for the diagnosis of malignant catarrhal fever and their purpose

Method	Purpose			
	Natural host species		Clinically affected animals	All animals
	Population freedom from infection	Individual animal freedom from infection	Confirmation of clinical cases	Prevalence of infection – surveillance
PCR	+	+	+++	++
C-ELISA	+++	+++	++	+++
Virus isolation	+(AIHV-1)	+(AIHV-1)	+(AIHV-1)	+(AIHV-1)
Virus neutralisation	+(AIHV-1)	+(AIHV-1)	–	–
IFAT	+	+	+	–
Immunoperoxidase test	+	+	+	–

Key: +++ = recommended method; ++ = suitable method; + = may be used in some situations, but cost, reliability, or other factors limit its application; – = not appropriate for this purpose.

Although not all of the tests listed as category +++ or ++ have undergone formal standardisation and validation, their routine nature and the fact that they have been used widely without dubious results, makes them acceptable.

PCR = polymerase chain reaction; C-ELISA = competitive inhibition enzyme-linked immunosorbent assay; IFAT = indirect fluorescent antibody test; . Note that virus isolation and virus neutralisation have only been documented for AIHV-1.

- Protocol 1: Hemi-nested PCR to detect OvHV-2 DNA (Baxter *et al.*, 1993)**

Primers

Name	Length	Sequence
556	30 mer	5'-AGT CTG GGT ATA TGA ATC CAG ATG GCT CTC-3'
555	28 mer	5'-TTC TGG GGT AGT GGC GAG CGA AGG CTTC-3'
755	30 mer	5'-AAG ATA AGC ACC AGT TAT GCA TCT GAT AAA-3'

Primary amplification (product size 422 bp)

- Protocol 2: Hemi-nested PCR to distinguish AHV-1 and OvHV-2 DNA (Flach *et al.*, 2002)**

Primers

Name	Length	Sequence*
Primer POL1	24-mer	5'-GGC (CT)CA (CT)AA (CT)CT ATG CTA CTC CAC-3'
Primer POL2	21-mer	5'-ATT (AG)TC CAC AAA CTG TTT TGT-3'
Primer OHVPol	20-mer	5'-AAA AAC TCA GGG CCA TTC TG-3'
Primer AHVPol	20-mer	5'-CCA AAA TGA AGA CCA TCT TA-3'

Treatment

- Survival is rare if clinically ill
- Mortality reaches 100%
- No specific antiviral drug
- Antibiotics for secondary bacterial infection
- Supportive therapy
- Recovered animals will remain virus carriers

Control

- Isolation of affected animal
- Separation of cattle from sheep in outbreak (sheep transmit diseases)
- Wild life 1 KM distance from livestock
- Quarantine
- Hygiene
- Vaccination ??? (no specific immunity)

Thank You