CATTLE PLAGUE or RINDERPEST

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<th>ANIMAL GROUP AFFECTED</th>
<th>TRANSMISSION</th>
<th>CLINICAL SIGNS</th>
<th>FATAL DISEASE?</th>
<th>TREATMENT</th>
<th>PREVENTION &amp; CONTROL</th>
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<tr>
<td>- wild and domestic Ruminants - Asiatic and wild pigs</td>
<td>- inhalation - contact - (oral)</td>
<td>- fever - necrotic lesions of the mouth - diarrhoea</td>
<td>Yes</td>
<td>None available</td>
<td>In houses In zoos Avoid contact with infected animals Vaccination</td>
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Last update
January 2009

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Susceptible animal groups
All cloven-hoofed animals are probably susceptible. Among domestic animals cattle, water buffaloes and yaks are highly susceptible. Sheep and goats are less susceptible. Asiatic pigs are susceptible whereas European pig breeds usually undergo subclinical infection. Among wild ruminants some species are highly susceptible: African buffalo, eland, giraffe, kudu. Gnou, ourebi and impala show an intermediate susceptibility whereas small gazelles, cobs, hippopotamus are considered as less susceptible. Warthogs and bushpigs are highly susceptible. Camels are not susceptible (only subclinical disease).

Causative organism
The rinderpest virus belongs to the genus Morbillivirus (family Paramyxoviridae). It is a RNA virus, which is closely related to the measles, peste des petits ruminants and distemper viruses. There is only one serotype of rinderpest virus (3 lineages), but the virulence can vary widely. Some strains are hypovirulent and cause almost no clinical symptoms whereas others are hypervirulent. Rinderpest strains, which are responsible for mild disease in cattle, might cause severe disease in susceptible wildlife species. The virus is not very resistant and is rapidly inactivated at environmental temperatures by solar radiation and desiccation.

Zoonotic potential
The rinderpest virus is not infective to man.

Distribution
Currently, rinderpest is limited to the Somali Ecosystem in Africa. A Global Rinderpest Eradication Programme (GREP) is going on. It is coordinated by FAO and eradication is targeted for 2010.

Transmission
Close contact with an infected animal is necessary for virus transmission. Although oral transmission is possible (ingestion of contaminated feed, water or fresh, infected meat), infection is transmitted mainly by aerosol (droplets containing virus particles in the expired air) or by contact with secretions or excretions of infected animals (saliva, faeces, milk, semen, urine, vaginal, nasal or ocular discharges). Rinderpest virus is shed by infected animals during a relatively short period (about 2 weeks), but virus shedding starts already a few days before clinical symptoms appear.

Incubation period
The incubation period is maximum 21 days, but can be as short as 1 to 3 days in case of hyperacute rinderpest.

Clinical symptoms
Fever, necrotic lesions of the mouth causing salivation and diarrhoea are the major clinical symptoms of rinderpest. The evolution of the disease can be peracute with very few symptoms before the animal dies, acute with the full range of symptoms (successively fever, anorexia, depression, rapid and shallow respiration, necrotic lesions on gums, lips and tongue resulting in salivation, erosions on the nasal, vaginal mucosa and finally diarrhoea) or mild with less marked clinical symptoms and absence of one or more of the cardinal features. Hypovirulent strains can cause almost inapparent disease with as only symptom a short, transient fever whereas hypervirulent strains can cause very high mortality.

Post mortem findings
The lesions are not pathognomonic. Advanced or peracute cases will not show the typical signs. In acute cases the carcass is dehydrated and soiled with loose faeces. Erosions are present on lips, gums, dental...
pad, palate and pharynx. The rumen pillars and abomasum show congestion and necrosis. The Peyer’s patches are swollen, dark and friable. Zebra striping is present in the large intestine. The nasal cavity, trachea and lungs are congested. All lymph nodes are enlarged, soft and oedematous in early cases, later they are shrunken and grey.

**Diagnosis**

Anamnesis, clinical and pathological signs are highly suggestive of rinderpest, but for a definitive diagnosis the virus or specific antigen or antibodies need to be demonstrated. Differential diagnosis has mainly to be made with mucosal disease in cattle (which is usually restricted to some animals in a herd) and PPR in small ruminants (absent in cattle).

1. Direct methods
   a) **virus isolation**: lymphoid tissues or blood leucocytes from suspected animals are inoculated into cell cultures. Cytopathogenic effects appear after 3 to 12 days. Rinderpest is confirmed by different tests (i.a. virusneutralisation or direct immunofluorescence, etc)
   b) **Polymerase chain reaction (PCR)**: Reverse transcription (RT)- PCR can be used to identify rinderpest virus.
   c) **Antigen detection**: rinderpest antigen can be demonstrated using the agar-gel immunodiffusion test (AGID), the counter-immunoelectrophoresis test, the sandwich ELISA or the chromatographic strip test. The latter test is a real pen-side test, which gives a result within 5 to 10 min. It is less sensitive than the RT-PCR and can only be used for diagnosis at herd level. Other antigen detection tests include immunohistocemical staining and electron microscopy.

2. Indirect methods: specific antibodies in serum can be detected using a monoclonal antibody based competitive ELISA or virus neutralisation test.

**Material required for laboratory analysis**

Whole blood (with anticoagulants), spleen, lymph node, eye swab, ocular secretions (excellent for antigen detection). Samples for virus isolation should be chilled, but not frozen. Samples should be collected from as many animals as possible, preferably in the early stages of infection (febrile or mucosal erosion phase).

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**Treatment**

Drugs for an effective etiological treatment are not available. Only supportive and symptomatic treatment can be initiated.

**Prevention and control in zoos**

Effective live attenuated vaccines are available, which give a life long immunity. New animals from endemic areas should be kept in quarantine for 3 weeks.

**Suggested disinfectant for housing facilities**

Lipophilic disinfectants are recommended for cleansing contaminated stables. In the presence of organic matter, the most effective disinfectants are 5% sodium hydroxide and 50% lysol.

**Notification**

Yes

**Guarantees required under EU Legislation**

**Guarantees required by EAZA Zoos**

**Measures required under the Animal Disease Surveillance Plan**
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**References**