Rift Valley Fever

Symptoms

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- Dr Linda Logan, “Rift Valley Fever” CSU Foreign Animal Disease Training Course, College of Veterinary Medicine and Biomedical Sciences, August 1-5, 2005.

- Professor JAW Coetzer, Department of Veterinary Tropical Diseases, Faculty of Veterinary Science, University of Pretoria, “Rift Valley Fever” presented at the FEAD course in Knoxville, Tenn. 2005.
In this presentation the authors especially drew from the first hand experience of their colleagues in South Africa. Personal interviews as well as standard research sources provide the insights we bring you for the recognition of this exotic disease.

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Rift Valley Fever

Rift Valley Fever (RVF) is an arthropod-borne, acute, fever-causing viral disease of sheep, goats, cattle and people.
Rift Valley fever in Africa causes abortions in sheep, cattle and goats high mortalities in lambs and kids and generalized disease in man.
Rift Valley Fever

RVF was first observed when European stocks of domestic animals were introduced to Africa. These species are more severely affected than native African stock.
Host Range

Mainly a disease of sheep
Host Range

- In Sheep
  Mortality in lambs under 2 weeks of age approaches 100%

Mortality in older sheep reaches 30%
with abortions approaching 100%
Host range

- Cattle are less susceptible than sheep, some are subclinical; mortality averages 5% with some abortions.
Host Range

- Goats
- Buffalo
Host Range

- Domestic dogs and cats – susceptible but usually only have asymptomatic viremia
- Swine - resistant
- Birds - refractory, no virus isolation
Host Range

- Horses – have viremia but are resistant
Host range - wildlife

- Springbok
- African Buffalo
- Camels (in Egypt)
- Water buffalo in Egypt
Host range - wildlife

Water buffalo - up to 50% abortion rate
Host range - wildlife

Camels (in Egypt) - inapparent disease except abortions
### Rift Valley Fever host range and disease severity

<table>
<thead>
<tr>
<th>Mortality</th>
<th>Severe Illness Abortion, Low Mortality</th>
<th>Severe Illness Viremia Abortion</th>
<th>Infection Viremia</th>
<th>Refractive to infection</th>
</tr>
</thead>
<tbody>
<tr>
<td>~100%</td>
<td>Sheep, Cattle, Goats, Water buffalo</td>
<td>Monkeys, Camels, Rats, Gray squirrels</td>
<td>Horses, Cats, Dogs, Monkeys</td>
<td>Guinea pigs, Rabbits, Pigs, Hedgehogs, Tortoises, Frogs, Chickens, Canaries, Pigeons, Parakeets</td>
</tr>
</tbody>
</table>
Incubation period

- 1-6 days
- 12-36 hours in lambs; will be dead before they can acquire passive immunity
Clinical signs
Sheep and Goats

- Incubation period less than 3 days
- High rate of abortion at any stage of gestation
- Some show no symptoms
In pregnant ewes, abortion may approach 100%. Aborted fetus is usually autolyzed.
Clinical signs
Sheep and Goats

- Abortion rate in sheep from 40 – 100%
- Ewe may also retain the placenta
- Endometritis is another complication after aborting the fetus

USDA
Clinical signs
Sheep and Goats

Early signs

- Fever 40-41°C
- Loss of appetite
- Jaundice
- Weakness
Clinical signs
Sheep and Goats

- Encrustation around the muzzle from bloody nasal discharge
Clinical signs
Sheep and Goats

Some develop diarrhea
Clinical signs
Sheep and Goats

Acute death may occur in 20-30% of adults
Clinical signs
Sheep and Goats

Heavy sheep losses occur during epidemic.
Clinical Signs in lambs and kids

- Newborn Lambs, Kids: Most severe in young lambs under 2wks old
  (mortality has high as 90%)
  - fever (40-42°C),
  - anorexia,
  - weakness,
Clinical Signs in lambs and kids

Lambs seem reluctant to move; they have signs of abdominal pain, rapid respiration and listlessness.
Clinical Signs in lambs and kids

Death may occur within 24 to 36 hours after the first signs appear. Death is due to severe liver necrosis and vascular collapse.
Clinical signs in cattle

- Anorexia
- Weakness
- Fetid diarrhea
- Often only sign is a drop in calving rates
Clinical signs in cattle

- Calves: fever (40-41°C), depression. Mortality rate: 10-70% Death occurs about 2-8 days after the first signs appear.

- Adults: fever (40-41°C), excessive salivation, anorexia, weakness, fetid diarrhea, fall in milk yield. Abortion may reach 85% in the herd. Mortality rate is usually less than 10%
Clinical signs in cattle
Clinical signs in cattle

- Disease most severe signs are seen in young animals
- Symptoms may be prolonged and will include jaundice in some calves
- Aborted calves are moderately autolyzed.
Clinical signs

- **Dogs:** Abortions may occur in adult dogs; severe disease and death usually only in puppies

- **Cats:** Death in kittens
## Relative susceptibility

<table>
<thead>
<tr>
<th>Animal Category</th>
<th>Susceptibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newborn ruminants</td>
<td>++++</td>
</tr>
<tr>
<td>Pregnant ruminants</td>
<td>++++</td>
</tr>
<tr>
<td>Sheep and young cattle</td>
<td>+++</td>
</tr>
<tr>
<td>Adult cattle, goats, sheep</td>
<td>++</td>
</tr>
<tr>
<td>Humans</td>
<td>++</td>
</tr>
<tr>
<td>Dogs, cats and camels</td>
<td>+</td>
</tr>
<tr>
<td>Pigs</td>
<td>-</td>
</tr>
</tbody>
</table>
Transmission

RVF is primarily transmitted from animal to animal by a mosquito

Aedes, Culex, Anopheles, Erehrmapodites, Monsosmia
Necropsy findings

- Massive hepatitis: hemorrhages, necrotic foci, marked enlargement, orange-brown, friable, edematous liver tissue

("If you open a newborn lamb, the liver jumps into your face" Coetzer)

- Chocolate-brown digested blood in abomasum, hemorrhages in intestinal mucosa, free blood in lumen
Pathology Summary

- Focal or generalized hepatic necrosis
- Congestion, enlargement, and discoloration of liver with subcapsular hemorrhages
- Brown-yellowish color of liver in aborted fetuses
- Hemorrhagic enteritis
- Icterus (low percentage)

- Widespread cutaneous hemorrhages, petechial to ecchymotic hemorrhages on parietal and visceral serosal membranes
- Enlargement, edema, hemorrhages and necrosis of lymph nodes
- Congestion and cortical hemorrhages of kidneys and gallbladder
Necropsy: new-born lambs

Liver massively enlarged; hemorrhages; orange-brown color; small areas of necrosis. The liver is very friable.
Necropsy: new-born lambs

Gall bladder hemorrhage; Abomasum diffuse hemorrhage, serosa has petechial hemorrhage
Necropsy: new-born lambs

Abomasum shows diffuse chocolate brown hemorrhages, serosa has petechial hemorrhages, necrotic foci, and D. I. C.
Necropsy: adult sheep

May look like plant poisoning
Necropsy: adult sheep

Gall bladder contains frank hemorrhage

Rift Valley Fever- 2006
Necropsy: sheep & cattle

Abomasum is edematous similar to Heartwater
Necropsy: adult cattle

Close up of gall bladders
Necropsy: adult cattle

Petechia
Necropsy: cattle

Spleen with many hemorrhages
Necropsy: other lesions

Enlarged lymph nodes
Differential Diagnosis

- Abortifacient agents
- Agents causing hepatitis
- Agents that cause hemorrhages
Differential Diagnosis

- Bluetongue
- Wesselsbron disease
- Enterotoxemia of sheep
- Ephemeral fever
- Brucellosis
- Vibriosis
- Trichomonosis
Differential Diagnosis

- Nairobi sheep disease
- Heartwater
- Ovine enzootic abortion
- Toxic plants
- Bacterial septicemias (Pasteurella, Salmonella, Anthrax)
- Rinderpest and Peste des petits ruminants
Suspect Rift Valley Fever if:

- High mortalities in lambs, kids and calves following increase in mosquito populations
- Disease is milder in adults than in newborns
- Abortions in sheep, goats and cattle
- Extensive necrotic liver changes
- Influenza symptoms in people working with sick animals or handling infected carcasses
Rift Valley Fever - Bibliography


2. Professor J A W Coetzer, Department of Veterinary Tropical Diseases, Faculty of Veterinary Science, University of Pretoria, “Rift Valley Fever”


An excellent video about Rift Valley Fever is available from:
http://www.up.ac.za/academic/veterinary/depts_vtd_teach/index.htm
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