OBSERVATIONS ON RISK FACTORS ASSOCIATED WITH SOME CAMEL VIRAL DISEASES

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ABSTRACT

Four diseases of camels are of increasing economic significance. These are camel pox (CP), camel contagious ecthyma (CCE), rota viral diarrhea (RVD) and Morbillivirus infection (MVI). CP occurred in epizootics that lasted for 2-5 months with higher prevalence in winter. It mostly affected young animals of less than 5 years old. Group watering and introduction of new animal to a susceptible herd are the main risk factors. CCE is endemic in Sudan with variations in severity and mortality depending on age and geographical location. The major risk factors for CCE are season of the year, camel age and location associated with abundance of thorny acacia trees. MVI is an emerging viral disease that recently caused heavy losses in eastern Sudan. Mortality rate ranged between 0 to 50% and vary in accordance with location with a mean of 7.4%. More than 80% of deaths were in pregnant and recently delivered she-camels. Group A rotavirus was detected in 20% of diarrheic camels in Sudan. The main age group affected was 0-3 months. Higher prevalence of rotavirus infection was noticed during wet season than dry and winter seasons. Risk factors for these viral diseases contributing to disease transmission in free ranging camels are identified and discussed.

INTRODUCTION

Risk factors for viral diseases are factors that do not seem to be a direct cause of the disease but to be associated in some way that make the chance of getting a condition higher but do not lead to the disease. Camels, like other farm animals are susceptible to many infectious diseases. This communication is intended to through light on pattern of four diseases which have occurred in epizootic form and recently become of increasing importance.

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Does control of animal infectious risks offer a new international perspective?
CAMELPOX (CP)

CP is considered the most important viral disease of camels since the middle ages. Clinically affected animals show fever, edema of face and legs, lymph node enlargement and appearance of generalized pox lesions particularly seen on head, neck, leg and abdomen. Morbidity and mortality rates were estimated at 9 and 1.2%, respectively with 14% case fatality rate (Khalafalla and Mohamed, 1996) The disease occurred in epizootics that lasted for 2-5 months with 2-4 years inter-epizootic period. As shown in Table 1 the disease has higher prevalence in winter season (November-March). The disease spread mainly by direct contact with sick animals particularly at watering places. Pox scabs shed from affected camels contaminate water that becomes source of infection. According to camel owners outbreaks of the disease usually occur after co-watering with infected herd or the introduction of new animals to a herd through purchase or as a gift. As shown in Fig 2 most affected animals were immature, less than 4 years old with a mean of 2.7 years. All deaths occurred in animals less than 3 years old with a mean of 1.7 years. It is concluded that risk factors associated with CP are herd structure (age), season of the year, introduction of new camel and common watering.

Table 1. Seasonal pattern of CP outbreaks.

<table>
<thead>
<tr>
<th>Season</th>
<th>N° of CP outbreaks (%)</th>
<th>N° of animals affected-examined</th>
<th>Per 1000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Summer</td>
<td>7 (20)</td>
<td>57/5500</td>
<td>10.4</td>
</tr>
<tr>
<td>Autumn</td>
<td>8 (23)</td>
<td>27/7500</td>
<td>3.6</td>
</tr>
<tr>
<td>Winter</td>
<td>20 (57)</td>
<td>146/8000</td>
<td>19.5</td>
</tr>
</tbody>
</table>

Figure 1. Age distribution of CP cases.
CAMEL CONTAGIOUS ECTHYMA (CCE)

It is a sparsely studied disease caused by a Parapoxvirus of the family Poxviridae (Munz et al., 1986). Clinically the disease is characterized by a localized pox - lesion on lips and head. Most of affected animals are calves less than one year old (Khalafalla and Mohamed, 1997). The mean morbidity and mortality rates in this age group could reach 60% and 9%, respectively. As shown in Table 2, though most affected camels are in the age group 7-12 month, the highest fatality rate was in age group 0-6 months. This indicate slight protection of young calves via colostral antibodies but reduced disease resistance probably due to immature immune system. The disease showed a marked seasonality been associated with the rainy season (June-October) and skin abrasion caused by browsing thorny Acacia trees. In line with that observation, the incidence and severity of the disease varied depending on the geographical distribution of Acacia trees with higher incidence and severity of lesion in camels of Blue Nile and Southern Butana areas of Sudan. It appears that the major factors associated with increased likelihood of CCE occurrence are: season of the year, camel age and location in association with thorny Acacia trees.

Table 2. Age distribution of cases and deaths due to CCE.

<table>
<thead>
<tr>
<th>Age</th>
<th>Num.of cases (% morbidity rate)</th>
<th>Num.of death (% fatality rate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-6 month</td>
<td>76 (27)</td>
<td>16 (21)</td>
</tr>
<tr>
<td>7-12 month</td>
<td>198 (71)</td>
<td>18 (9)</td>
</tr>
<tr>
<td>1- 2 years</td>
<td>4 (1.5)</td>
<td>0</td>
</tr>
<tr>
<td>2-3 years</td>
<td>2 (0.7)</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>280</td>
<td>34 (12)</td>
</tr>
</tbody>
</table>

ROTAVIRUS DIARRHEA (RVD)

Camel calf diarrhea affects 33% of neonates in Sudan causing 23% mortality rate. Group A rotaviruses were found responsible for 14% of camel calve diarrhea in most areas of Sudan where camels are raised (Ali et al., 2005). Higher prevalence of rotavirus infection was noticed during wet season than dry and winter seasons, probably due to the difficulty to access treatments. We noticed that most of camel owners ignore the microbial causation and believes that calf suckling during the hot weather naturally causes the disease. Bad management of stopping calve suckling when diarrhea is observed without compensation by fluid therapy resulted in high mortalities probably due to dehydration. Proper treatment was seldom done and round 40% of cases were left untreated.
CAMEL MORBILLVIRUS (CMV) INFECTION

CMV infection is a newly emerged respiratory disease of camels caused by a *Paramyxoviridae* in the genus *Morbillivirus*. The disease was recently reported in eastern Sudan (Khalafalla *et al.*, 2004) and evidences indicate that it is endemic in Ethiopia (Roger *et al.*, 2000). Clinically the disease was characterized by sudden death of apparently healthy animals, yellowish and later bloody diarrhea and abortion. The disease outbreaks coincided with the seasonal movement of animals towards autumn green pasture. Death was always sudden and preceded with colic and difficulty in respiration. Mortality rate ranged between 0 to 50% and vary in accordance with the area with a mean of 7.4%. Adult animals are affected more severely and more than 80% of deaths were in pregnant and recently delivered she-camels making this category at great risk (Figure 2). Reasons behind this phenomenon are not yet known. Diagnosis of the disease was made based on detection of morbillivirus antigens in AGDT and virus genome by PCR as well as virus isolation. Herd structure and physiological status, seasonal animal movement and PPR outbreaks in sheep are the main risk factors.

![Figure 2](image_url)

**Figure 2.** Distribution of deaths due to morbillivirus infection by sex and adult female physiological condition.

CONCLUSION

There are relatively few reports in the literature on viral diseases of camels. We tried in this communication to point to risk factors associated with four important camel viral diseases. Much of the information is based on published work by the authors and others and field observations
as well. We consider our knowledge in this regard preliminary in that it only highlights the issue and we believe that much in-depth studies are needed to accurately assess and analyze these risk factors and establish link with disease control measures.

REFERENCES


