PREVALENCE OF HYDATIDOSIS AND FERTILITY OF HYDATID CYST IN SLAUGHTERED CAMELS IN MAIDUGURI, NIGERIA

Igwenagu, E.; *Onyiche, E. T.; Saidu, A. M.; Chahari, A. M.; Waziri, A.; Kayeri, B. K.

1 Department of Veterinary Pathology, University of Maiduguri, Maiduguri, Nigeria
2 Department of Veterinary Parasitology and Entomology, University of Maiduguri, Maiduguri, Nigeria
3 Department of Veterinary Surgery and Radiology, University of Maiduguri, Maiduguri, Nigeria.

*Author for correspondence. E-mail: eonyiche@yahoo.com, Tel:+2348037035135

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The study was conducted to determine the presence of hydatid cyst disease in slaughtered camels at the Maiduguri metropolitan abattoir. Four hundred and four (404) camels (162 males and 242 females) were examined at post mortem by visual inspection and palpation for evidence of cystic hydatidosis and fertility of the cyst. The prevalence was determined based on the sex and location of the cyst. An overall prevalence of 7 (1.73%) was recorded. Based on sex, 2 (1.20%) and 5 (2.10%) were found for males and females respectively. Location of the cyst shows that lungs were the most predominant site with a value of 7 (100.00%), with none found in the liver and kidneys. The entire collected cysts were fertile and characterized by the presence of protoscoleces. Despite the low prevalence, the zoonotic importance of the disease is still of public health concern.

Keywords: Hydatid cyst, Camel, Maiduguri, Prevalence, Organ, Kidney

INTRODUCTION

Hydatidosis is an important parasitic zoonotic disease caused by the metacestode (hydatid cyst) stage of the dog tapeworm Echinococcus granulosus (Soulsby, 1982). This disease has a worldwide distribution and is commonly seen in developing and undeveloped countries of the world.

The infection represents a medical, veterinary and economic importance in endemic areas due to its public health importance to humans, morbidity to the animals as well as organ and meat condemnation at meat inspection in the abattoir (Schantz et al., 1990).

Hydatid cysts have been seen in a wide range of mammals, including domestic ruminants, camels, giraffes, pigs, equines, elephants, hippopotamuses, marsupials and different types of deer, as well as humans (FAO, 1982; Raush, 1986). The most reliable diagnostic method is cyst detection during meat inspection or at post-mortem examination via visualization and palpation for dead animals (Dada and Belino, 1978), while serology and ultrasonography is the best for living animals. The cysts are most commonly found in the liver, lungs and spleen of domestic animals.

The one-humped camel (Camelus dromedarius) is an important multi-purpose animal in arid and semi-arid areas of the world. They are kept for a variety of purposes like transportation and racing (Osuobeni and Hamidzada, 1999) and as source of human food (Dorman, 1986). The camel population in Borno state comprises mostly of those being traded between Niger and Chad Republics mostly serving as a means of transport, food in terms of meat and milk (Biu and Abbagana, 2007).

Prevalence studies of the disease in camel have been carried out in various parts of the world such as Iran (Moghaddar et al., 1992), Libya (Kassem and Gdoura, 2006) and India (Srivastava et al., 1983). In Nigeria, prevalence studies have been carried out in Sokoto by Magaji et al. (2011) and Okolugbo et al. (2013) and previously in Maiduguri (Adamu and Ajogi, 1998). Therefore, the aim of this study is to provide an update on the prevalence of cystic hydatidosis in slaughtered camels in the Maiduguri metropolitan abattoir in Borno state, Nigeria.

MATERIALS AND METHODS

Study area

Borno state with Maiduguri as its capital lies between latitude 10.20N and 13.40N longitude 9.80E and 14.40N with an area of 69,436 sq km
located in the North eastern corner of Nigeria sharing borders with Niger to the north, Chad to the northeast and Cameroon to the east (Musa and Pindar, 2005). The state has Sahel vegetation in the north and Sudan savanna in the south. The Maiduguri metropolitan abattoir is located in Maiduguri, the capital of Borno state.

Sample collection
Samples were collected in the months of December, 2012 to January 2013. Samples were collected from a total of 404 slaughtered camels. The abattoir was visited periodically to examine the liver, lungs, kidney, spleen and other organs of slaughtered camels for the presence of cystic Echinococcosis. All camels presented on each visit day were examined. Each organ was assessed macroscopically by visual inspection and palpation and the sex and organ where the cyst was recovered were recorded. The suspected cysts were collected in 10% formalin and taken to the Veterinary Parasitology Laboratory, University of Maiduguri for identification using the description of Soulsby (1982).

Determination of cyst fertility
Individual cysts were grossly examined for degeneration and calcification. Then, non calcified hydatid cysts selected for fertility study. The cyst wall was incised with sterile scalpel blade and the content was transferred into a sterile container. The content was examined under a microscope (40 x) for the presence of protoscoleces. The cysts which contained no protoscoleces were considered as infertile cysts while the presence of protoscoleces was considered as indication of fertility (Macpherson et al., 1985).

Statistical analysis:
Simple percentage and a Chi-Squared test were used to statistically analyze the data generated from the study.

RESULTS
The result of the prevalence of hydatidosis in slaughtered camel is presented in table 1 and 2. Out of 404 camel examined, only 7 were positive giving an overall prevalence of 1.73%.

Table 1 shows the result of sex-specific prevalence of hydatidosis in slaughtered camels. Out of 404 camels that were examined, 162 (40.10%) were males and 242 (59.90%) were females. Of the 162 males examined, 2 (1.20%) were infected while 5 (2.1%) females were infected out of 242 females.

There was no statistically significant association between sex and cystic hydatidosis in camel (\(\chi^2=0.3941, p=0.2651\)). The result of organ specific prevalence of cystic hydatidosis in slaughtered camels in Maiduguri is presented in table 2. The survey showed a prevalence of hydatidosis based on organ infected to be 7 (1.73%) out of the 404 camels sampled with all being in the lungs and none found in the liver and kidney. There was statistically significant association between cystic hydatidosis and the organs found (\(\chi^2=14.08, p=0.0009\)).

Cyst fertility
All the seven (7) cysts recovered from the lungs were fertile. On examination through the microscope, it was characterized by the presence of protoscoleces (hydatid sand) in the vesicular fluid (Figure 1).

<table>
<thead>
<tr>
<th>Sex of Camel</th>
<th>No of camel examined</th>
<th>No of camel infected (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>162</td>
<td>2 (1.20)</td>
</tr>
<tr>
<td>Female</td>
<td>242</td>
<td>5 (2.10)</td>
</tr>
<tr>
<td>Total</td>
<td>404</td>
<td>7 (1.73)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sex of Camel</th>
<th>Organs Found</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Lungs</td>
</tr>
<tr>
<td>Male</td>
<td>2 (28.6)</td>
</tr>
<tr>
<td>Female</td>
<td>5 (71.4)</td>
</tr>
<tr>
<td>Total</td>
<td>7 (100)</td>
</tr>
</tbody>
</table>
DISCUSSION AND CONCLUSION
Veterinary and medical problems have been associated with cystic hydatid disease in livestock and humans. Domestic intermediate host (cattle, camel, sheep, goats and buffaloes) are major reservoirs for the disease in humans.

In this study, the prevalence of hydatidosis was 1.73% out of the 404 camel examined, which is lower compared to a similar work carried out by Dada (1980) in the abattoirs in Kano, and Zaria (Northern Guinea zone), where hydatid cyst prevalence of 55.5% and 50.0% respectively were observed in camels. Magaji et al. (2011) in a retrospective study also reported a prevalence of 8.97% (n = 3545) in camels slaughtered at Sokoto central abattoir, which is also higher than that obtained in this survey. This could be due to environmental conditions that are conducive to the perpetuation of the parasite in those region which may be absent in this region. In a study conducted by Wachira et al., (1993) to determine the transmission dynamics of cystic Echinococcosis (CE), they found that eggs of *E. granulosus* could survive only a few hours under the high ambient temperatures of Turkana. However, when these eggs are exposed to sunlight and high temperatures, they became desiccated and did not hatch even when consumed by intermediate hosts. This may also be a contributing factor to the low prevalence as the ambient temperature in Maiduguri could rise up to 45°C thereby causing desiccation to the eggs and resulting to low prevalence. In addition, the low prevalence may also be attributed to periodic treatment of ruminants with anthelmintics by the pastoralists who now patronize veterinary services. Furthermore, increase in stray dog population and the close contacts with animals may also assist the transmission of CE in the affected regions with resultant high prevalence in such areas.

The lungs were found to be more infected compared to the liver and kidney. This agrees with earlier reports (Biu and Abagwe, 2001; Fathi et al., 2011). In addition, lungs and liver possess the first great capillary sites encountered by the migrating *Echinococcus* oncosphere (hexacanth embryo) which adopt the portal vein route and primarily negotiate hepatic and pulmonary filtering system sequentially before any other peripheral organ is involved (Ibrahim, 2010). High cyst fertility has been found to occur in the lungs and cysts found in the lungs have been shown to be more fertile.

![Vesicular Fluid Containing Numerous Protoscoleces (Hydatid Sand)](image)
than that found in other organs. Himonas (1987) postulated that the relatively softer consistency of lung tissue allows the easier development of the cyst in lungs than any other organs.

In conclusion, the prevalence of the disease in the dromedary camel (Camelus dromedarius; one humped camel) in this study area is low. However, the low prevalence is of significance largely from the zoonotic point of view and the role camels play as being an important source of meat in this part of the country.

REFERENCES
Raush, R.L. 1986. Life cycle patterns and geographic distribution of Echinococcus...


