

Some observations on the prevalence and pathology of hydatidosis in Sudanese camels (*Camelus dromedarius*)

par M. B. SAAD, E. A. ZIEN ELDIN and M. H. TAG EL DIN

Veterinary Research Administration — P.O. Box 8067, Al Amarat, Khartoum, Sudan.

RÉSUMÉ

Observations sur la fréquence et la pathologie de l'hydatidose chez les dromadaires soudanais

Des kystes hydatiques ont été mis en évidence chez 64 (45,4 p. 100) des 141 dromadaires sacrifiés à l'abattoir de Tampool dans le nord-est du Soudan. Leur nombre et leur taille variaient suivant leurs localisations : poumons, foie et rate. L'aspect global et histologique de la maladie ressemblait généralement, avec quelques variations, à celui observé chez d'autres animaux.

Mots clés : Hydatidose — Dromadaire — Soudan.

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Summary. — Hydatid cysts were revealed in 64 (45.4 p. 100) of 141 camels slaughtered at Tampool in the North Eastern part of the Sudan. The cysts were found in the lung, liver and spleen. The number and size of the cyst varied in different organs. The gross and histological aspect of the disease in camels were found to be generally similar to those described for other animals with some variations reported.

Key words : Hydatidosis — Camels — Sudan.

I. INTRODUCTION

Hydatidosis/echinococcosis is a cyclozoonotic disease caused by the taeniid worm *Echinococcus granulosus*. The disease in cattle, sheep, goats and camels in the Sudan was reported by EISA, MUSTAFA and SOLIMAN (6) and EL KHAWAD, SLEPNEV and EISA (7). Despite

that the disease in camels in the Sudan had first been reported in 1908 (3), little is as yet known about its prevalence and pathology.

The aim of this study is to present some information on the prevalence and pathology of hydatid disease in camels slaughtered at Tampool area in the North Eastern part of the Sudan.

II. MATERIALS AND METHODS

Several visits were paid to Tampool slaughter house during 1981. A total of 141 camels were examined. The internal organs including lungs, livers and spleen were inspected for the presence of hydatid cysts. Cysts were counted and their sizes measured using an ordinary ruler. They were also aspirated and the fluid was then examined for viable scolices. Representative samples from the infected organs were fixed in 10 p. 100 formal-saline, embedded in paraffin, sectioned and stained with Haematoxylin-Eosin and Van Gieson stains.

III. RESULTS

1. General observations

Out of the 141 camels examined, hydatid cysts were found in 64 animals. This comprises 45.4 p. 100 of the animals examined. The lung, liver and spleen were the only organs involved. The lung was the most commonly affected organ (65.6 p. 100) followed by the liver (14.06 p. 100) (Table 1). The table also shows that lung and liver of the same animal were involved in 17.06 p. 100 and the lung and spleen infection were observed in 3.1 p. 100 of the cases. The number and size of hydatid cysts in the affected organs varied considerably. Their number ranged from 1-15 cysts in the lungs, 1-2 in the liver and a solitary cyst in the spleen. The range size of the cysts in the lungs was 0.7-9.0 cm in diameter, 0.6-9.5 in the liver and 6.2-7.6 in the spleen.

The number of fertile cysts in the lungs was greater than in the livers.

Cysts under calcification were found in the lungs while fully calcified cysts were observed in both livers and lungs.

2. Histopathology

a. LUNG : Microscopically the hydatid cysts in most cases showed the typical structure of a common echinococcus cyst. They consisted of germinal layer, cuticular membrane, fibrous tissue capsule and cellular infiltration. The fibrous capsule consisted of thick connective tissue layer which was infiltrated with aggregates of lymphocytes and plasma cells. In old sterile cysts, the connective tissue capsule showed hyalinization, focal necrosis and calcification. In most instances, the fibrous layer was thicker than the inner chitinous layer. These two layers were clearly separated by a serous layer. The cellular infiltration was consisting mainly of lymphocytes and few plasma cells. In fertile cysts this layer was diffuse and dense while sparse and focal in sterile degenerating ones. The cellular infiltration is usually seen adjacent to the lung tissue, but in some few cases it was inbetween the serous and fibrous layers. The adjoining lung tissue in most cases exhibited slight alveolar oedema or atelectasis and emphysema, in addition to mild or severe congestion. Bronchioles adjacent to the cyst were compressed. Some areas of focal cellular infiltration were observed in the lung tissue and around the bronchioles. In fertile cysts, scolices were found bordering the outer layer capsule or inbetween the lung tissue and the infiltration zone (Fig. 1).

b. LIVER : In this organ, the cyst oftently contained active germinal layers and broad capsules with scolices (Fig. 2). Along the fibrous layer, areas of dense infiltration were observed. These infiltrations were consisting mainly of lymphocytes and plasma cells. The infiltration characteristically divides the fibrous capsule into two layers and thus lied between them (Fig. 3). Marked infiltrations were neither observed between the parasitic cyst and the host capsule, nor between the connective tissue capsule and the adjacent liver

TABLE 1. Range size and range number of hydatid cysts encountered at Tampool slaughter house

Organs involved				Range size of cysts (cm)			Range number of cysts		
Only lung	Only liver	Spleen and lung	Liver and lung	Liver	Lung	Spleen	Liver	Lung	Spleen
42 (65.6p.100)	9 (14.06p.100)	2 (3.1p.100)	11 (17.06p.100)	0.6-9.5	0.7-9.0	6.2-7.6	1-2	1-15	0-1

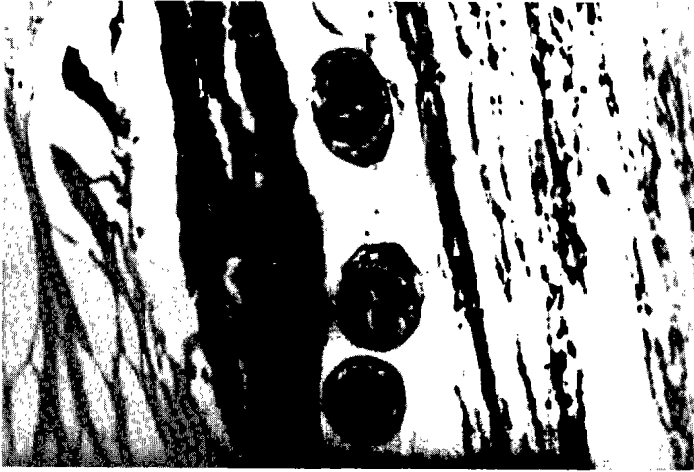


Fig. 1. — Lung showing the scolices between the lung tissue and infiltration zone. H & E \times 100.

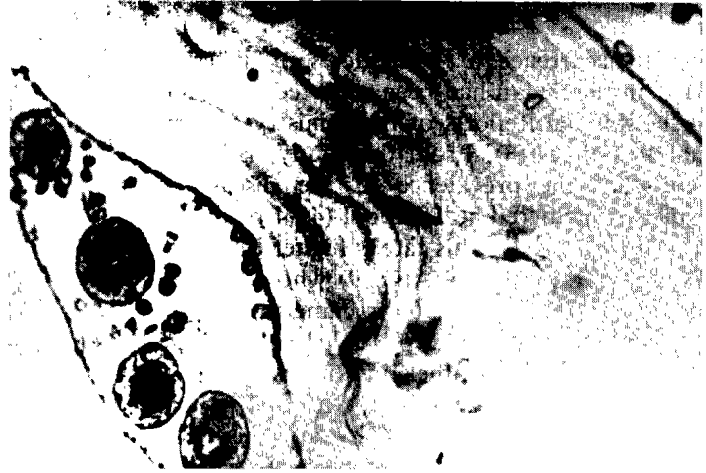


Fig. 2. — Liver cyst with active germinal layer and scolices. H & E \times 100.

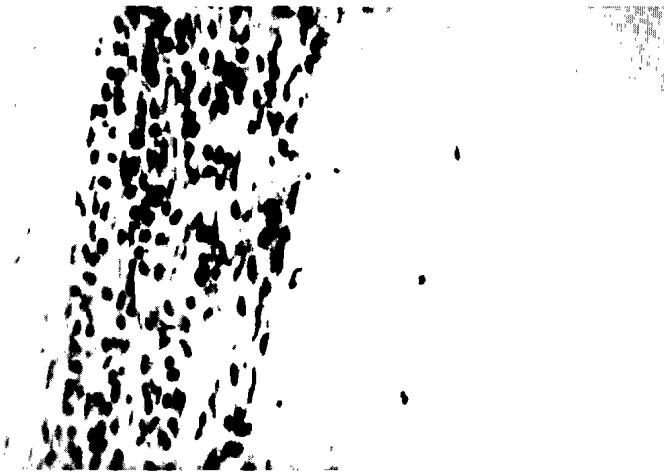


Fig. 3. — Liver showing the cellular infiltration between the inner and outer fibrous layers. H & E \times 100.

tissue. This constitutes the main histological difference between the lung and liver cysts. Atrophy was seen in liver tissue surrounding the fibrous capsule. The main circulatory disturbances were : dilatation of sinusoids, haemorrhages and formation of new blood vessels along the host capsule. Bile ducts showed hyperplasia.

c. SPLEEN : The histological structure of the hydatid cyst in this organ was principally similar to that seen in the liver. The host capsule consisted of two layers which were separated by focal cellular infiltration mainly lymphocytes. In one case, extensive haemorrhages were seen near the trabeculae and in the inner fibrous tissue layer.

IV. DISCUSSION

The occurrence of hydatidosis in different parts in the Sudan had been reported in camels in the Annual Reports of the Ministry of Animal Resources (3). From this study, it is evident that the prevalence of the disease in camels slaughtered at Tampool (45.4 p. 100) is considerably high. This rate is higher than that reported by HALLAWANI (9) who found an infection rate of 31 p. 100 in camels in Egypt. DADA (5) reported 57.2 p. 100 prevalence rate of hydatid cysts in camels in Nigeria. He showed this high prevalence to be a good indicator of high level of cystic hydatid infection acquired locally in the Sudan. In Somalia, KAGAN and CAHILL (11) showed that 16 out of 52 camels were positive for hydatidosis in haemagglutination and precipitation tests. A high prevalence of hydatidosis in camels has also been reported from Iraq (4) and Iran (2) with rates of 49.1 and 42.8 respectively.

From our findings, it is quite obvious that the lungs and livers are the most preferable sites for hydatid cysts. These findings are con-

sistent with those of GEMMEL (8) in domestic animals other than camels.

The high prevalence of the disease reported in this study may be attributed to the type of animal husbandry practiced in that area where dogs are usually found in close contact with camels and other domestic animals. People used to throw infected organs around the slaughter house which gives roving dogs an access to these discarded parts.

To further elucidate the epidemiology of hydatidosis at Tampool area, SAAD (12) carried out a preliminary investigation on *E. granulosus* in dogs. He found high infection with the parasite in all the 3 dogs autopsied with counts of 2100, 3000 and 8300.

The gross and histological characteristics of hydatidosis in camels were relatively similar to those described in other animals (10). However, some histological variations in the arrangement of layers of the cysts were observed. The cellular reaction in the affected liver was milder than in the lung tissue and oftenly divides the fibrous tissue capsule into two adjacent layers.

In this study, the cellular infiltration consisted mainly of lymphocytes and plasma cells. This finding is inconsistent with that of JUBB and KENNEDY (10) who reported eosinophil infiltration in hydatidosis infection in other domestic animals.

The kind of cellular infiltration reported here may suggest to some extent an immune response of the host to the infection which is assumed to be a delayed hypersensitivity type of reaction.

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RESUMEN

Se evidencian quistes hidaticos en 64 (45,4 p. 100) de 141 dromedarios matados en el matadero de Tampool en el nordeste del Sudan. Su número y su tamaño variaban según sus localizaciones : pulmones, hígado, bazo. El aspecto general e histológico de la enfermedad generalmente se parecia, con algunas variaciones, al observado en demás animales.

Palabras claves : Hidatidosis — Dromedario — Sudan.

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