

EPIDEMIOLOGICAL AND SEROLOGICAL STUDIES ON HYDATIDOSIS IN DROMEDARY CAMELS

BY

A.A. ZAYED AND A.A. DERBALA

Department of Parasitology and Animal Diseases, National Research Center, Dokki, Cairo, Egypt.

(Received:21.12.1992)

SUMMARY

The prevalence of hydatidosis was investigated in 140 camels. The infection rate of these animals reached 37.1% with a high rate in females (44.9%) than males (34.0%). The hydatid cysts were mainly located in lungs, liver or both and heart with fertility rates of 69.1, 25.0 or 58.8 and 0%. Respectively. The seroprevalence detected by IHAT reached 79.3%. Out of 52 infected and 88 non-infected camels, IHAT detected 100 and 65.9% positive cases respectively with a sensitivity of 100%.

INTRODUCTION

Domestic animals play important role in most of tape worm infection of man, serving either as reservoir or intermediate hosts. The most relationships of these animals is illustrated by the species of *Taenia saginata*, *Taenia solium* and related hydatid worm *Echinococcus granulosus*.

The degree of hydatid infection in food animals helps to indicate the risk to man with *E. granulosus* via dogs. However, the cyst fertility rates determine the real role of a particular species of these animals in the cycle of infection.

The prevalence of hydatidosis in slaughtered dromedary camels showed marked variations in Egypt (El-Garhy and Selim, 1957; Cahill et al., 1965; Basiouny, 1977; Mansour, 1979 and El-Mossalami & Ghawi, 1981) and in many countries of the Middle east region (Al-Abbassay et al., 1980 in Iraq; Al-Yaman et al., 1985 in Jordan; Pandey et al., 1986 in Morocco and Gusbi et al., 1990 in Libya). They reported that the infection rate of hydatidosis in camels varied from 8.8-80%.

The purpose of this work is to study the preva-

lence, location and fertility rate of hydatidosis in camels. Serological diagnosis of infected and non-infected animals by Indirect haemagglutination test (IHAT) was also concerned.

MATERIAL AND METHODS

Carcass inspection:

A total of 140 camels, slaughtered at El-Kalag abattoir, Kalyopia governorate, Egypt were examined between March and August 1992. The lungs, liver, heart, spleen and kidneys were routinely inspected for hydatid cyst infections. The cysts, if present were collected, counted and subjected to laboratory investigations to determine the intensity of infection and fertility rate.

Determination of cyst fertility:

In low infection (1-5 cyst/organ), all cysts were incised and examined. In heavy infection (> 6 cyst/organ), few cysts were randomly selected for microscopical examination of its germinal layer and protoscolices. Fertile cyst was clean with protoscolices showing muscular activity.

Serological diagnosis by IHAT:

Blood samples of 140 camels were collected during slaughter. The serum samples of infected (*n = 51) and non-infected (*n = 89) animals were separated and kept frozen at -20°C until use. The partially purified hydatid fluid antigen was prepared from fertile cysts according to Pazzuoli et al. (1972). The protein concentration was adjusted to be 30 mg protein/1 ml by dialysing it against polyethylene glycol (Derbala, 1988). The IHA assay was adopted after Kagan and Norman (1976).

RESULTS

Prevalence of camel hydatidosis:

The present study found that out of 140 examined camels, 52 (37.1%) were infected with hydatid cysts. The infection rate was apparently higher in female camels which was 44.9% in females and 34.0% in males (Table 1).

Location and fertility rate:

In this study, it was found that the hydatid cysts of camels were mainly located in the lungs, liver or both. Occasionally, few cysts were also found in the heart. Out of 52 infected camels, 34 (65.4%) cysts were found in the lungs only, 7 (13.5%) in the liver only and 9 (17.3%) in both. Two (3.8%) hearts were found to be infected with hydatid cysts, each of them harboured one small cyst. The

Table (1): Infection rate of hydatid cysts in camels

Camel sex	Examined No.	Infected No.	%
Males	91	30	34.0
Females	49	22	44.9
Total	140	52	37.1

Table (2): Location and fertility rate of hydatid cysts recovered from 52 infected camels

Site	No. infected	%	No. of collected cysts	No. of fertile cysts	%
Lung only	34	65.4	231	103	69.1
Liver only	7	13.5	16	4	25.0
Lung + liver	9	17.3	80	47	58.8
Heart only	2	3.8	2	0	0
Total	52	100.0	329	195	64.8

Table (3): Intensity of hydatid cysts infection in lung, liver and heart of 52 infected camels

Size of infection in cysts	lung		liver		heart	
	No.	%	No.	%	No.	%
1- 5	32	74.4	16	100	2	100
6-10	9	20.9	0	0	0	0
11-15	0	0	0	0	0	0
16-20	2	4.7	0	0	0	0

Table (4): Sero-prevalence and titre variation of hydatidosis in camels detected by IHAT

No. of tested samples	IHA activity		Titre variation					
	positive No.	%	1/1024		1/2048		1/4096	
			No.	%	No.	%	No.	%
*52	52	100.0	0		29 (55.8)		23 (44.2)	
**88	58	65.9	8 (13.8)		40 (69.0)		10 (17.2)	
Total 140	110	79.3	8 (7.3)		69 (62.7)		33 (30.0)	

No. number

* serum samples of infected camels

** serum samples of non-infected camel

fertility rate of recovered cysts varied considerably in different organs. It was higher in lungs only (69.1%) than in liver only (25.0%) or both (58.8%). However, no fertile cysts were found in the heart (Table 3). Hydatid cysts other than fertiles were either sterile, caseated or calcified ones. Most of cysts recovered from liver were small in size and had a high percentage of caseation and calcification.

Intensity of infection:

The present study found that all infected livers and hearts harboured 1-5 cysts/organ, however, 74.4, 20.9 and 4.7% of infected lungs had 1-5, 6-10 and 16-20 cyst/lung, respectively (Table 3).

Seroprevalence of hydatidosis detected by IHAT:

In this study, IHAT revealed that out of 140 tested serum samples, 110 (79.3%) were positive with high titres varied from $1/1024$ to $1/4096$. The highest percentage of serum samples was found at titre $1/2048$ (62.7%), followed by $1/4096$ (30.0%) and $1/1024$ (7.3%). When the serum of 52 infected camels were tested by IHAT, all of them (100%) were positive indicating a sensitivity of 100%. The titre of these positive samples were $1/2048$ (55.8%) and $1/4096$ (44.2%). However, IHAT detected 58 (65.9%) out of 8 non-infected camels were positive with 69.0% had high titre $1/2048$ (Table 4).

DISCUSSION

Hydatidosis is a disease caused by the hydatid cysts which are formed in various organ tissues by developing the larvae of the tape worm *Echinococcus granulosus* after ingestion of the contaminated food by its eggs.

The infection rate of camel hydatidosis (37.1%) reported in this study was relatively similar to those reported in Egypt by El-Askalany (1981) 35.96% and Basiouny (1977) 30.%. However, Cahill et al. (1965) reported it to be 81.4%, Mansour (1979) 22.26% and El-Mossalami & Ghawi (1981) 19.4%. A higher incidence in cam-

el was reported in many countries of the Middle east region; 80% in Morocco (Pandey et al., 1980) and 66.2% in Tunisia (Ben-Osman, 1965). However, Al-Abbassy et al. (1980) found it to be 20% in Iraq and Al-Yaman et al. (1985) 8.8% in Jordan. The highest infection rate may be related to that the camels are usually bred between desert and cultivated land where most of village population keeps dogs, for guarding probably are often infected with *E. granulosus*. It also may be due to there is no periodical eradication of stray dogs especially of those wandering around the abattoirs where the infected organ may find their way to the dogs (El-Mossalami and Ghawi, 1981).

As reported by Pandey et al. (1986) for sheep and goats and Al-Yaman et al. (1985) for cattle, our study found that the hydatidosis infection rate in camels was higher in females than males which may be related to the role of keeping for longer periods than males.

The major sites of hydatid cysts demonstrated in this study were the lungs, liver and occasionally heart. Such results were also reported El-Garhy and Selim (1957), by Mansour (1977) and El-Mossalami & Ghawi (1981). They added that spleen was also infected. However, Al-Abbassy et al. (1980), Al-Yaman et al. (1985) and Pandey et al. (1986) reported that lungs and liver were only infected organs in camels.

The cyst fertility rate (64.8%) presented in this study was relatively similar to that reported in Morocco 67.8 (Pandey et al., 1986), but it was lower than that reported in Jordan 14.7% (Al-Yaman et al., 1985). On an organ basis, this study found that the highest fertility rate was seen in lungs rather than liver as reported by Gusbi et al. (1990) in Libya. This may be due to the relatively softer consistency of the lung which allows easier development of the pressed cysts.

The present work reported that the seroprevalence of hydatidosis in camels (79.3%) detected by IHAT was higher than those reported in camels by El-Askalany (1981) 37.5% in Egypt and Saad & Hassan (1989) 40% in the Sudan. However, it was lower than that reported in buffaloes by Verma and Malviya (1989) 81.7%. The IHAT detected hydatidosis 100% sensitivity. However,

El-Askalany (1981) found it to be 81% and Saad & Hassan (1989) 40%.

ACKNOWLEDGEMENT

Sincere thanks to staff member of El-Kalag abattoir; Dr. Usab, Dr. Morkos and Dr. M. Ragab for their cooperation during the course of this study.

REFERENCES

- Al-Abbassy, S.N.; Al-Talif, K.L.; Jawad, A.K. and Al-Saqur, I.N. (1980): The prevalence of hydatid cysts in slaughtered animals in Iraq. *Ann. Trop. Med. and Parasitol.*, 74: 185-187.
- Al-Yaman, F.M.; Assaf, L.; Hallat, N. and Abdel-Hafez, S.K. (1985): Prevalence of hydatidosis in slaughtered animals from North Jordan. *Ann. Trop. Med. and Parasitol.*, 79: 501-506.
- Basiouny, A. (1977): Some biological studies on *Echinococcus granulosus*. M.V.Sc. Thesis, Fac. of Vet. Med. Zagazig Univ., Egypt.
- Ben-Osman, F. (1985): Considerations epidemiologiques sur l'hydatidose animal en Tunisie. *Archives de l'institut Pasteur, Tunis*, 3-4: 409-418.
- Cahill, K.M.; Atalla, W. and Johnson, R.D. (1985): An echinoccal survey in Egypt and Sudan. *J. Egypt. Publ. Hlth. Ass.*, 11:293.
- Derbala, A.A. (1988): Immunological studies on some nematodes infesting sheep. Ph.D. Thesis, Fac. of Vet. Med., Cairo Univ., Egypt.
- El-Askalany, M.A. (1981): Evaluation of some serological tests on diagnosing hydatid cysts in camels. M.V.Sc. Thesis, Fac. of Vet Med., Cairo Univ., Egypt.
- El-Garhy, M.T. and Sellim, M.K. (1957): Incidence of echinococcosis in camels slaughtered for meat production in Egypt. *Egypt. Vet. Med. J.*, 4: 191.
- El-Mossalami, E. and Ghawli, A. (1981): Public health importance of camel's lung infection. *Egypt. J. vet. Sci.*, 18: 109-119.
- Gusbi, M.A.; Awan, Q. and Beesley, W.N. (1990): Echinococcosis in Libya. I.V. Prevalence of hydatidosis (*Echinococcus granulosus*) in goats, cattle and camels. *Ann. Trop. Med. and parasitol.*, 84: 477-48.
- Kagan, I.C. and Norman, C. (1976): Serodiagnosis of parasitic disease in Rose, N. & Friedman, H.ed. *Manual of Clinical Immunology*. American Society for Microbiology. Washington. pp. 932.
- Mansour, N.K. (1979): Hydatidosis in food animals slaughtered at Cairo abattoir. M.V.Sc. Thesis, Fac. of Vet. Med. Cairo Univ., Egypt.
- Pandey, V.S.; Ouhelli, H. and Ouchtou, M. (1986): Hydatidosis in sheep goats and dromedaries in Morocco. *Ann. of Trop. Med. and Parasitol.*, 90: 525-529.
- Pazzholl, T., Musiani, P.; Arru, E., Plantilli, M. and Massarella, R. (1972): *Echinococcus granulosus*: Isolation and characterization of sheep hydatid flui antigen. *Exp. Parasitol.*, 32: 45-55.
- Saad, M.B. and Hassan, A.K.M. (1989): Indirect haemagglutination (IHA) and immunoelectrophoresis in the diagnosis of hydatidosis in Sudanese camels. *Revue d'Elevage et de Medecine Veterinaire de Pays Tropicaux*, 42: 41-44.
- Verma, T.K. and Malviya, H.C. (1989): Comparative study of serodiagnosis for hydatidosis in buffaloes. *Rivista di Parasitologica*, 5: 51-56.