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PREVALENCE OF HYDATID CYSTS IN SLAUGHTERED ANIMALS IN SIRTE, LIBYA

By

HAMED H. KASSEM[1], ABDEL-KADER M. ABDEL-KADER[2] AND SEDIGH AHMED NASS[3]

Faculty of Science, Benghazi University, Benghazi[1], and Faculty of Science, Sirte University, Sirte[2], and Faculty of Science, Tripoli University, Tripoli [3], Libya.

Abstract

The prevalence of cystic echinococcosis was studied among the livestock slaughtered in abattoir of Sirte, Libya during the period July 2004 to May 2005. The overall infection rate of 4.9% in sheep, 2.4% in goats, 2.7% in camels and 15% in cattle were observed. The increase in prevalence with age of the animals was statistically significant in the four species. In female goats, examined infection was higher in the male. Liver had higher hydatid cysts than lungs in sheep, goat while infected lungs had higher in camel.

Key words: Libya, cystic echinococcosis, Hydatidosis in edible animals

Introduction

The unilocularhydatid disease caused by the cystic larval stage of *Echinococcus granulosus* is a cyclozoonotic infection of animals and humans of worldwide importance? Hydatid disease is considered endemic in man and animals in North-Africa,while in rural areas of Algeria, Morocco and Tunisia, its hyper endemic (Matossian *et al*, 1977). The disease appears to be endemic in Libya where many domestic animals including sheep, goats, camels and cattle act as intermediat*e* host for *E. granulosus* (Dar and Taguri, 1978; 1979; Gebreel *et al*, 1983; Shambesh *et al*, 1992; Kassem, 2006; Kassem and Gdoura, 2006) and dogs Packer and Ali, 1986)**.**

The objective of the present study was to determine the prevalence of cystic echinococcsis infection in herbivorous animals slaughtered in abattoir of Sirte, Libya at different age and sex.

Materials and Methods

The study was conducted in Sirte city, on the Mediterranean Coast. Its population is about 140.000. Sirte city is surrounded by pasture and agricultural land that support sheep and goats population of 1,470,000 and 950,000 respectively.

In addition, there are a few hundreds of cattle and 120.000 camels around Sirte. The warmest months are July and August (mean monthly temperature = 27-31^{o}C) and coldest are January and February (mean monthly temperature = 14-18˚C). The relative rainfall exceeds

253 mm. The relative humidity ranges from 67 to 71% all-over the year.

The Sirte abattoir was visited two times weekly from July 2009 to May 2010. At each visit random examination of liver, lungs and other organs of indigenous sheep, goats, camels, and cattle slaughtered in abattoir was carried out for the presence of hydatid cysts. This included 3794 sheep, 8123 goats, 739 camels and 113 cattle slaughtered for human consumption.

Statistical analysis: A computerized statistical program SPSS. V11.5 (Statistical Package Science Sociality) has been utilized to analyze the available data of the present study. The statistical analysis such as multiple response tables has been used to present percentage and number of cases between variables. Using Pearson and spearman rank correlation determined the significance levels. P-value was considered significant difference less than 0.05 even though P-value less than 0.01 considered strong significance.

Results

Hydatid cysts of *E. granulosus* were detected in all animals species examined. A total of 186 (4.9%) of 3794 sheep, 195 (2.4%) of 8123 goats, 20 (2.7 %) of 739 camels and 17(15.0%) of 113 cattle were found to be infected (Tab. 1). The result shows no significant differences in the prevalence of hydatid cysts between males and females in sheep, prevalence in males of sheep was 5.9% while in females the prevalence was 4.4%. Otherwise, the result shows strong correlation and significant difference of hydatid cyst between males and females in goats $P<0.01$, prevalence in males of goats was 1.8%, while in females the prevalence was 3.9 %. On other hand, the result showed that there was no significant difference between males and females in cattle. Numerically, males of cattle were 12.9% while in females the prevalence was 18.6%. Finally, the result showed slight correlation and significant difference in the prevalence of hydatid cysts between males and females in camels $P<0.05$. Prevalence in males of camels was 1.7%, while in females it was 4.1% (Tab. 2). The result also showed strong correlation and significant difference between sheep's age group ($P<0.01$). The same result was got from age group of goats, the result also showed a strong correlation and significant difference between age group of goats and prevalence of infection were higher in the older age especially in age more than three years. Also, result showed again in cattle age group the older age had higher infection rate and support the idea that younger age had less infection rate between age group (Tab. 3). The liver and lung were the common sites of hydatid cysts, a total of the186 infected sheep, 95 (51.1%) had infected liver and 42 (22.6%) had infected lung. Multiple infections involving two organs were common. As expected, the most usual combination was the involvement of liver and lung 49 (26.3%). The result showed higher infection rate in liver of sheep. In goats, a total of the 195 infected goats, 76 (39.0%) had infected liver and 54 (27.7%) had infected lung,

and 65 (33.3%) had infected multiple liver and lung. On the same line, the result pointed out that cattle had higher infection rate in the sites. A total of the 17 infected cattle, seven (41.2%) had infected liver and six (35.3%), and four (23.5%) had infected multiple liver and lung. Otherwise, the lungs in camels had higher infection rate than livers and that the 20 infected camels, five (25.0%) had infected liver and 10 (50.0 %), and five (25.0%) had infected multiple liver and lung (Tab. 4).

Table 1: Prevalence of hydatid cysts in slaughtered animals from Sirte

Examined animals	No. examined	No. of infected (%)
Sheep	3794	186 (4.9)
Goats	8123	195 (2.4)
Cattle	113	17 (15.0)
Camels	739	20 (2.7)

Table 2: Prevalence of hydatid cysts in slaughtered animals according to sexes:

Sex	Sheep		Goats		Cattle		Camels	
	No. exam	Infected (%)	No. exam	Infected (%)	No. exam	Infected (%)	No. exam	Infected (%)
Male	1247	73 (5.9)	5836	105 (1.8)	70	9 (12.9)	421	7 (1.7)
Female	2547	113 (4.4)	2287	90 (3.9)	43	8 (18.6)	318	13 (4.1)
Total	3794	186 (4.9)	8123	195 (2.4)	113	17 (15.0)	739	20 (2.7)
p-value	0.058		0.000		0.411 (Non-sig)		0.044	

Table 3: Prevalence of hydatid cysts in slaughtered animals according to age:

Age (Years)	Sheep		Goats		Cattle		Camels	
	No. exam.	Infected (%)	No exam.	Infected (%)	No. exam.	Infected (%)	No. exam.	Infected (%)
< 1	1920	58 (3.0)	4062	61 (1.5)	47	1 (2.1)	393	3 (0.8)
1 – < 2	947	44 (4.6)	2422	40 (1.7)	21	3 (14.3)	199	5 (2.5)
2 – <3	592	42 (7.1)	1141	44 (3.9)	23	8 (34.8)	82	6 (7.3)
≥ 3	3	42 (12.5)	498	50 (10.0)	22	5 (22.7)	65	6 (9.2)
Total	3794	186 (4.9)	8123	195 (2.4)	113	17 (15.0)	739	20 (2.7)

Table 4: Hydatid cysts in liver and lungs of sheep, goats, cattle and camels:

Animals	No. infected	Infected liver (%)	Infected lungs (%)	Liver&lungs (%)
Sheep	186	95 (51.1)	42 (22.6)	49 (26.3)
Goats	195	76 (39.0)	54 (27.7)	65 (33.3)
Cattle	17	7 (41.2)	6 (35.3)	4 (23.5)
Camels	20	5 (25.0)	10 (50.0)	5 (25.0)

Discussion

Prevalence rates of cystic echinococcosis were epizootiological features related to infection rates in the intermediate host reservoir livestock population (Dar and Al-Karmi,1997). Gusbi *et al*. (1987; 1990) reported varying ecological zones of echinococcosis and hydatidosis in different areas of Libya. Varying infection rates have been reported in various domestic herbivores in Libya and other countries. In the present study, the prevalence rates of hydatid cysts were 4.9% in sheep,

2.4% in goats, 15.0% in cattle and 2.7% in camels. Similar and different prevalence rates to those seen in the present study have been reported from Libya and other countries.The overall prevalence rates of hydatid cysts in sheep, cattle, and camels were 3.3%, 18.1%, 13.9% & 19.1% respectively (Gusbi *etal*,1987,1990). In different area of northern Libya, the prevalence rate in sheep, goats and camels was 15.8%, 3.8% and 48% respectively (Ibrahem and Craig, 1998). The overall prevalence rates from Benghazi in sheep, goats and camels were 1.02%, 4.65% &1.01% (Khan and El-Buni,1999). Tashani *etal*. (2002) in Benghazi reported the prevalence rates among sheep, goats, cattle and camels were 20%, 3.4%,11% &13.6% respectively.The prevalence rates of cystic echinococcosis in other countries were 5.9% in sheep, 5.1% in goats, 4.9 in cattle & 20.4% in camels in central Iraq (Al-Abbassy *et al*, 1980); 1.3% in sheep and 0,54% in goats in central Jordan (Dajani and Khalaf,1981). The prevalence rate was 10.7%, 1.4% and 80% in sheep, goats and camels respectively in north western Morocco (Pandey *et al,* 1986) .In north western Iran, the prevalence rate was 19.0% in sheep and 22% in cattle (Nourian *etal,* 1997). Sheep were highly infected in central Tunisia (Lahmar *et al,* 1999) and the infection rate were 15%, 6.2% and 10.9% in sheep, goats and cattle respectively in northern Iraq (Saeed *et al*, 2000). Comparing these results with the present ones, the prevalence of hydatid cysts in domestic animals in Sirte decreased, although in cattle remained high. The decrease might be attributed to several factors, the campaign for the destruction of stray dogs, or the standard of meat inspection in abattoirs has been improved significantly and there a considerable improvement in the living standards.

The data of the present study indicated that the rate of infection by hydatid cysts in the goats was the lowest between others. This can explained by the fact that goats usually feed on the upper parts of plants and shrubs, while other hosts feed on the ground grass that increase the chance of swallowing the *Echinococcus* eggs and may related to host immunity (Pandey *et al*, 1986). The data of the present study revealed that the rate of infection by hydatid cysts in female goat was higher than in male. Tashani *et al.* (2002) have been recorded that female livestock higher infection rate than male. Sheep, camel and cattle had nearly equal infection rate between female and male.

Older age in all livestock examined had higher infection rate, in agreement with the present study, Tashani *et al*. (2002) reported young camel, sheep and cattle less likely to be infected than their older ones. Pullar and Marshall (1958) and Gemmell (1961) reported that the prevalence increase with age in sheep and cattle. Ibrahem and Craig (1998) reported similar results. This can be explained by the fact that cysts in younger animals are still in infancy and take several months to develop. The rate of infection was significantly higher in cattle as they tend to graze on plants more exposed to *E. granulosus* eggs inhibited by infected dogs in the

fields or due to slaughtering of cattle usually older age groups that are likely having higher infection rate. Liver in the present study had higher hydatid cysts number than lung in sheep, goat, and cattle, while lung had higher hydatid cysts in camel. The present data agreed with many authors (Pandey *et al,* 1986; 1988; Gusbi *et al*, 1987; 1990; Ibrahem and Craig, 1998; Shaafie *et al*, 1999; Tashani *et al*, 2002; Kassem and Gdoura, 2006a, b) also went with the consideration of Thompson (1995).

Generally speaking, hydatidosis was sporadic in North America, Central America, northern South America, northern Europe (Bouree, 2001), Australia and New Zealand (Gemmell, 1990) and China (Chi *et al,* 1990). A high prevalence was found in southern South America, parts of southern Europe, parts of the formerly called USSR, Mediterranean Regions (Battelli *et al,* 2002), Middle Eastern countries, and northern and Eastern Africa and most Asian countries (Wilson, 1991). In Arab countries, human hydatidosis was reported in Tunisia (Ben-Osman, 1965), Saudi Arabia (El Marsfy and Morsy, 1975; Taha, 2012), North Africa (Matossion *et al,* 1977), Algeria (Fendri *et al*, 2010), the Sudan (Omer *et al,* 2011), Jordan (Boutennoune*et al,* 2012), Syria (Darwish, 2006), Morocco (Anderson, 1997; Boulahroud *et al*, 2012), Kuwait (Varro *et al*, 2011), Iraq (Hamdan, 2012), West Bank of Palestine (Abu-Hasan *et al*, 2002) and Egypt many authors too-much to mention (Mansour, 1963 to Mazyad *et al*, 1998; Haridy *et al*, 1998; 2008a, b; Ibrahim *et al*, 2007; El-Shazly *et al,* 2007a, b; El Kady *et al*, 2011; Hotez *et al*, 2012).

Nowadays, human and animals cystic echinococcosis caused by *E. granulosus* remained a zoonotic public health problem (Ibrahim *et al*, 2007) and economic loss in livestock animals (Haridy *et al,* 2000). The stray dog was the principal definitive host of *E. granulosus*, but in certain regions wild canids were involved in the lifecycle of this parasite (Haridy *et al,* 2008).

Conclusion

The detection of echinococcosis *granulosus* hydatid cysts in edible animals paved the way for more human infections. One must keep in mind that the infected dogs are asymptomatic and human hydatidosis is typically asymptomatic except a few cases of long standing and heavy infections that may be fatal.

No doubt, this zoonotic disaster disease needs local and national collaboration, at least in the Arab Countries to minimize its incidence and prevalence.

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