



## Prevalence of cystic echinococcosis in Egyptian donkeys.

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### Abstract

The present study detected the prevalence rate of hydatid cysts in different organs of 103 donkeys at Giza Zoo in Egypt during the period that extended from October, 2016 to September, 2017. The overall prevalence rate of hydatid cysts was 15.53%, with the majority of cysts (87.50%) found in the liver, followed by the mixed infection of lung and liver (12.50%). The majority of the cysts (56.89%) were fertile, and (40.72%) were sterile, while (2.40%) were calcified. Considering number of fertile cyst, (66) of mixed type lung and liver cysts were fertile compared to (29) of liver cysts. It was found that the prevalence rate of hydatid cysts was higher in female donkeys than in male and in old age donkeys with no cases in young to adult age ones.

**Keywords:** Donkeys, Hydatid cyst, Fertility

### INTRODUCTION

Cystic echinococcosis is a cosmopolitan zoonotic disease caused by the larval stage of canids adult tape worm of the genus *Echinococcus granulosus*. *E. granulosus* commonly develops in dogs as final host. Also several other wild carnivores can be a final hosts, as well as many mammals are intermediate host. Hydatid infection is widely spread and the disease has been detected in camel, cattle, donkeys, sheep, buffaloes and man. Human infection occurs accidentally. Omer et al., 2010; Ibrahim et al., 2011; Giuseppe et al., 2012 and Omer et al., 2013).

Cystic hydatidosis is an endemic disease in Arab North Africa including Egypt and the Middle East (Sadjjadi, 2006 and Tappe et al., 2011). The highest prevalence of cystic echinococcosis in human and animal hosts is recorded in countries of the temperature zones as Eursia, Australia, America and Africa (Giuseppe et al., 2012).

In Egypt, cystic echinococcosis is an endemic disease and several reports have indicated an increasing prevalence rate of the cystic echinococcosis infection in animals and humans in the last few years (Omer et al., 2013).

### MATERIALS AND METHODS

This study included 103 donkeys were carefully visual inspected for the presence of hydatid cysts in different organs from Giza Zoo in Egypt during the period that extended from October, 2016 to September, 2017. Palpation and incision of each visceral organs; liver, lung, kidney, spleen, heart and lymph nodes and were examined according to **FAO (1994)**.

The sex, age of animals and type of examined organs were recorded. 167 hydatid cysts were individually collected in clean plastic bags, labeled and transferred to the laboratory to conduct cyst count and their content, fertility of protoscolices according to **Soulsby (1982) and Thompson (1995)**.

Hydatid fluid was aseptically aspirated by sterile syringe with a wide needle after washing the cyst with distilled water twice. It was further subjected to centrifugation at 1500 rpm for 15 minutes; the sediment (protoscolices) was washed by centrifugation three times with PBS (pH 7.2) and then examined under microscope to observe the protoscolices. The fertility of hydatid cyst was detected and classified as fertile and infertile cysts; this was done according to the presence and absence of protoscolices, respectively. The infertile cysts were further classified into sterile and calcified. Fertility was assessed by microscopic observation under a 40X of the germinal layer and a drop of the whitish

sediment representing hydatid sand (protoscolices and hooks) while, the cysts without protoscolices were considered as sterile cysts according to **Macpherson (1985), Ahmadi (2005), Kebede et al. (2009) and Gebremeskel and Kalayou (2009)**.

## Results

Results of the prevalence survey are summarized in **(Table 1, 2 and 3)**. Out of 103 donkeys, 16 animals were found to be infected with hydatid cysts. The infection rate was 15.53%. The total number of cysts counted from the 16 infected donkeys was 167 cysts. The liver was the most infected organ with hydatid cyst with a percentage 87.50% followed by mixed type of lung and liver 12.50%. No cysts were observed in the spleen, kidneys, or other visceral organs.

Microscopic examination of cystic fluid from 167 collected hydatid cysts revealed that 56.89% of them were fertile, 40.72% were sterile while, calcified cyst showed a lower percentage 2.40%. The number of fertile cysts obtained from the mixed type of lungs and livers of donkeys were larger than ones obtained from liver 66 and 40 cysts, respectively. Female donkeys were infected with hydatid cysts more than males and all infected donkeys were old aged with no cases of infection were detected in young to adult.

**Table (1) Prevalence of hydatid cysts in the examined slaughtered donkeys.**

Animal species	No. of examined animals	No. of infected animals	%	No. cysts	Predilection sites							
					Lung (No.of infected animals)	%	Liver No.of infected animals)	%	Lung and liver (No.of infected animals)	%	Other organs	%
Donkeys	103	16	15.53	167	0	0.0	14	87.50	2	12.50	0	0.0

**Table (2) Fertility of hydatid cysts collected from infected donkeys.**

Animals species	No of cysts	Organs	Cyst fertility		
			Calcified	Fertile	Sterile
Donkeys	167	Lung	0	0	0
		Liver	4	29	40
		Lung and liver	0	66	28
		Other organs	0	0	0
		Total no. of cysts	4	95	68
		Prevalence	2.40	56.89	40.72

**Table (3) Effect of age and sex on infection with hydatid cysts in examined animals**

## DISCUSSION

The study was carried out at Giza Zoo in Egypt during October, 2016 to September, 2017 for cystic echinococcosis infecting donkeys. In our study, the overall infection rate of cystic echinococcosis in donkeys was (15.53%). This result was higher than that mentioned by **Ahmed et al. (2011)** in Egypt, who mentioned that the prevalence rate of hydatid cyst in donkeys was (4.62 %) and **Aboelhadid et al. (2013)** in Beni-Suef zoo, Egypt, who recorded that the infection rate of hydatid cyst in donkeys was (6.89%). While it was nearly similar to that mentioned by **Azlaf and Dakkak (2006)** in Morocco, who recorded that the prevalence rate of cystic echinococcosis in 455 equines was (17.80%) and **Al-kappany et al. (2016)** in Giza Zoo, Egypt, who mentioned that the prevalence rate of cystic echinococcosis in 83 donkeys was (20%). The difference in the result with other workers may be attributed to size of samples, variations in environmental factors, difference in culture and social activities, dog population in the region, status condition of public health and veterinary services (**Kumsa, 1994**).

In the current study, the infection rate

of hydatid cysts was more prevalent in liver followed by mixed type (lung and liver) then lung with percentage 87.50%, 12.5% and 0.0%, respectively. This result was similar with that mentioned by **Aboelhadid et al. (2013)** in Beni-Suef zoo and Egypt, who reported that the liver was more infected than mixed type (lung and liver) then lung with percentage of 70%, 30%, and 0.0%, respectively. This result was contrary with **Blutke et al. (2010)** in Germany, who demonstrated the presence of hydatid cysts only in the lung of infected mares. The reason for the presence of higher infection rate in the liver in donkeys was due to the bile duct in the liver receives the blood with the oncospheres after the blood has passed the duodenum as mentioned by **Elmajdoub and Rahman (2015)**.

In the present study, the fertility rate of 167 examined hydatid cysts was observed to be 56.89%, while 40.72% of the cysts were sterile, and 2.40% cysts were calcified. This result was nearly closed to that mentioned by **Aboelhadid et al. (2013)** in Beni-Suef zoo, Egypt, who reported that, most of collected cysts were fertile and the lowest were sterile. This study not agree with **Al-kappany et al. (2016)** in Giza Zoo, Egypt, who recorded the

Animal species	Sex	Young to adult			Old			Total		
		No. of examined	No. of infected	No. of examined	No. of examined	No. of examined	%	No. of examined	No. of infected	%
Donkeys	Male	47	0	0.0	32	11	34.38	79	11	13.92
	Female	14	0	0.0	10	5	0.0	24	5	20.83
	Total	61	0	0.0	42	16	38.10	103	16	15.53

number of sterile, fertile, calcified cysts in infected donkeys to be 13, 7 and 4 cysts, respectively. Also, **Desouky et. al. (2017)** in Giza Zoo, Egypt who recorded that all the collected cysts were fertile with a percentage (100%).

In terms of the number of fertile hydatid cysts in different organs, it was observed that in mixed type lung and liver, it was (66) which were higher than that for liver (29) and other organs (0). This result was nearly closed to that mentioned by **Lahmar et. Al. (2014)**, who mentioned that, in the lungs, the percentage of fertile cysts was higher (15.38%) than that in the liver (3.58%). On the contrary, **Aboelhadid et al. (2013)** in Beni-Suef Zoo, Egypt, who reported that, in the livers, eight cases possessed fertile cysts, one

case was sterile and the last one was caseous while, the lungs of three-infected cases possessed fertile cysts.

In the current study, according to the sex, the higher prevalence rate of hydatid cysts was observed in female with a percentage 20.83%. Whereas, the lowest rate was detected in male with a percentage 13.92%. This may be due to female donkeys have a long gestation period as mentioned by **Abo-shehada (1988)**

Also, our result showed further that the infections with hydatid cysts occurred in old animals with a percentage (38.10%). This result was in agreement with that mentioned by **Desouky et al. (2017)** who recorded that all cases infected with hydatid cysts were old age. This may be because older donkeys have a higher rate of exposure to infective stages as mentioned by **Ibrahim(2010)**.

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### الملخص العربي

#### معدل الإصابة بداء المشوكات الكيسي في الحمير المصرية

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أجريت هذه الدراسة على الحمير المذبوحة فى حديقة الحيوانات فى الجيزة فى مصر فى الفترة ما بين اكتوبر ٢٠١٦ و سبتمبر ٢٠١٧ لدراسة مدى إصابتها بداء المشوكات الكيسى (الأكياس المائية). تم فحص ١٠٣ حمار لتحديد نسبة الإصابة بالأكياس المائية. ازيلت الأكياس المائية من الكبد و الرئة المصابة بعد إجراء الفحص العيانى للاحشاء وقد أظهرت النتائج ان نسبة الإصابة بتلك الأكياس المائية كانت (١٥.٥٣%) . بينت الدراسة ان اعلى نسبة إصابة بالأكياس المائية هى الكبد بنسبة (٨٧,٥٠%) يليها عدوى مختلطة من الرئة والكبد بنسبة (١٢,٥٠%). وبالنسبة لأنواع الأكياس المائية التى تم تجميعها من الحمير المصابة كانت اعلى نسبة من الاكياس الخصبة يليها الاكياس العقيمة و المتكلسة بنسبة ٥٦,٨٩% و ٤٠,٧٢% و ٢,٤٠% على التوالى. وفيما يتعلق بعدد الاكياس المائية الخصبة فى الاعضاء المصابة اظهرت النتائج عدد ٦٦ كيس خصب فى العدوى المختلطة من الرئة والكبد يليها عدد ٢٩ كيس خصب فى الكبد. أظهرت الحمير الإناث معدل إصابة اعلى من الذكور وكانت جميع الحمير المصابة من الأكبر سنا ولم يتم الكشف عن اى حالات إصابة فى الحمير الصغيرة او البالغة.