Study the prevalence of hydatid cyst in cattle and sheep

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Abstract

Two groups of hydatid cysts were collected, the first one contained 206 cattle specimens while the second one contained 150 sheep specimens. Nine (7 female and 2 males) from cattle and 5 (4 female and 1 male) of sheep found to be infected. The specimens were collected from different ages, sexes and weight. The most infected organ was the liver followed by (liver and lung) and pancreas. In addition to studied the effect of some factors on the volume and fertility of these cysts. The cyst infertility in cattle male was more than female, while in sheep all cases showed infertility of cysts.

دراسة انتشار الأكياس المائية في الأبقار والأغنام

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الخلاصة

جمعت عينات الأكياس المائية على أساس مجموعتين تضمنت الأولى 206 عينة للأبقار، بينما تضمنت المجموعة الثانية 150 عينة للأغنام. احتوت هذه العينات على 9 (7 إناث و2 ذكور) من الأبقار المصابة و5 (4 إناث و1 ذكور) من الأغنام المصابة. تم جمع العينات من مختلف الأجناس، الأعمار إضافة إلى أوزان الحيوانات. الأكياس التي تم الحصول عليها كانت من الكبد والكبد والرئة ثم البنكرياس. إضافة لذلك فقد تم دراسة تأثير مجموعة من العوامل على حجوم الأكياس وخصوبتها، حيث أوضحت الدراسة ان نسبة عدم خصوبة الأكياس في الأبقار كانت أعلى في الذكور منها في الإناث، بينما تبين ان جميع العينات المأخوذة من الأغنام غير خصبة.

Introduction

Cystic Echinococcosis (CE) is a chronic zoonotic disease, due to infection with the larval stage (hydatid) of the dog tapeworm *Echinococcus granulosus* (1,2). The parasite has a global distribution but is particularly prevalent in rural areas where it is transmitted in a cycle between the dog, the definitive host and the sheep, the important intermediate host, and causing major economically and healthy problems. (3,4).

Echinococcus granulosus, lives as an adult parasite in the intestines of dogs and related wild carnivores and as a larva in man, cattle, sheep, goats, horses, and wild animals, the larva localizes in the liver, lungs, spleen, kidney, brain and other organs. (5,6). On the other hand, the hydatidosis in sheep, cattle and man, the liver is the organ most frequently

affected followed by lungs and then other organs (7). Hydatids also occurs as watery cysts in the soft tissues of sheep, cattle, pigs, kangaroos and occasionally man (8). The aims of this study to investigate the effect of some factors on the volume of animal´s cyst and their fertility.

Materials and Methods

- **Study specimens:** Hydatid cysts of sheep and cattle were obtained from many butchers in different areas of Al-Ramadi city, which contains 206 specimen from cattle, and 150 specimen from sheep. During collection of these specimens, there are many agents for each specimen were recorded such as: animal´s weight, they were weighted using Nobel balance (50-100 kg) in sheep cases and Salter balance (150-200 kg) in cattle cases, in addition to confirm age and sex in all cases (infected and non infected).
- **Determination of fertility and infertility of sheep and cattle hydatid cysts:** Cysts were collected from the liver, lungs and pancreas from infected sheep and cattle, these cysts were transported into laboratory as soon as possible. Every sample was examined by light microscope (Bausch and Lomp) to confifm the fertility of the cysts that's mean presence of protoscoleces, and fertility of these cysts, which may not produce protoscoleces (9,10). Furtherly, they were measured the size of cysts as a diameters, and weight the infected organs by electric balance (Sartorius).
- **Statistical Analysis:** Statistical analysis were compute assisted using SAS (Statistical Analysis System) (11). In addition to using T tests (LSD) for variables.

Results and Discussion

The animal hydatid cases were devided into two groups, the first one represent 206 cattle group, which contained 9 infected cases only (2 male and 7 female).

As shown in (Table 1) this study revealed increased volume of cyst in the female than male, which reach the level of statistical significance. This study also appeared females were more likely to have cystic Echinococcosis infection than males in the animal´s examined, females are more susceptible to the infection by metacestode of Echinicoccus granulosus than the males, this result agree with (12).

Furtherly, the cattle which have 2 years and less showed increased volume of cyst compared to those with the 3, 4 and more years, these effect were statistically significance, that´s mean the volume of hydatid cysts in cattle which have 2 years and less increased more than another ages of cases, this result agree with (13).

The location of cyst also showed the difference of the cyst volume. So, the pancreas showed significance increased level of volume compared with liver, (liver and lung), this result may be due to the structure of pancreas which have many spaces between the tissue, in addition to covered by loose vacuolated tissue, this may leads to more expand the cyst. while the infected cases in liver, (liver and lung) showed no effect on the volume of cyst. So, they were failed to reach the level of statistical significance. In addition, the cattle which have (90-130kg) showed significance differences in volume of cyst compared to those with the cattle which weight more than 130kg, this result occurred in old animals, so the chances of expand the volume of the cyst are more than other weights in these animals.

Table (1) The effect of some factors on the volume of cyst in cattle

Factor	No. of infected cases	Mean ± std. error
Gender		
Male	**2**	**11.00 ± 51.50 b**
Female	**7**	**31.30 ± 93.10 a**
Age		
2 years and less	**4**	**50.22 ± 115.25 a**
3 years	**2**	**15.50 ± 65.50 b**
4 years and more	**3**	**31.87 ± 54.24 b**
Site of infection		
Pancreas	**1**	**262.00 a**
Liver	**6**	**11.04 ± 58.66 b**
Liver and lung	**2**	**47.62 ± 70.37 b**
Animal´s weight		
90kg and less	**5**	**41.03 ± 102.20 a**
91-130kg	**2**	**29.12 ± 51.87 b**
more than 130 kg	**2**	**48.00 ± 69.99 ab**

The small different letters in the same factor deals with presence of statistical significance in 5%.

As shown in (Table 2) all infected cases in cattle male showed infertility of cyst, so they were 100% in its percentage compared to those with the infected female cases 71% the differences of these percentage between male and female reach the level of statistical significance, this result agree with (14). Fatherly, the infected cattle which have 2 years and less appeared 100% in its infertility percentage. While, the cases which have 3,4 and more years showed 50% and 66% in its infertility percentage respectively, these differences between 3 ages were statistically significant, in this study old animals have a chance to be infected or more time for cyst to develop than young animal, the result showed that the infection prevalence and fertility rate were higher in the older age classes, this result agree with (5). In addition this age variation can be translated into differential exposure to infection because older livestock may have been exposed to more infective stages (15). On the other hand, the percentage of infertility also showed differences in different location of cyst, so the infected case in pancreas appeared infertile 100%, while the percentage of infertility showed 83% and 50% in liver, liver and lung respectively. These differences in 3 locations reach the level of statistical significance. In the present study, livers and lungs were the most frequently infected visceral organs in all cattle cases, this is explained by the fact that livers and lungs possess the first great capillaries sites encountered by the migrating echinococcus oncosphere, this result agree with (16). In addition the fertility rates of hepatic and (hepatic&lung) cysts were higher than those pancreatic cyst, this result agree with (17). In addition, the differences of cattle weight showed effect on infertility percentage of cyst, so the animals which have 90 kg and less have 80% in infertility of cyst, while the animals which have 91-130kg and 131 kg and more appeared 100% and 50% respectively, these effect reach the level of statistical significant in different 3 weights, this difference is perhaps to the variability of mode of grazing and other environmental factors.

Table (2) The effect of same factors on the fertility of cyst in cattle

Factor	No. of infected cases	Infertility rate %
Gender		
Male	**2**	**100 a**
Female	**7**	**71 b**
Age		
2 years and less	**4**	**100 a**
3 years	**2**	**50 c**
4 years and more	**3**	**66 b**
Site of infection		
Pancreas	**1**	**100 a**
Liver	**6**	**83 b**
Liver and lung	**2**	**50 c**
Animal´s weight		
90kg and less	**5**	**80 b**
91-130kg	**2**	**100 a**
131kg and more	**2**	**50 c**

***The small different letters in the same factor deals with presence of statistical significance in 5%.**

On the other hand from this study, the sheep hydatid cysts which represent 150 specimens they contain 67 male and 83 female. In (Table 3) showed no effect between male and female sheep cases on the percentage of infection, this result may be due to the low numbers of infected sheep cases leads to failed to reach the level of statistical significance. Furtherly, the sheep cases which have 2 years or less appeared 0% in its percentage of infection, while the cases which ages more than 2 years showed 9% in its percentage of infection, these differences of percentages were statistically significance. In this study the older sheep were highly infected, while the younger ones had low rate of infection, this is attributed to two factors, firstly- higher age reflects a much longer period of risk of infection, secondly- the chances of detecting cysts at meat inspection are higher in aged animal due to the bigger size of the cyst, this result agree with (18). Furthermore, the weight of animal in 16-22 kg showed the 7% in percentage of infection while, the animal in weight 23 kg and more appeared 0% in percentage of infection, these differences were statistically significant, this result may be due to the relationship between sheep herds in this weight and dogs is very close, infected feces of dogs scattered near by the sheep herds and due to dryness of the area usually with movement of sheep the eggs float in the air and the eggs with dust swallowed by sheep. When the animal in 15 kg and less showed 3% in percentage of infection, so this percentage was failed to reach the level of statistical significance.

Table (3) The effect of some factors on the percentage of infection in sheep

factor	No. of cases	Percentage of infection%
Gender		
Male	**67**	**1 a**
Female	**83**	**4 a**
Age		
2 years and less	**97**	**0 b**
more than 2 years	**53**	**9 a**
Animal´s weight		
15 kg and less	**56**	**3 ab**
16 – 22 kg	**42**	**7 a**
23 kg and more	**52**	**0 b**

***The small different letters in the same factor deals with presence of statistical significance in 5%.**

As shown in (Table 4) the numbers of infected cases in cattle (most of them fertile) more than sheep cases, this result was agree with (19,20), so the low number of infected cases in sheep leads to difficult to reach the level of statistical analysis. The total percentage of infection in cattle and sheep failed to reach statistical significant.

Table (4) The total percentage of infection in cattle and sheep

Total no. of animals	No. of infected cases	Percentage of infection %
Cattle 206	**9**	**4 a**
Sheep 150	**5**	**3 a**

(21) stated that the low fertility rate detected in lung cysts of sheep, while in this study all infected cases of sheep appeared infertility, so this result differs from (21), may be due to the spongy texture of the lung tissues in sheep which permits hydatid cysts to grow well with little resistance to the growth of hydatid cyst, this helps to detect small cysts in lungs before they reach the stage of germinal membranes formation. Furtherly, the presence of one or more hydatid cysts in the cattle and sheep cases usually located in the liver, lung or both, this result is agree with (22). Generally, in the present study the prevalence of fertility found was low, this result was the same to (23).

Reference

1. Elmahdi, I. E.; Ali, Q. M.; Magzoub, M. M.; Ibrahim, A. M.; Saad, M. B. & Romig, T. (2004). Cystic Echinococcosis of livestock and humans in central Sudan. Ann. Trop. Med. Parasitol., 98: 473-479.
2. Thompson, R. C. & McManus, D. P. (2002). Towards a taxonomic revision of the genus Echinococcus. Trends Parasitol., 18: 452-457.
3. Torgerson, P. R. & Budke, (2003). Echinococcosis: An international public health challenge. Res. Vet. Sci., 74: 191-202.
4. Thompson, R. C. (2008). The taxonomy, Phylogeny and transmission of Echinococcus. EXP. Parasitol., 119: 439-446.
5. Azlaf, R. & Dakkak, A. (2006). Epidemiological study of the cystic Echinococcosis in Morocco. Vet. Parasitol., 137: 83-93.
6. Craig, P. S.; Rogan. M. T. & Campos-Ponce, M. (2003). Echinococcosis: disease detection and transmission. Parasitology., 127: 5-20.
7. Mahmoud, S. S. (1980). Studies on hydatid disease in Mosul. M.Sc. Thesis. University of Mosul, Iraq.
8. Goossens, B.; Osaer, S.; Kora, S.; Chandler, K. J. & Petrie, (1998). Abttoir survey 0f sheep and goats in the Gambia. Vet. Res., 142: 277-281.
9. Njoroge, E. M.; Mbithi, P. M.; Gathuma, J. M.; Wachira, T. M.; Gathura, P. B.; Magambo, J. K. & Zeyhle, E. (2002). A study of cystic echinococcosis in slaughter animals in three selected areas of Northern Turkana, Kenya. Vet. Parasitol., 104: 85-91.
10. Azordegan, N.; Yazdankhah, A. & Pouraliakbar, H. (2007). Hydatid disease of the spleen. Travel. Med. Infect. Dis., 5: 60-61.
11. SAS. Statistical Analysis System, (2004). Users Guide. Statistical Version 7th ed. SAS. Inst. Inc. Carj. N. C. USA.

12. Blancas, M. M.; Herrera, E. R.; Rodriguez, P. C.; Tavizon, J. P.; Mercado, R. M.; Badillo, A. V.; Echavarria, F.; Lopez, S. A. & Mondragon, C. (2007). Gender as a factor of susceptibility to infection in experimental hydatidosis. Rev. Latinoam. Micribiol., 49: 31-37.
13. Baldock, F. C.; Arthur, R. J. & Lawrence, A. R. (1985). A meatworks survey of bovine hydatidosis in southern Queensland. Aust. Vet. J., 62: 238-243.
14. Pal, R. A. & Jamil, (1986). Incidence of hydatidosis in goats, sheep and cattle. Pak. Vet. J., 6: 69-85.
15. Ibrahim, M. M.; Al-Ghamdi, M. A. & Al-Ghamdi, M. M. (2008). Helminths community of veterinary importance of livestock in relation to some ecologicaland biological factors. Turkiye Parazitol. Derg., 32(1): 42-47.
16. Kebede, N.; Mekonnen, H.; Wossene, A. & Tilahun, G. (2009). Hydatidosis of slaughtered cattle in Wolaita Sodo Abattoir, Southern Ethiopia. Trop. Anim. Health Prod., 41(4): 629-633.
17. Dalimi, A.; Motamedi, G. H.; Hosseini, M.; Mohammadian, B.; Malaki, H.; Ghamari, Z. & Ghaffari Far, F. (2002). Echinococcosis/hydatidosis in western Iran. Vet. Parasitol., 105: 161-171.
18. Pandey, V. S.; Ohelli, H. & Moumen, A. (1988). Epidemiology of hydatidosis/ Echinococcosis in Quarzazte, The Presaharian region of Morocco. Ann. Trop. Med. Parasitol., 82(5): 461-47.
19. Al-Yaman, F. M.; Assaf, L.; Hailat, N. & Abdel-Hafez, S. K. (1985). Prevalence of hydatidosis in slaughtered animals from North Jordan. Ann. Trop. Med. Parasitol., 5: 501-506.
20. Daryani, A.; Sharif, M.; Amouei, A. & Nasrolahei, M. (2009). Fertility and Viability rates of hydatid cysts in slaughtered animals in the Mazandaram Province, Northern Iran. Trop. Anim. Health Prod. May 20.
21. Al-Autabbi, R. (1983). Fertility and Viability of hydatid cysts in some intermediate hosts in Iraq. M.Sc. Thesis. College of Medicine. University of Baghdad.
22. Harandi, M. F.; Hobbs, R. P.; Adams, P. J.; Mobedi, I.; Morgan-Ryan, U. M. & Thompson, R. C. (2002). Molecular and morpho-logical characterization of *Echinococcus granulosus* of human and animal origin in Iran. Parasitol., 125: 367-373.
23. Manterola, C.; Vial, M.; Melo, A.; Oberg, C. & Fonseca, F. (2006). Viability and Fertility of human hepatic hydatid cysts. World. J. Surg., 2: 227-232.