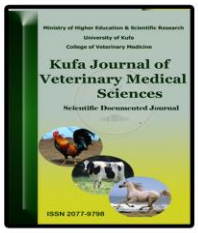
Kufa Journal for Veterinary Medical Sciences Vol.(5). No.(2) 2014

Kufa Journal for Veterinary Medical Sciences

www.vet.kufauniv.com



Epidemiological and Histopathological study of Hepatic Hydatidosis in slaughter animal house in AL- Najaf AL- Ashraf Province

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Abstract

The study was carried out in Al-Najaf slaughterhouse to show the prevalence of hydatid cysts among the slaughtered animals during the period from 1/1/2011 to 31/12/2011 , the slaughtered animals were local breeds , both sex (male & female) , different ages and from different region in Al-Najaf province . the hydatid cysts was examined grossly by naked eye and palpation . The study was conducted on 114717 slaughtered animals (21799 cattle , 51332 sheep , 41586 goats) . The morbidity of hydatidosis was 0.93% in cattle , 0.62% in sheep and 0.61% in goats .

The gross pathological changes of liver revealed variety necropsy findings represented by enlargement, discoloration to dark and red zones surrounding the hydatid cysts as responses to the inflammatory reaction. Cysts mostly protruded from the surface of the organ and sometimes embedded in the parenchyma. White wall covered the cysts has been observed .

The histological changes of livers represented by infiltration of inflammatory cells such as neutrophils, monocytes and phagocytes. Hepatocytes appeared separated from each other and there was vaculation in liver tissue, which contain huge number of kupffer cells .

Key words: Epidemiological, Histopathological , Slaughtered animals, Hydatid cyst, Al-Najaf Al-Ashraf, Iraq.

دراسة وبائيه ومرضيه بداء الأكياس المائية في الحيوانات المذبوحة في مجزرة النجف الاشرف

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الخلاصة:

اجريت الدراسة مسحية لبيان مدى انتشار الاصابة بداء الاكياس المائية في الابقار والاغنام والماعز المجزورة في مجزرة النجف الاشرف للفترة من 2011/1/1 الى 2011/12/31 . ان الحيوانات المجزورة كانت من السلالات المحلية ومن مناطق مختلفة لمحافظة النجف الاشرف ومن كلا الجنسين وبأعمار مختلفة . استخدم الفحص العياني والجس باليد للكشف عن اصابات الاكياس المائية , تبين من فحص 114717 من الحيوانات المذبوحة في المجزرة ان 21799 حالة عائدة للابقار و 51332 للاغنام و 41586 للماعز) وقد كانت نسبة الاصابة في الابقار 0.93% و الاغنام 0.62% و الماعز 0.61% .

بين الفحص العياني للكبد تغيرات مرضية متباينة تمثلت بتضخم الكبد وتغير لونه إلى اللون الغامق مع ظهور حلقة حمراء حول الكيس المائي نتيجة للتفاعلات الالتهابية. وكما لوحظ تواجد الأكياس المائية على السطح الخارجي وفي متن الكبد مع وضوح الغشاء الأبيض الذي يغطي الكيس من الخارج .

أما التغيرات المرضية النسجية للكبد فقد تمثلت بارتشاح اعداد كبيرة من الخلايا الالتهابية كالخلايا العدلة والخلايا الوحيدة والخلايا البلعمية مع ظهور تباعد في الخلايا الكبدية عن بعضها وارتشاح اعداد كبيرة من خلايا كوفر في أنسجة الكبد. .

Introduction:

The first described of disease which is synonym for the infection with hydatid cyst was in Bible and also referred to by the Babylonians, the disease has been described by Hippocrates (460-379 BC) that the liver is filled with water and cause serious illness and when the outburst may lead to death (1) . The Greeks description of these worms and named it ***Lumbricus latus*** meaning broad worms, and these facts remain for many centuries(2).

hydatid cyst are considered aquatic larval stage of the worm ***Echinococcus granulosus*** and the worm reside in the intestine of dogs and other canids and the length of the worm 2-8mm. Infection occurs as a result of contamination of food of human or animal by dog's feces containing tapeworm eggs, as well as friction or contact with infected dogs (3). After eating animal or human for these eggs, they hatch and out of hexacanth embryo to reach the intestines into the blood and then to move to the liver, lungs, and various places in the body forms the hydatid cyst, which ranges between 1-15 cm (4).

This disease Spread in the internal organs, especially the liver and lungs, which are most important in the incidence of human and other intermediate hosts, dogs and foxes are final hosts of the disease (5), Echinococcosis is the most important diseases that infect animals, which mentions that it is zoonotic diseases transmitted to human from dogs and other final hosts, where most of the world suffer from the spread of this disease, especially developing countries (6). This disease in Iraq in terms of epidemiological consider Hyper endemic to the presence of large numbers of stray dogs infected with adult *Ecinococcus granulosus* which discard eggs containing hexacanth embryo, which in turn infect intermediate hosts (7), also the disease in Iraq called cancer of Iraq (8).

Due to the spread of this disease in productive animals broadly, it is classified among the diseases that cause significant economic losses in livestock as a result of the destruction of the affected organs with hydatid cysts such

as the liver and lungs in addition to the indirect losses as less the production of milk, meat and few births and sensitivity to other diseases (9).

According to great importance of this disease, this survey of infection was conducted in the province of Al-Najaf Al-Ashraf .

Material and Methods

The study was conducted in the slaughterhouse of the province of Al-Najaf from 1/1/2011 to 31/12/2011. Where they were taking statistics from official records in the slaughterhouse, in addition to visit to the slaughterhouse, for this purpose. The number of slaughtered cows 21799 , sheep 51 332 and goats 41 586. The slaughtered animals were of local breeds and different ages. Carcasses were examined to note the hydatid cyst in the viscera through visual examination and palpation to see the size of the cysts and spread sites. sometimes scalpel was used to distinguish them from other similar lesion such as cysts and tumors, among others.

Collect of Hydatid cyst samples :

After macroscopic examination of the organs and palpation. Small specimen that contain part of hydatid cyst were taken from the infected organ and transferred to clean container (with 10% formalin) which learned number with date, animal species and infected organs the specimens were transferred to a laboratory of microbiology at the College of Veterinary Medicine of University of Kufa till examined.

Results:

Infection in cows:

The total percentage of infected cows with hepatic hydatid cyst was 0.93% and the highest infection rate was 2% in May while the lowest rate was 0.28 % in February.

It is statistically significant ($p<0.05$) table (1).

Table (1): percentage of infection of slaughtered cows with hydatid cyst disease distributed on year months.

Month/ 2011	cows		Infection rate %	
	slaughter	infected		
January	1989	10	0.5	ab *
February	2802	8	0.28	cb
March	1165	13	1.11	ca
April	2081	30	1.44	ad
May	1500	30	2	ae
June	1653	7	0.42	fa
July	1818	31	1.7	ga
August	1803	19	1.05	ha
September	1733	16	0.92	ia
October	1574	10	0.63	ja

November	1773	14	0.78 ka
December	1908	15	0.78 ia
Total	21799	203	0.93

* The same letters indicates that the differences were not significant (p<0.05).

Infection in sheep:

The total percentage of infected sheep with hepatic hydatid cyst was 0.62% and the highest rate of infection was 1.07% in May while the lowest rate was 0.3% in October.

The differences in percentages of infection among months of year not reach to level of significant (p>0.05) table (2).

Table (2): percentage of infection of slaughtered sheep with hydatid cyst disease distributed on year months.

Month/ 2011	sheep		Infection rate %
	slaughter	infected	
January	3623	25	0.69 ab *
February	2802	10	0.35 bc
March	3241	20	0.61 ca
April	5837	43	0.73 da
May	4289	46	1.07 ea
June	4546	26	0.61 fa
July	4546	34	0.74 ga
August	4357	25	0.57 ha
September	4886	28	0.57 ia
October	4317	13	0.3 ja
November	4979	29	0.58 ka
December	4202	20	0.47 ia
Total	51332	319	0.62

* The same letters indicates that the differences were not significant (p<0.05).

Infection in goats:

The total percentage of infected goats with hepatic hydatid cyst was 0.61% and the highest infection rate was 1.37% in May while the lowest rate was 0.095 % in February.

It is statistically significant ($p<0.05$) table (3).

Table (3) percentage of infection of slaughtered goats with hydatid cyst disease distributed on year months.

Month/ 2011	goat		Infection rate %
	slaughter	infected	
January	2622	20	0.76 ab *
February	2102	2	0.095 bc
March	2028	15	0.73 ca
April	3768	37	0.98 da
May	2765	38	1.37 ea
June	14536	22	0.15 fa
July	2667	31	1.16 ga
August	2751	19	0.69 ha
September	3061	20	0.65 ia
October	2613	12	0.45 ja
November	2987	19	0.63 ka
December	2747	19	0.69 la
Total	41586	254	0.61

* The same letters indicates that the differences were not significant ($p<0.05$).

Gross changes:

The macroscopic pathological changes of infected livers characterized by large size and amplified in a clear and well marked changes macroscopic sore color, especially in the case of the large size of hydatid cyst, where the color of the liver dark red with the appearance of a red ring around those cysts because of the inflammatory processes that occurred in the liver tissue as well as increased fibrous tissue between lobes of the liver with the presence of yellow spots or necrotic patches between cysts in some areas.

Forms of hydatid cyst varied between circular and oval or irregular shape as a result of extending it in different directions to impede its growth and its intersection with the blood vessels and bile ducts or other hydatid cyst. Cyst appeared as distinct sweeling in infected tissue. hydatid cyst Was seen surrounded by fibrous capsule white in color soft texture with the presence of inflammatory signs on infected surfaces, as clarified easily separated hydatid cyst from liver tissue. The hydatid cysts container on yellow liquid or colorless liquid known as Hydatid fluid.

In the case of calcified hydatid cysts, were macroscopic changes similar to what previously reported, with some variations, where the color and shape of the infected liver are normal in most cases and cysts singly or in small multiple sizes as a prominent solid nodules or embedded within tissue and when opened found that some of the material to be necrotic and devoid of the hydatid fluid completely.

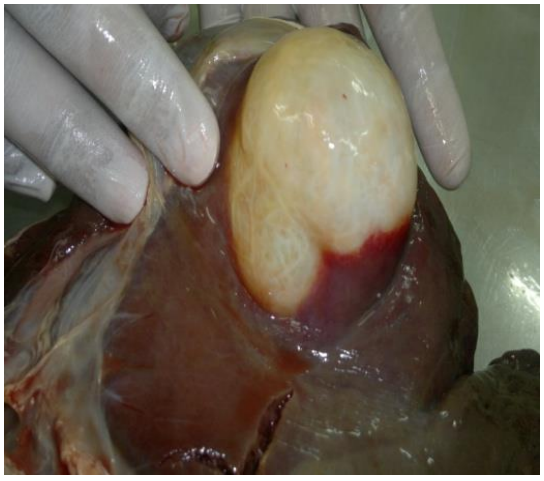

Figure (1): Liver of cow infected with hydatid cysts large and prominent and surrounded by a red ring because of inflammatory processes.

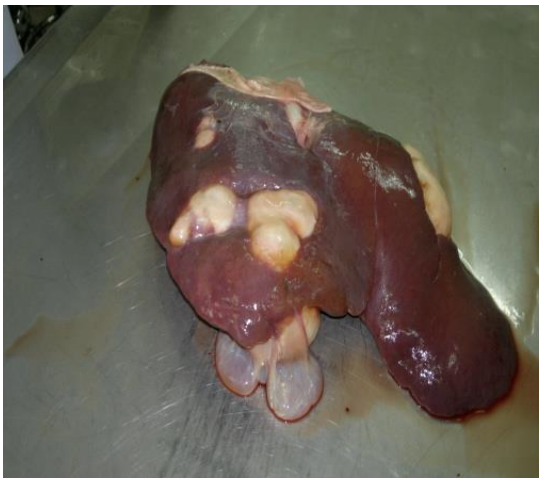

Figure (2): Liver of cow infected with hydatid cysts superficial and scattered randomly on the surface of the liver.

Microscopic changes:

The microscopic histopathological changes characterized by of severe infiltration of large numbers and amounts of inflammatory cells including lymphocytes and monocytes cells eosinophils and neutrophils, as well as plasma cells which large in size particularly in the paranchyma of liver and around the fibrous capsule surrounding the hydatid cysts .

It was observed a significant increase in the number of Kupffer cells in the liver tissue, as well as to the presence of hemorrhage was observed in liver tissue and hepatic vascular congestion and the presence of yellowish granules represent bilirubin material in the liver tissue.

In addition to a large spread of fibrous tissue in hepatic tissues and around the hydatid cysts, as well as note the existence of some debris. histological sections taken from the livers of cows Show presence fibrous layer, laminar and germinal layers.

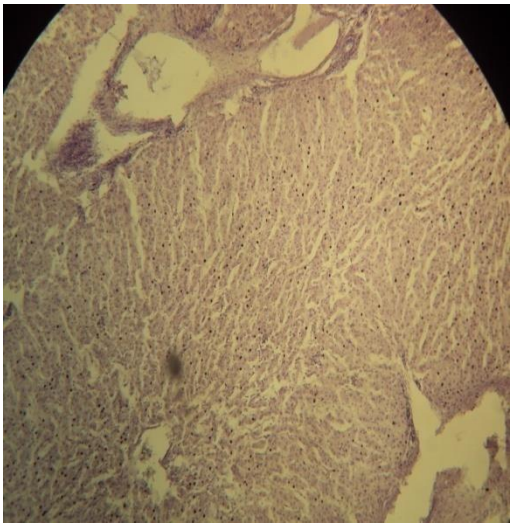

Fig.(3): section in the liver of a cow infected hydatid cyst showing the three layers of the cyst (fibrous (outer), laminar (mid) and germinal (inner) (hematoxylin - eosin 100X).

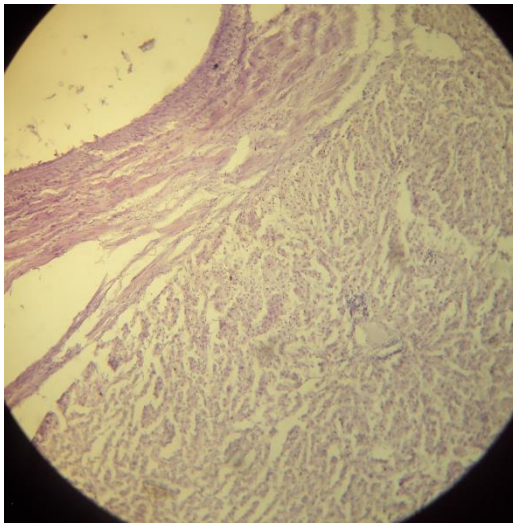

Fig. (4): liver section of a cow infected with hydatid cyst showing degeneration and necrosis with infiltration of inflammatory cells (hematoxylin - eosin 100X).

Discussion:

A number of researchers studied the case of the spread of this disease in Iraq and show that the prevalence of this disease has increased in the areas of animal breeding in recent times due to the lack

of periodic tests for dogs and poor health care for livestock. This disease is endemic in environmental areas where dogs -livestock -human are found because the parasite's life cycle will be completed (10).

The results of the current study showed that the incidence of hydatid disease in cows was 0.93%, and this result was agree with the result that record by (11) in Mosul, a ratio of 0.55%, approaching from the results of each of (12) in Kirkuk 4.38% and (13) , (14) in Diwaniyah and (15) in Iran, where he pointed out that the percentages are 42. 5%, 21.3% and 23%, respectively.

The difference in the infection rates return to several reasons, including the number of samples where the great studied numbers give real representative results, as well as the short duration of the study, whenever the longest study period, it will reflect a comprehensive picture of the disease in the conducted study region, the geographical location of the area and the surrounding environmental conditions, where temperature and humidity are considered important factors affecting the life cycle of *Echinococcus granulosus* and hatching the egg. There are also environmental conditions conducive to the growth and activity of eggs of *Echinococcus granulosus* where live for only a few hours in warm conditions where it's dry when exposed to sunlight and not hatching in the final host (16). Lack of health control and the prevalence of cases of slaughtering outside slaughterhouses and not to quarantine the remnants of the slaughterhouses infected with hydatid cysts and default the infected carcass and not removing and easily taken by stray dogs, and also the large number of stray dogs in the areas and lack of control and lack of good treatment for the parasite in dogs has considerable intervention in aggravation the problem, also the ways of animal husbandry and free grazing for animals and dogs accompanying the herds in the pasture and the nature of grazing, as well as the age of slaughter animals since most cows are slaughtered between the small ages due to quality of their meat, which does not allow for hydatid cyst to grow in this relatively short period, this is because the hydatid cyst takes several months (6-8 months) to get to the cystic larva (17, 18).

Also percentage of infection of sheep with hydatid cysts recorded 0.62% and this approximated from that record by researcher (19) in Sudan and differs from the percentages referred to by each of the researcher (20) in Iran , the differences in infection rates was caused by environmental conditions and geographic location where the environmental conditions of Al-Najaf city characterized by high temperatures for most of the year and the occurrence of drought in the summer and the end of spring and the beginning of autumn, and this has a negative effect on growth of the hydatid cyst because the eggs that are discarded from the final host is not tolerant drought for a short period of time, as the duration of the eggs ranges from three days to one year depending on the appropriate environmental conditions as humidity

and temperature (where the eggs tolerate a wide range of temperatures - 30 °c to 38 °c), the infection of intermediate host depends on the average number of eggs and activity, as well as the severity of infection and the effect of the disease depends on the natural and acquired immunity and this depends on the age and sex of the animal and healthy and physiological state (17).

In goats the total infection rate 0.61% and this was close to ratios mentioned by the researcher (11) 0.52% and (12) where the recorded ratio 0.32% and (19) a percentage 1.85% and differs from the ratios obtained (8) in Iraq has recorded 25.6% and (21) in Syria 22% , this difference is due to environmental conditions and geographic location and size of the sample as the local breeds of goats more resistant than other breeds.

The results of the current study variation in the rates of infection in different months of year as it recorded the highest ratios in May for different animals (cows, sheep and goats) , the reason may be return to nature of feeding and grazing and contamination of pastures with pathogens as well as the size of tested sample in different months play a role in the variation of these ratios.

Gross and histopathological changes of infected livers:

During examination of livers infected with hydatid cysts, observed macroscopic pathological changes refered to presence of inflammatory markers in those organs in addition to notice those cysts in various places, including surface and deep in tissues. signs indicate that inflammation in most cases were chronic as a result of the emergence of fibrosis around the hydatid cysts and liver tissue, but the red-dark frame about the cyst, it indicate the increased aggregation of blood in the affected regions as well as the dense inflammatory cells inside or near the infected foci with hydatid cyst was deep or superficial.

The histologic changes has proved what has been shown in macroscopic study. sections derived from the infected livers revealed that dense infiltration of inflammatory cells as macrophages, neutrophil, monocyte in addition to the presence of large numbers of kupffer cells eosinophilus with a considerable damage in liver cells ranged between degeneration and necrosis, also high distribution of fibrous tissue in hepatic tissue as well as notice laminate and germinal layers.

That gross and histopathological changes which seen in current study were not systemic (asymptomatic) but probably came as a natural complications that can result from the pressure of hydatid cysts on adjacent tissues, especially near large cysts (22).

findings of the present study similar to that found by other researchers as (23) in their study about buffalo infection with hydatid cysts which revealed a considerable damage in parenchymal tissues of liver and tissue around the cyst be solid because of the fibrous capsule formed around

the cyst with additional cellular interactions in the area surrounding the cyst because of large infiltration of cells generating of fibers with infiltration of monocyte and eosinophilus, and that these changes may also referred by (24) and (25).

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