PREVALENCE OF HYDATID DISEASE AMONG SLAUGHTERED ANIMALS IN SLEMANI PROVINCE/ KURDISTAN-IRAQ.

Wijdan M.S. Mero,* Jaladet M.S. Jubrael,** and Abdullah A. Hama,***

*Department of Biology, Faculty of Science, University of Zakho, Zakho, Kurdistan -Iraq.
**Scientific Research Centre, Faculty of Science, Duhok University, Duhok, Kurdistan -Iraq.
*** Department of Nursing, Slemani Polytechnic University, Halabja Technical Institute Slemani Kurdistan -Iraq.

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Abstract

Hydatid cyst (HC) is one of the common silent zoonotic disease worldwide distributions, with medical importance and economical effect. The present study was conducted from January 2011 to March, 2012 to determine the prevalence rate of hydatid disease among slaughtered livestock including sheep, goats and cattle in Slemani province. A total of 7698 slaughtered animals were examined from different abattoirs for hydatid cyst during post mortem inspection including 6550 sheep, 348 goats and 800 cattle. The study showed that the prevalence rates among slaughtered animals were 12.7% in sheep, 4.8% in goats and 4.3% in cattle. The fertility rate of HCs was higher in sheep than that of goats and cattle furthermore, the rate of the fertility was higher in liver cysts than in lung cysts in all studied intermediate hosts.

KEYWORD: Hydatid cyst, E.granulosus, prevalence, Hydatid Disease

Introduction

Echinococcosis or hydatid Disease is one of the neglected silent helminthes infection caused by the larval stages of cestode belonging to the genus Echinococcus (family Taeniidae), which is a major public health problem in developing countries (Siracusano et al., 2012). The larval infection is characterized by long-term growth of the metacestode in the intermediate host (Zhang et al., 2003).

Hydatid disease has a dual impact on human health and livestock production. Human populations dependence on livestock are not only most at direct risk from zoonotic disease, but are most vulnerable to the indirect impacts on health, or reduced production on livelihoods and food security, which exacerbates the poverty cycle (Molyneux, et al., 2011). Humans become infected accidentally by ingesting food or water contaminated with fecal material containing E. granulosus eggs passed from infected carnivores, or when they handle pet or infected dogs (WHO, 2006; Satoskar, et al., 2009). The commonest sites of infection are the liver and lungs (Markell et al., 1999), whereas, it was noticed that the disease cannot be transmitted between humans or from human to dogs (Rood and Kelly, 2009).

There are six species of Echinococcus: E. granulosus, E. multilocularis, E. vogeli, E. oligarthrus, E. shiquicus and E. felidis (Brunette, 2012), two of these species are of medical importance, which are E. granulosus and E. multilocularis causing Cystic Echinococcosis (CE) and Alveolar Echinococcosis (AE), respectively. This study aimed to determine the status and analysis of epidemiological factors of hydatid disease among slaughtered domestic animals in Slemani province.

Materials and methods:

A total of 7698 slaughtered animals of both sexes were examined for hydatid cyst during post mortem inspection including 6550 sheep, 348 goats and 800 cattle. Livers and lungs were inspected by cutting, and both surfaces were examined by incisions as well as examined through visual inspection. The Hydatid cyst fluid (HCF) was collected from individual cyst, washed by phosphate buffer saline (PBS) and checked for the presence of protoscolecies (Latif et al., 2010).

The investigation of hydatid cysts was carried out for the following parameters: location of cysts (organ specificity), cyst fertility and viability of protoscolecies. Animal intact cysts were obtained from Slemani abattoir, which included 10 individual cysts from goat, 12 from cattle and 20 cysts from sheep. The samples were transported to the laboratory in a cool box. Individual cysts were grossly investigated for degeneration and calcification (WHO, 2003). Then according to the animal species, size of cyst and infected organs around 10% of hydatid cysts were randomly selected for fertility and viability study.
Fertility and Viability

After aspiration of cyst fluid, the fluid was centrifuged, then one drop of precipitated was taken by Pasteur pipette and examined by light microscope under (40x) for the presence of protoscoleces. The cysts which were without protoscoleces were considered as non fertile (Daryani et al., 2006). Eosin dye (vital stain) was used for determination of viability of protoscoleces (Daryani et al., 2006). The protoscoleces with inactive flame cell or stained with eosin considered as dead (Esfahani and Youssefi, 2010).

Statistical analysis

The data were analyzed using chi-squire (GraphPad Prism 6).

Results

The result revealed that the prevalence rate of Echinococcosis was significantly differences (p<0.05) between all animal species (Table1). The prevalence rate of HC in sheep, goats and cattle was 12.7%, 4.8% and 4.3%, respectively. The highest rate of infection was observed in sheep followed by goats and cattle. The results of the present study showed that the sex of the slaughtered animals has non significant effect on the distribution of HC, as the rate of HC in males and females were very close (Table 1).

Table (1): The prevalence rate of HCs among different slaughtered animals in Slemani province.

<table>
<thead>
<tr>
<th>Species</th>
<th>No. of inspected animals</th>
<th>No. of Infected</th>
<th>Rate of infection %</th>
<th>Total infected</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
<td>Total</td>
<td>Male</td>
</tr>
<tr>
<td>Sheep</td>
<td>2400</td>
<td>4150</td>
<td>6550</td>
<td>313</td>
</tr>
<tr>
<td>Goats</td>
<td>227</td>
<td>121</td>
<td>348</td>
<td>11</td>
</tr>
<tr>
<td>Cattle</td>
<td>700</td>
<td>100</td>
<td>800</td>
<td>31</td>
</tr>
<tr>
<td>Total</td>
<td>3327</td>
<td>4371</td>
<td>7698</td>
<td>355</td>
</tr>
</tbody>
</table>

Sex: $X^2 = 3.32$ p = 0.68 df=1
Species: $X^2 = 54.24$ p = 0.0002 df=2

Organ specificity

The distribution of HCs in various organs among slaughtered animals is shown in Table (2). The present study revealed that the co-infection of the liver and lungs was the predominant infection and the preponderant site of hydatid cyst was the liver followed by lungs, this indicates that the liver is the primary site for cyst development and lung involvement comes as a secondary consequence.

Table (2): Distribution of hydatid cysts in the internal organs among slaughtered animals in Slemani province.

<table>
<thead>
<tr>
<th>Species</th>
<th>No. of inspected animal</th>
<th>No. and % of infection</th>
<th>Infected organs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td></td>
<td>Liver</td>
<td>Lung</td>
<td>Liver and Lung</td>
</tr>
<tr>
<td>Sheep</td>
<td>6550</td>
<td>835</td>
<td>12.75</td>
</tr>
<tr>
<td>Goats</td>
<td>348</td>
<td>17</td>
<td>4.89</td>
</tr>
<tr>
<td>Cattle</td>
<td>800</td>
<td>35</td>
<td>4.38</td>
</tr>
<tr>
<td>Total</td>
<td>7698</td>
<td>887</td>
<td>11.52</td>
</tr>
</tbody>
</table>

$X^2 = 60.2$ p= 0.0001 df=2
Type of cysts

The nature of the isolated cysts of slaughtered animals was studied on the base of fertile, sterile and calcified (Table 3). In sheep, the rates of fertile, sterile and calcified cysts among 100 examined cysts were 86, 9 and 5%, respectively. In goats, the rates of fertile, sterile and calcified cysts among 40 examined cysts were 60, 20 and 20%, respectively. The same pattern was observed in cattle, 58, 22 and 20%, respectively.

Table (3): The number and percentage of cyst types in different intermediate hosts

<table>
<thead>
<tr>
<th>Intermediate host</th>
<th>No. of cysts</th>
<th>Type of cysts</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Fertile</td>
<td>Sterile</td>
<td>Calcified</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Sheep</td>
<td>100</td>
<td>86</td>
<td>86</td>
<td>9</td>
<td>9</td>
<td>5</td>
</tr>
<tr>
<td>Goats</td>
<td>40</td>
<td>24</td>
<td>60</td>
<td>8</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>Cattle</td>
<td>50</td>
<td>29</td>
<td>58</td>
<td>11</td>
<td>22</td>
<td>10</td>
</tr>
<tr>
<td>Human</td>
<td>12</td>
<td>10</td>
<td>83.3</td>
<td>1</td>
<td>8.3</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>202</td>
<td>149</td>
<td>73.7</td>
<td>29</td>
<td>14.3</td>
<td>24</td>
</tr>
</tbody>
</table>

X² = 19.22     p = 0.003    df = 6

Discussion

The highest rate of infection was observed in sheep followed by goats and cattle. Similar high rate of infection in sheep have been reported by Amin (2007) in Slemani, Al-Berwari (2012) and Abdullah and Mero (2013) in Duhok, they suggested that due to the host specificity and strain distribution in this region, in addition in Kurdistan sheep are more desirable for rearing due to their consumption preference to fulfill religious and social requirements and they are more adapted with dog than goats or cattle also their feeding habit have effect on the infection rate.

On the other hand, lower rates were reported by Bajalan (2006) in Kalar; Kadir and Rasheed, (2008) in Kirkuk, and Jarjees and Al-Bakri, (2012) in Mosul. The low prevalence rate in goats, in the present study may be due to feeding habit of this animal, as they eat the higher parts of herbage that are exposed to the sunlight which decrease the viability of the eggs (Torgerson and Budke, 2003), also the low prevalence rate of HC among cattle in the present study may be due to rearing them in cowshed with better care which relatively has no contact with the source of infection (Thompson and McManus, 2002).

In contrast Meerkhan and Abdullah, (2012) in Duhok, reported higher infection rates among cattle than in sheep and they attributed it to the fact that cattle are slaughtered at older age which increase the risk of exposure to eggs of E. granulosus and cattle eat larger amount of herbage than sheep and goats.

This difference in prevalence rate among livestock attributed, to the mode of grazing, presence of the definitive host (carnivore) and other environmental factors. El-Ibrahim (2009), and the strains of the parasite also have essential role in HC distribution which is known as host specificity (Hama et al., 2012).

The results of the present study revealed that the sex of the slaughtered animals has no effect on the prevalence rate of HCs, as the rate of HC in males and females were very close. This finding is in agreement with Rokni (2009) and Salem et al. (2011) they stated that both sex has the same chance to get infection which usually depend on the contact with the source of infection and habit of grazing. In contrast Ibrahim (2010) and Muqbil et al. (2012) reported that females of sheep and goats were more likely to have HC infection than males as males were slaughtered in younger age while female sheep and goats were usually maintained for longer periods than males to give offspring several times before slaughtering.

Organ specificity

The present study revealed that the co-infection of the liver and lungs was the predominant infection and the preponderant site
of hydatid cyst was the liver followed by lung, this indicates that the liver is the primary site for cyst development and lung involvement comes as a secondary consequence. Similar findings were reported by many researchers from different parts of the world Saida and Nurraddin (2011) in Erbil; Muqbil et al. (2012) in Baghdad; Ioan et al. (2012) in Romania, and Jarjeees and Al-Bakri (2012) in Mosul they stated that the liver acts as the first barrier for the oncosphere penetrating the intestinal mucosa to reach the portal vein and carried by the blood stream to all parts of the body, due to the large size of oncosphere, most of them become settled in the liver. On the other hand, the results of this study did not coincide with those of some other workers in which they found that the lungs were the most predominant site for Echinococcosis Abdullah, (2010) in Duhok and Lotfi et al. (2010) in Iran they attributed it to the larger lymphatic vessels which provides a chance for the oncosphere to reach lymphatic lacteal then travel through the lymph to the lungs before being translocated in venules to reach the liver, or the oncosphere may be released from the egg during rumination which may gain access to the lung.

Type of cysts

In the present study the majority of cysts in sheep (86%) and goats (60%) were fertile, while the fertility rate of HCs in cattle was lower (58%) than in sheep and goats, this indicate that sheep and goats have an essential role for the perpetuation of the life cycle then spread of the disease.

These results are consistent with Ioan et al. (2012) in Romania and Jarjeees and Al-Bakri (2012) in Iraq. The fertility rate of hydatid cyst is an important factor in the epidemiological studies, due to the possibility of fertile cysts to disseminate the disease and to determine the main species as a potential host in the spread of the infection (Mahmoud, 1980). The variation in fertility rate among different intermediate hosts due to the difference in strain of E. granulosus (Hama et al. 2013).

In contrast Saeed et al. (2000) and Fikire et al. (2012) found that the fertility rate was higher in the lung cysts than in liver cysts and they attributed it to the relatively softer consistency of lung tissue which allows the easier development of the cyst. The fertility of hydatid cysts varies depending on the host species (Saeed et al., 2000). The variation in the prevalence rate of fertile cysts in different intermediate hosts in the present study may be due to the presence of different strains of E. granulosus which might cause the variation in the fertility rate in various environmental regions (McManus, 2006).

References:


ريعدي بلو بونوهدي نخوشى توردكى ناوى
ساربراووكان له پارزگای سليماني/ كوردستان-عراق

توردكى ناوى یعکبکه له نخوشیه بیندتهگه شارواوكان و له نخوشیه سرچاوه نازدلیه کانه، وه
ناسمرتاساري جهاندار بیریلاووه، کاریگاری هایه له اسم تعیترستو و ووه نایبکر کومالگا، نام
تویزینهیوهی ناجام دار له ماووی کانوی یاکام 2011 تا نازاري 2012 بؤ دیاری کردنی ریزه
بلاو بونوهدي نخوشی توردكى ناوى له نیوان نازدله ساربراواوكانا (مار، بزن و هرهشولوم) له
پارزگای سليماني و یوهشکنین بؤ 7698 سمار نازدل كر پاش ساربرین بؤ زاییى توش بوون به
نخوشی ساربراواوكانا ناوى له کوشتاره جیا یاکی پارزگای سليماني كه پریتی بوون له
650 سمار مار، 348 سمار بزن و 800 سمار دیه و خلاک. ریزه توروشبوون براتی بوو له 12% له
محذر دا، 60% له بزن دا و 3% له رهمشولوم دا. تیکرای ریزه پابریتی لهو توردكه نازیاتى
که له مار و ودرگیربیه زیایتیوو نوهاهی كه له بزن و رهمشولوم و ودرگیربیون هارووها
نامره زانیارا كه نام ریزه له توردكامه كه له گچرموه و ودرگیراون زیاته نوهاهی كه له
سیهکامووه و ودرگیراون له هاموو نازدله کاندا.

نسبه انتشار داء الاكياس المالية (Hydatid cyst) بين الحيوانات المذبوحة في محافظة السليمانية/
كردستان-العراق

المcaracterísticas:
داء الاكياس المالية هو أحد الامراض المخلاصة ذو النشأة البيئية، وله انتشار عالمي، وله تأثير على اقتصاد في المجتمع. أجريت
هذة الدراسة خلال الفترة من كانون الثاني 2016 إلى الآذار 2017 تلتحديد نسبة انتشار داء الاكياس المالية بين الحيوانات المذبوحة والتي
تضمنت الاكياس والدجاج والمواشي في محافظة السليمانية، وتم فحص والتحري على 7998 حيوان تم ذبحهم في مختلف المخازن للتحري
عن داء الاكياس المالية ولشمل 655 رأسا من الاكياس و488 دجاج و8300 من المواشي. بلغت نسبه الانتشار لهذا الداء 12% في الاكياس و4.8% في الدجاج و4.3% في المواشي. وجد علی معدل نسبة الخصوبة لاكياس المالیة في الاكياس والتي كانت علی
مما هي عليه في الدجاج والمواشي. وأيضاً لوحظ أن معدل الخصوبة كان أكثر في الاكياس المعروفة من الكبد مقارة بالاكياس المعروفة من
الرنة في جميع الحيوانات التي تمت دراستها.