

A surveillance study on condemnation of ruminant's livers and lungs due to common disease conditions in Kerbala abattoirs

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Abstract:

A slaughterhouse study was conducted in Kerbala abattoirs during the period of January 2012 to December 2012 in order to determine the condemnation rate of liver and lungs of slaughtered ruminants due to common notifiable diseases. Diseases and lesions of livers and lungs were diagnosed based on pathological changes of organ color, size, morphology, consistency, presence of lesions and parasites. Out of 89571 heads of slaughtered sheep, goats, cattle and buffaloes which were examined during this study, a partial or complete condemnation of livers and lungs was carried out in 1114 (1.24%), 259 (0.29%), 392 (0.44%), 587 (0.66%) and 327 (0.37%) of the slaughtered animals due to hydatidosis, fascioliasis, lung worms, pneumonia and hepatitis respectively. The highest infection rate of the condemned livers in slaughtered ruminants was due to hydatid cysts 660 (0.74%), followed by hepatitis 327 (0.36%) and liver fluke 259 (0.29%), with a significant difference between condemned livers in the animal species ($P < 0.05$). The livers of 0.69% sheep, 0.84% goats, 0.87% cattle and 1.03% buffaloes harbored hydatid cysts. However, lungs of slaughtered ruminants were frequently rejected due to pneumonia (0.66%) , followed by hydatid cyst (0.51%) and lung worms (0.44%). The findings of the current study revealed that condemnation of sheep, goats, cattle and buffalo's livers and lungs in Kerbala abattoirs due to parasitic infestation and pathological lesions representing significant economic losses. Accordingly, efforts should be spent for minimizing the prevalence of these diseases through destruction of intermediate hosts, deworming program and good animal husbandry.

Key words: condemnation , liver and lung diseases, hydatid cysts , Fasciola spp. , lung worms , hepatitis , Pneumonia, slaughterhouse, Kerbala.

دراسة ميدانية عن حالات إتلاف أكباد و رئات المجترات بسبب الحالات المرضية الشائعة في مجازر
محافظة كربلاء

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الخلاصة

أجريت دراسة في مجازر محافظة كربلاء خلال الفترة من كانون الثاني 2012 و لغاية كانون الأول 2012 لتحديد معدل إتلاف أكباد و رئات ذبائح المجترات بسبب عدد من الأمراض و الطفيليات التي تصيب هذه الأعضاء ، و التي تم تشخيصها

من خلال التغيرات المرضية في العضو المصاب فيما يخص اللون ، الحجم ، الشكل ، المحتوى ، وجود الآفة و كذلك وجود الطفيلي إضافة إلى الفحص المختبري . تم فحص ما مجموعه 89751 رأسا من الأغنام والماعز و الأبقار و الجاموس و قد وجد إن الإلتلاف قد حدث في 1114 (1,24%) بسبب الأكياس المائية ، 259 (0.29%) ديدان الكبد ، 392 (0.44%) ديدان الرئة ، 587 (0.66%) ذات الرئة و 327 (0.37%) التهاب الكبد. أوجدت الدراسة بان اعلي معدل لأتلاف الأكباد كان بسبب الأكياس المائية 660 (0.74%) و يليه التهاب الكبد 327 (0.36%) ثم ديدان الكبد 259 (0.29%) مع وجود فرق معنوي بين أكباد فصائل الحيوانات ($P < 0.05$)، كما أظهرت الدراسة بان أكباد 0.69% من الأغنام ، 0.84% من الماعز ، 0.87% من الأبقار و 1.03% من الجاموس كانت تحمل أكياسا مائية عند فحصها. و من جانب أخر أوجدت الدراسة بان رئات ذبائح المجترات كانت تتلف بالدرجة الأولى بسبب مرض ذات الرئة (0.66%) يليه الأكياس المائية (0.51%) ثم ديدان الرئة (0.44%). لخصت الدراسة الحالية بان إلتلاف أكباد و رئات ذبائح المجترات في كربلاء تمثل خسائر اقتصادية كبيرة ، و عليه يتوجب بذل الجهود الكافية للسيطرة على الطفيليات و الأمراض التي تصيب أعضاء هذه الحيوانات من خلال القضاء على المضايق الوسطية لهذه الطفيليات و كذلك إتباع برنامج مكافحة للديدان الداخلية إضافة إلى تحسين طرق عناية و تربية الحيوانات.

Introduction:

Food animals serve as vehicles of disease transmission. Beside economic losses, diseases of sheep, goats, cattle , buffaloes and camel might constitute an epidemiologic and zoonotic threat (1). As such problems concerning meat hygiene and possible health risks to the consumer should be documented during both ante-mortem and post-mortem examination. In this context, meat-inspection data are a potential source of information and have an important role to play in epidemiology and preventive veterinary medicine (2). Monitoring disease and other conditions at slaughter has been recognized as one way of assessing the disease status of a herd (3). Ruminants are commonly affected with hydatid cysts, *Fasciola* spp, *Dictyocaulus* spp. (4) causing considerable economic losses in form of mortality and partial or complete condemnation of the carcasses at abattoirs (5). In slaughtered ruminants , the high number of these helminthes infection (hydatidosis, fascioliasis and lung worm) lead to great loss of organs and carcasses which are the source of animal protein, in addition to loss of production and performance of animals (6).

In Iraq, the Comprehensive Annual Report/ 2012 which was conducted by the State Company for Veterinary Services on the pathological conditions (detected by veterinarians during routine meat inspection) revealed that hydatid cysts, liver fluke, lung worms, pneumonia and hepatitis were the most reported prevalent

disease conditions in slaughtered ruminants in all 15 central and southern governorates of the country (7) .

A cross sectional study which was conducted on distribution of liver and lung helminthiasis in domestic ruminants slaughtered at Kirkuk abattoirs by (8) revealed that the overall prevalence of helminthiasis in these animals was 2.5%. The same study also found that hydatid cyst was the most prevalent parasite (1.6%) followed by liver fluke (0.6%) then lung worms (0.2%). In another comparative study on liver and lung helminthes infections which was carried out in Kerbala slaughterhouses by (9) , the grand total prevalence of hydatid cyst infection was found to be the highest (3.16%) followed by Fascioliasis (1.32%) and lung worms (0.86%).

The prevalence of liver and lung helminthes , pneumonia and hepatitis in slaughtered animals was also studied by other workers such as (10)who reported that liver fluke was the most prevalent parasite (1.6%) followed by hydatid cyst (1.24%), and lung worms (0.19%), whereas the overall prevalence of pneumonia and hepatitis were 0.3% and 0.34% respectively. In Tanzania a slaughterhouse survey revealed that livers of cattle, sheep and goats were condemned due to 11 diseases/conditions namely, fasciolosis, hydatidosis, stilesiosis, calcified cysts, abscess, *Cysticercus tenuicollis* infection, telangiectasis,

hepatitis, fatty degeneration, melanosis and liver cirrhosis (1).

Echinococcus granulosus and its metacestode (hydatid cyst) in herbivores and humans have been recognized as the most important helminthes- zoonoses with great economic and public health significances in the developing countries (11). Nevertheless, apart from its veterinary and economic importance throughout the world, fasciolosis has recently been shown to be an emerging and widespread zoonosis affecting a number of human populations (12). Furthermore, as a zoonotic disease, the World Health Organization (WHO) estimated that 2.4 million people were infected with *Fasciola* in 1995 and a further 180 million were at risk of infection (13).

The purpose of this study was to investigate the condemnation rate of liver and lungs due to the most prevalent disease conditions reported in kerbala abattoirs.

Materials and methods:

The study was carried out at three main slaughterhouses of Kerbala during 12-month period extended from January 2012 to the end of December 2012, and involved inspecting liver and lung of ruminants slaughtered there. Livers and lungs of 66673 sheep, 9552 goats, 11591 cattle and 1755 buffaloes were inspected by visual examination, palpation and incision.

Diseases and lesions of livers and lungs were diagnosed based on pathological changes of organ color, size, morphology, consistency, presence of lesions and parasites. All partial and total rejected livers and lungs were undertaken further examination and identification of the lesions and parasites. Identification of *Fasciola* spp was done as described by (14), and lung worms were identified according to (15), while hydatid cyst was grossly diagnosed. In all examined- cases of hepatitis in liver and pneumonia in lungs none of the examined parasites were detected. The data was analyzed using Chi Square analysis , and the test was used to find out the variation in the infection rates during the study.

Results:

The results shown in Table 1, indicated that out of 89571 heads of slaughtered ruminants which were examined during this study, a partial or complete condemnation of liver or lungs was carried out in 1114(1.24%), 259(0.29%), 392(0.44%) , 587(0.66%) and 327(0.37) of the examined animals due to hydatid cysts, fascioliasis, lung worms, pneumonia and hepatitis respectively. Statistical analysis proved no significant difference in the incidence rates of infections between different species of animals ($P > 0.05$).

Table 1 : Incidence rates of parasitic and pathological infections in livers and lungs of slaughtered ruminants.

species	No. examined	No. of infected animals (%)				
		Hydatid cysts	Fascioliasis	Lung worms	Pneumonia	Hepatitis
sheep	66673	818 (1.23)	145 (0.22)	285 (0.43)	372 (0.56)	189 (0.28)
Goats	9552	135 (1.41)	50 (0.52)	89 (0.93)	113 (1.18)	66 (0.69)
Cattle	11591	131 (1.13)	49 (0.42)	14 (0.12)	80 (0.69)	54 (0.47)
Buffaloes	1755	30 (1.71)	15 (0.85)	4 (0.23)	22 (1.25)	18 (1.03)
Total	89571	1114 (1.24)	259 (0.29)	392 (0.44)	587 (0.66)	327 (0.37)

The total infection rates of the condemned livers in slaughtered ruminants due to hydatidosis, fascioliasis and hepatitis were 660(0.74%), 259(0.29%) and 327(0.36%)

respectively (Figure 1). Statistical analysis revealed a significant difference between condemned liver and the animal species ($P < 0.05$).

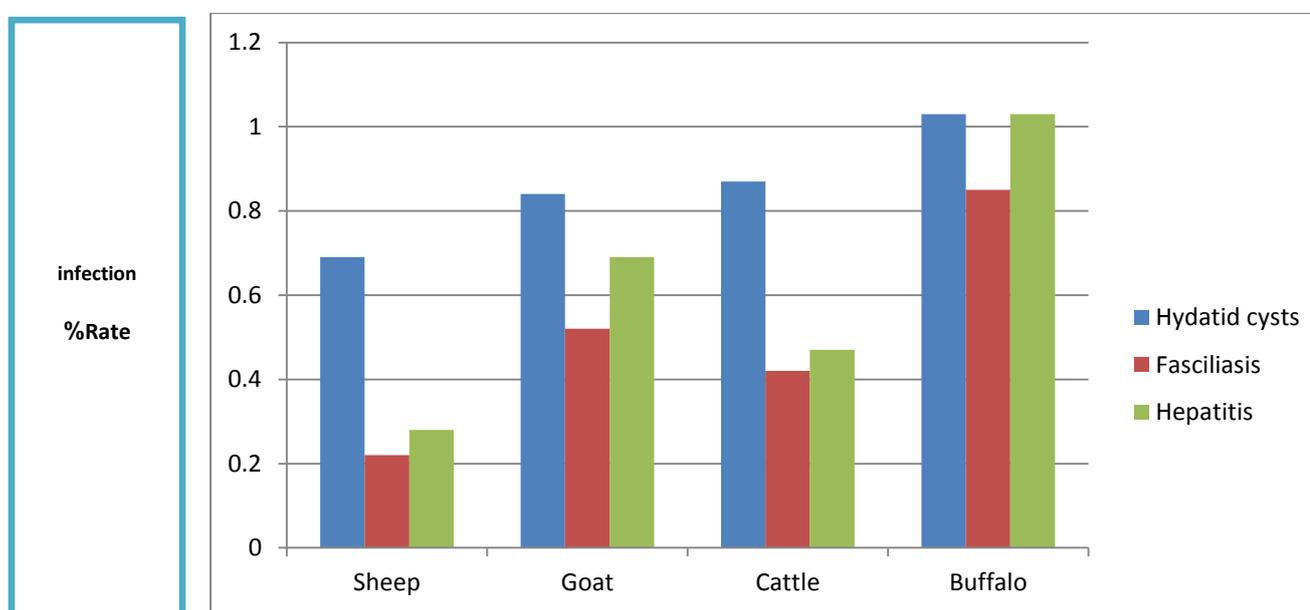


Figure 1. Infection rates of condemned livers in slaughtered ruminants with hydatid cysts, fascioliasis and hepatitis.

The results presented in Table 2 showed that condemnation of liver due to hydatid cysts occurred in 461(57.98%) of sheep,

80(40.81%) of goats, 101(49.50%) of cattle and 18(35.29%) of buffaloes.

Table 2: Number and percentage of condemned livers due to hydatidosis in slaughtered ruminants

Species	No. of examined animals	Total No.(%)condemned liver	No.(%)condemned livers due to hydatid cysts	Prevalence of hydatid cysts
Sheep	66673	795 (1.2)	461 (57.98)	0.69%
Goats	9552	196 (2.05)	80 (40.81)	0.84%
Cattle	11592	204 (1.76)	101 (49.50)	0.87%
Buffaloes	1755	51 (2.9)	18 (35.29)	1.03%
Total	89571	1246 (1.39)	660 (52.97)	0.74%

The results illustrated in Figure 2 show that the total infection rates of the condemned lungs in slaughtered ruminants due to lung worms, pneumonia and hydatid cysts were 392(0.44%), 587(0.66%) and

454(0.51%) respectively. Statistical analysis revealed a significant difference between condemned lungs and the animal species ($P < 0.05$).

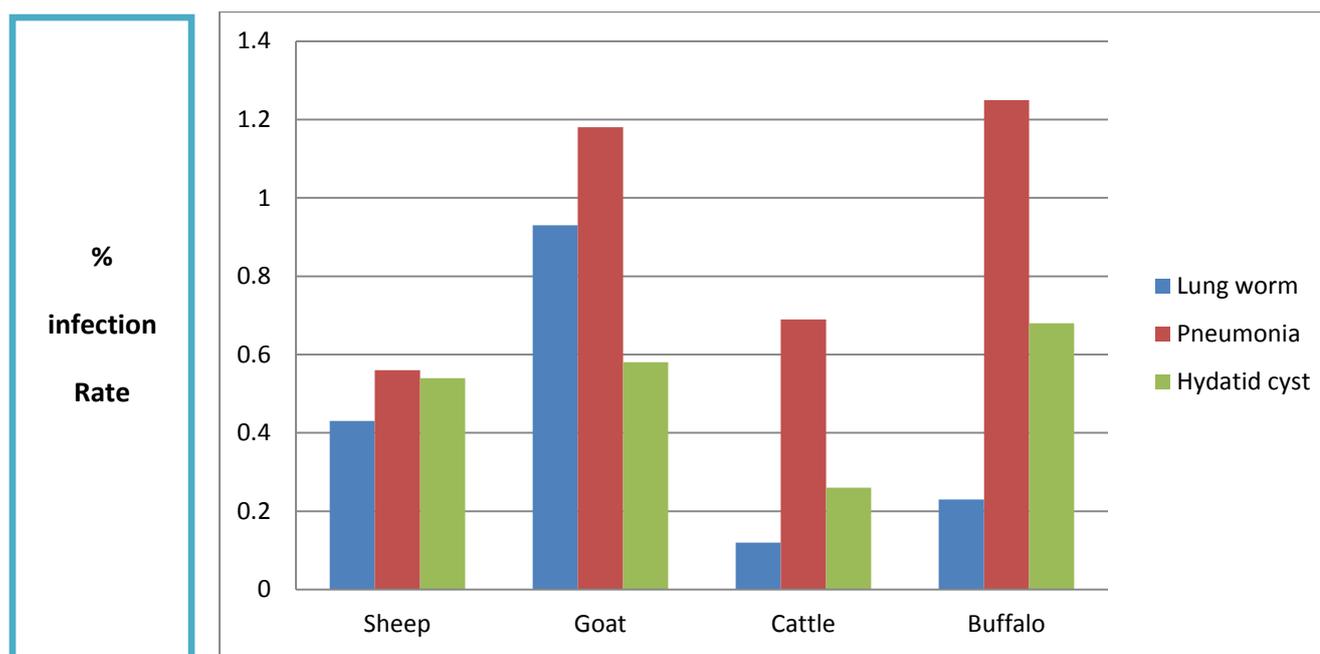


Figure 2. Infection rates of condemned lungs in examined ruminants with lung worms, pneumonia and hydatid cysts.

The results illustrated in Table 3 pointed out condemnation of lungs due to pneumonia carried out in 372 (36.69%) of sheep, 113(43.97%) of goats, 80(64.52%) of cattle and 22(57.89%) of buffaloes respectively. Statistically no significant

difference was noticed ($P > 0.05$). The same table also shows that prevalence of pneumonia in buffaloes, goats, cattle and sheep was 1.25%, 1.18%, 0.69% and 0.56% respectively.

Table 3: Number and percentage of condemned lungs due to pneumonia in slaughtered ruminants.

Species	No. examined animals	Total No.(%)condemned lungs	No.(%)condemned lungs due to pneumonia	Prevalence of pneumonia
Sheep	66673	1014 (1.52)	372 (36.69)	0.56%
Goats	9552	257 (2.69)	113 (43.97)	1.18%
Cattle	11592	124 (1.07)	80 (64.52)	0.69%
Buffaloes	1755	38 (2.17)	22 (57.89)	1.25%
Total	89571	1433 (1.60)	587 (40.96)	0.66%

Discussion:

The findings of this study revealed that condemnation of liver and lungs due to parasitic infestation and pathological lesions was frequently recorded in all animal species slaughtered at Kerbala abattoirs. The common detectable parasitic infestations and their prevalence in liver and lung which are documented in Table 1 were found to be hydatid cysts (1.24%), liver fluke (0.29%) and lung

worms (0.44%). However, pneumonia (0.66%) and hepatitis (0.37%) were reported to be the main pathological conditions behind rejection of examined lungs and livers respectively.

The results of this study on helminthes infection which are shown in Table 1 are consistent with those found in Kirkuk by (8) who recorded the prevalence of hydatid cysts (1.6%), liver flukes (0.6%) and

Lung worms (0.2%) in liver and lungs of slaughtered animal. Nevertheless, the results are slightly lower than those reported in a retrospective survey conducted in Kerbala abattoirs by (9) , through that survey the total infection rates of hydatid cysts , liver fluke and lung worms in slaughtered ruminants were found as 2.51%, 0.81% and 0.92 % respectively.

The findings of this study presented in Table 1 also indicated that condemnation of buffalo's liver and lungs due to hydatid cysts (1.71%) was the highest amongst other slaughtered ruminants . The highest prevalence of hydatid cysts in buffaloes recorded in this study was in agreement with those reported in Kerbala by (16) who found buffaloes carrying the highest infestation rate of hydatidosis (4.79%) among other slaughtered ruminants. The old age at which buffalo was slaughtered and examined for detection of hydatid cysts might have been the main cause for harboring the highest infection rate of hydatidosis amongst other slaughtered animals. Aged animals gain access of parasitic infection due to longer exposure than young ones (17).

The results illustrated in figure 1 demonstrated that livers of all animal species slaughtered at Kerbala abattoirs were frequently condemned due to hydatid cysts, followed by hepatitis and fascioliasis. The infection rate of hydatidosis in condemned liver of sheep (0.69%), goat (0.84%), cattle (0.87%) and buffalo (1.03%) was higher than the infection rates of fascioliasis and hepatitis in the same organ. Nevertheless, the number and percentage of condemned livers due to hydatidosis in sheep was the highest amongst other ruminants as 461 (57.98%) of sheep livers were rejected due to infestation with hydatidosis (Table 2). In Iran (18) recorded the prevalence of sheep liver hydatid cysts at the municipal slaughterhouse of Tabriz, northern region of Iran was 23.57%. The results of this

study suggested that hydatidosis was the leading cause of condemnation of liver and lung in sheep, goats, cattle and buffaloes alike. There are many factors behind the high prevalence of hydatidosis in Kerbala governorate, such as presence of large stray dog population particularly around abattoirs and the illegal killing of food animals outside slaughterhouses usually without veterinary inspection, as well as improper disposal of affected organs.

The results of this study presented in figure 1 suggested that condemnation of liver was also carried out due to Fasciolosis and hepatitis. The infection rate of condemned livers with fasciolosis in sheep, goats, cattle and buffaloes was 0.22%, 0.52%, 0.42% and 0.85% respectively. The findings of this study were in agreement with those reported in Kerbala abattoirs by (9) who recorded liver fluke in 0.68% sheep, 0.75% goats, 1.38% cattle and 2.57% buffaloes. The results were also in agreement with (8) who found the incidence of Fasciolosis in slaughtered ruminants in Kirkuk abattoir was 0.5% sheep, 0.3% goats , 3.2% cattle and 2.2% buffaloes. The results also resembled those reported by (10) who found Fasciolosis in liver of sheep 0.36%, goats 0.14%, cattle 1.27% and buffaloes 2.08%. However, results of the present study on the incidence of fascioliasis in liver of slaughtered ruminants were lower than those reported by other workers from other countries, such as (1), found liver condemnation due fascioliasis was 3.1% sheep, 3.1% goats and 8.6% cattle. Nevertheless, surveys in Tanzania, Ethiopia and Zambia reported higher prevalence of 14.04%, 24.3% and 41.3% respectively (18 , 19 , 20). Infestation of food animals with fasciolosis might have reflected the economic losses in the slaughtered ruminants due to this parasite infestation.

Once again, the results of the current study revealed that liver of buffalo has been incriminated to harbor the highest

infection rate of fascioliasis (0.85%) which was in agreement with those reported by (10) who found the distribution of fascioliasis in ruminants was the highest in buffaloes 2.08% followed by cattle 1.27%, sheep 0.36% and goats 0.14%. The highest incidence of fascioliasis in liver of buffalo which was reported in the current study was also similar to (9) who found 2.57% of buffalo liver was infected with fascioliasis, followed by cattle 1.38%. The highest infection rate of fascioliasis in buffalo's liver can be explained as buffalo grazing in and near water swamps, marshes and water lands where the intermediate host (snails) which carries the infective stage of the parasite is present. Accordingly, buffalo is on a higher risk than other ruminants (9). In addition to the different grazing system, the fluctuations in the infection rate of fascioliasis in ruminants can also be attributed to the histological differences and quantity of fibrous tissues of ruminant livers as well as to the advanced age of slaughtered animals (22, 23).

The results of this study on the occurrence of hepatitis in liver of ruminants which are shown in figure 1 revealed that the highest rate was recorded among buffaloes 1.03% followed by goats 0.69%, cattle 0.47% and sheep 0.28% . The rejection of liver due to hepatitis was also reported by other workers. (10) found the highest rate of hepatitis in cattle 1.12% followed by sheep 0.32% and goats 0.05% but no hepatitis observed among slaughtered buffaloes and camel. Compared to the findings reported from other countries, such as (24) reported 2.9% condemnation rate of liver due to hepatitis in ruminants in Western Nigeria, whereas, (1) found out hepatitis in 1.1% cattle, 1% sheep and 1.5 % goats slaughtered at Arusha, Tanzania. Another study (25) reported the incidence of hepatitis in goats in Northeast Brazil to be 2.5%. Moreover, (26) reported 3.8% liver condemnation rate in Bangladesh due to

abscesses and hepatitis. Generally, hepatitis occurred due to migrating intestinal parasites which pre optimize the conditions for a secondary bacterial infection (25).

The results of this study in figure 2 revealed that lungs of slaughtered ruminants in kerbala abattoirs were frequently condemned due to pneumonia (0.66%), followed by hydatid cysts (0.51%) and lung worms (0.44%), and that pneumonia represented the main notifiable disease behind rejection and disposal of affected lungs during inspection of carcasses and their offal. The high condemnation rate of ruminant- lungs due to pneumonia may be attributed to the absence of hygienic roles applied in management of these animals as well as to the predisposing factors such as migration of internal parasites which pave the way for secondary infection.

Furthermore, the results presented in figure 2 also demonstrated that lungs of goats harbored the highest infection rate (0.93%) of lung worms. The present results which indicated the highest infection rate of lungs worms in goats were consistent with those reported by (9) who found lung infection with lungs worms was highest in goats (1.29%) than sheep (0.94%), cattle (0.55%) and buffalo (0.8%). The present results also in agreement with (27) as the prevalence of lung worm infection was found to be higher in goats (28.02%) than sheep (25.6%). The highest rate of lung worm in goats reported in this study could be interpreted to the relatively softer consistency of lungs in goat which allows easier development and manifestation of the parasite there (28, 29).

Nevertheless, the results shown in Table 3 revealed that the number and percentage of condemned cattle- lungs due to pneumonia was the highest among other ruminants, as 64.52% of condemned lungs in cattle was attributed to the infection with pneumonia. The highest condemnation rate

of cattle lungs due to pneumonia reported in this study were similar to those recorded by (6) who found the rate of pneumonia among slaughtered ruminants was highest in cattle 0.79% followed by sheep 0.58% and goats 0.14%.

Actually, the results of this study revealed that the condemnation of sheep, goats, cattle and buffaloes livers and lungs in slaughterhouses of Kerbala due to parasitic infestation and pathological infection representing significant economic losses. However, some of the reported conditions can be prevented. Cases of hydatidosis could be reduced by destruction of stray dogs. Since most liver and lung conditions were caused by parasites, deworming programs coupled with good animal husbandry would possibly be effective in lowering their incidence.

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