

Prevalence of Liver Parasitic Infections in Sheep and Cattle Slaughtered in Torbat-E-Heidarieh Abattoir, Northeast Iran

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Abstract

Meat inspection records in abattoirs located in Torbat-e-heidarieh (northeast Iran), from 18 May 2009 to 30 May 2015, were used to determine the prevalence of liver fluke diseases in sheep and cattle in the region. A total of 1004858 livestock including 867015 sheep and 137843 cattle were slaughtered in the 6-year period. Dicrocoeliosis, fasciolosis and hydatidosis were responsible for 2%, 1.92% and 7.97% of total liver condemnations, respectively. Total condemnation of liver caused by hydatidosis in different animals was by far more than that observed in fasciolosis and dicrocoeliosis. The prevalence of liver condemnations due to hydatidosis increased from 4.23% and 5.21% in 2009 to 11.08% and 9.54% in 2015 for sheep and cattle, respectively. Dicrocoeliosis and fasciolosis were less prevalent than hydatidosis, and the prevalence rate of dicrocoeliosis declined from 1.87% and 2.35% in 2009 to 1.11% and 0.64% in 2015 for sheep and cattle, respectively; however, the prevalence rate of fasciolosis increased from 0.7% in 2009 to 3.3% in 2015 for sheep and declined from 2.12% in 2009 to 1.45% in 2015 for cattle. Data revealed significant seasonal pattern for dicrocoelium dendriticum in sheep ($p=0.045$), but, in the case of Fasciola spp. and hydatid in various animals, there have been no significant differences regarding the season. Because of hydatidosis, fasciolosis and dicrocoeliosis, liver condemnations were more common in cattle slaughtered throughout fall, while these were larger in winter for sheep. This study offers baseline information for the future tracking of these possibly essential parasitic attacks in the region.

Keywords: Prevalence, Fasciolosis, Dicrocoeliosis, Hydatosis, Torbat-e-heidarieh, Iran.

Introduction

Liver flukes (*D. dendriticum* and *Fasciola* spp.) and *Echinococcus* spp. occur in all herbivores with considerable community health issue and economic losses in worldwide (Ahmadi & Meshkehkar, 2011; Dalimi et al. 2002; Daryani et al., 2007). Many studies showed that these infections are widespread and endemic in all herbivores in the Middle East countries and Iran is an endemic or superendemic area for these diseases (Ahmadi, 2005; Fakhar & Sadjjadi, 2007). Ruminant infestation with the parasites can cause reduced amount of milk

generation and several problems such as diarrhoea, lack of weight obtain, abdominal pain, anemia and cachexia. In certain parasitic disorders, liver is an essential organ that is ravaged with organisms (Ansari-Lari & Moazzeni, 2006). Abattoirs are very important centers for gathering data achieved from daily inspection (Khanjari et al., 2010; Kojouri et al., 2014; Sadeghian et al., 2011). This information can be utilized for estimating prevalence rate of diseases. The survey was done with the aim to determine the prevalence rate of hydatidosis, fasciolosis and dicrocoeliosis in slaughtered animals, and the relation between prevalence rates with different seasons.

Materials and methods

All daily slaughtered animals and liver condemnations were recorded at Torbat-e-heidarieh abattoir, Northeast Iran, from 18 May 2009 to 30 May 2015. The livers were inspected according to the method described by Khanjari et al., (2010) to recognize hydatidosis, fasciolosis and dicrocoeliosis and the parasites were identified by their morphological characteristics (Khanjari et al., 2010). For determine the prevalence rate of these parasites, was used from the

recorded information, gained through observation, palpation and cut the livers.. The prevalence was sorted on a monthly basis. This period was selected to be probably to point any seasonal trends. Evaluation of information was performed using Epi Info software (Version 6.00). 2 test was used for determination of the relation between prevalence rates with different seasons at the level of $p < 0.05$.

Table 1. Annual frequency of liver condemnation due to dicrocoeliosis, fasciolosis and hydatidosis in cows&calves and sheep at Torbat-e-heidarieh abattoir during 6 years

Animal species	Sheep			Cattle				
	Number slaughtered	Hydatidosis (%)	Fasciolosis (%)	Dicrocoeliosis (%)	Number slaughtered	Hydatidosis (%)	Fasciolosis (%)	Dicrocoeliosis (%)
2009-2010	138581	5862 (4.23%)	976 (0.7%)	2600 (1.87%)	21727	1132 (5.21%)	458 (2.12%)	510 (2.35%)
2010-2011	143062	7754 (5.42%)	2726 (1.91%)	3816 (2.67%)	27477	1841 (6.7%)	640 (2.33%)	852 (3.09%)
2011-2012	181858	10566 (5.81%)	3608 (1.98%)	3600 (1.98%)	23615	2430 (10.29%)	602 (2.54%)	590 (2.5%)
2012-2013	139672	13646 (9.77%)	2738 (1.96%)	3426 (2.45%)	14269	1641 (11.5%)	332 (2.31%)	511 (3.57%)
2013-2014	152055	18718 (12.31%)	2992 (1.97%)	2428 (1.59%)	27275	1822 (6.68%)	242 (0.88%)	373 (1.36%)
2014-2015	111787	12386 (11.08%)	3684 (3.3%)	1244 (1.11%)	23480	2240 (9.54%)	341 (1.45%)	148 (0.64%)
Total	867015	68932 (7.95%)	16724 (1.93%)	17114 (1.97%)	137843	11106 (8.05%)	2615 (1.89%)	2984 (2.16%)

Table 2. Total number animals slaughtered and number (%) of condemned livers due to Hydatidosis, Fasciolosis and Dicrocoeliosis in Torbat-e-heidarieh abattoir during 6 years

Host	Total	Hydatidosis (%)	Fasciolosis (%)	Dicrocoeliosis (%)
Sheep	867015	68932 (7.95%)	16724 (1.93%)	17114 (1.97%)
Cattle	137843	11106 (8.05%)	2615 (1.89%)	2984 (2.16%)
Total	1004858	80038 (7.97)	19339 (1.92)	20098 (2)

Table 3. Seasonal prevalence rate (%) of liver fluke disease in animals slaughtered in Torbat-e-heidarieh abattoir during 6 years

Animal species	Spring	Summer	Fall	Winter
Animal slaughtered	216467	223004	212026	215518
Sheep				
Hydatidosis (%)	14234 (6.6)	16460 (7.4)	18060 (8.5)	20178 (9.4)
Fasciolosis (%)	4124 (1.9)	3666 (1.6)	4204 (1.98)	4730 (2.2)
Dicrocoeliosis (%)	3454 (1.6)	3476 (1.6)	4856 (2.3)	5328 (2.5)
Cattle				
Animal slaughtered	32974	33673	30891	40305
Hydatidosis (%)	2392 (7.3)	2803 (8.3)	2721 (8.8)	3190 (7.9)
Fasciolosis (%)	642 (1.9)	519 (1.5)	681 (2.2)	773 (1.92)
Dicrocoeliosis (%)	803 (2.4)	618 (1.8)	789 (2.6)	774 (1.9)

Results

Altogether, 137843 cattle and 867015 sheep were slaughtered at Torbat-e-heidarieh abattoir from 18 May 2009 to 30 May 2015. This survey revealed that the total rate of liver condemnation due to hydatidosis, dicrocoeliosis, and fasciolosis was 8.05% , 2.16% and 1.89% in cattle, respectively while among 867015 slaughtered sheep , 17114 (1.97%), 16724 (1.93%) and 68932 (7.95%) livers were convicted because of

dicrocoeliosis, fasciolosis and hydatidosis, respectively (Table 2). Because of hydatidosis, the prevalence of liver infestation increased from 4.23% and 5.21% in 2009 to 11.08% and 9.54% in 2015 for sheep and cattle, respectively. Dicrocoeliosis and fasciolosis were less prevalent than hydatidosis, and the prevalence rate of dicrocoeliosis declined from 1.87% and 2.35% in 2009 to 1.11% and 0.64 % in 2015 for sheep and cattle, respectively. The prevalence rate of fasciolosis increased

from 0.7% in 2009 to 3.3% in 2015 for sheep and declined from 2.12% in 2009 to 1.45% in 2015 for cattle (Table 1). The difference between the dicrocoeliosis, fasciolosis and hydatidosis prevalence rate in cattle and sheep in this period was significant. As shown in table 3, hydatidosis, fasciolosis and dicrocoeliosis, as causes of liver infestation, are more common in spring and summer. However, variations were not significant ($p>0.05$). The dicrocoelium prevalence rate in sheep was significant, ($p=0.045$) in various seasons, but the prevalence rate of the sheep fasciolosis and hydatidosis and the cattle dicrocoeliosis, fasciolosis and hydatidosis was not.

Discussion

It is reasonable enough to get trusted information for tracking epidemiologic facets of the illness and make a baseline knowledge for future studies. Though abattoir studies have restrictions, they are an economical method of collecting informative data on livestock infection (Ahmadi & Meshkehkar, 2011; Kojouri et al., 2014; Sadeghian et al., 2011). Several worldwide studies showed the significant financial lost and community health threats because of hydatidosis and liver flukes, considering the prominence of hydatidosis, fasciolosis and dicrocoeliosis prevalence in the Middle East (Ahmadi, 2005; Dalimi et al., 2002; Fakhar & Sadjjadi, 2007). During the 90s, a few big epidemics, consisting of a large number of human fasciolosis, were described in Iran, while human dicrocoeliosis has seldom been reported (Ahmadi & Meshkehkar, 2011). Sharma et al. (1996) reported that 51.3 % of sheep and 85.1 % of cattle were positive for *F. hepatica* in Kashmir, Pakistan (Sharma et al., 1989). In Turkey, 0.48% and 2.65% of cattle and 3.99% and 23.55% of sheep were infected with *F. hepatica* and *D. dendriticum*, respectively (Khanjari et al., 2010). High

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prevalence of hydatidosis in Iran can be a consequence of conventionally slaughtering of sheep and goat and readily available carcass wastes and offal's for scavenging rambler dogs and other ferine carnivores (Fakhar & Sadjjadi, 2007). The difference between cattle and sheep prevalence rate may be linked to outdoor grazing of sheep, close relationship between shepherd dog and sheep and high rate fertile hydatid cyst in sheep than cattle (Dalimi et al., 2002). The high outbreak of dicrocoeliosis may be as a result of more anti-helminthes persistence of *D. dendriticum* than *Fasciola* spp. in Iran. Significant seasonal pattern of this infestation may be described as grazing in temperate seasons, thus high condemnation rate is seen in winter. Such a high risk needs a serious control plan for hydatidosis in this area. In this survey, the prevalence rate of dicrocoeliosis, fasciolosis and hydatidosis was 2%, 1.92% and 7.97% of, respectively (Table 2). Thus, hydatidosis is a serious problem in the region. In a study conducted in slaughterhouse of Shiraz (Fars province), fasciolosis and dicrocoeliosis were reported to be 54% and 21% of whole liver infestations, respectively (Ansari-Lari & Moazzeni, 2006). In the present survey, mean contamination of hydatidosis in cattle and sheep was 8.05% and 7.95%. On the other hand, the mean prevalence of fasciolosis and dicrocoeliosis was 1.89% and 2.16% in cattle and 1.93%, and 1.97% in sheep. In a study conducted by Ahmadi and Meshkehkar (2011), in Khuzestan province, prevalence rate of *fasciola* spp. in cattle and sheep was 5.54% and 0.93% while the prevalence rate of dicrocoelium *dendriticum* was 0.11% and 0.09%, respectively. In 2006, in Ardabil province, it was shown that, in cattle and sheep, the contamination rate of dicrocoeliosis was 10.6 % and 25.9 % and the contamination rate of fasciolosis was 6.8 % and 5.3 % (Daryani et al., 2007). In a slaughterhouse study on

fasciola spp. in ruminants of Mazandaran province, respectively, 4.6% and 5.7% of infected cattle and sheep were reported (Moghaddam et al., 2004). In a study carried out in 2008, in the northwest region of Iran, the rate of livers contamination by *F. hepatica* and *D. dendriticum* was 8.57 % and 20 % in sheep (Khanjari et al., 2010). In 2008, reported hydatidosis is widespread in northeast of Iran. The contamination rate reduces in central and south provinces because of the severe environment and the few livestock (Tavakoli et al., 2008). In the current study, the prevalence of hydatidosis in northeast Iran (7.97%) was somewhat below the average prevalence in the country. Our results are possible, taking into consideration the relative drought conditions and the consequence so it would have on the intermediate host. Therefore, climatic conditions could be responsible for this improvement. The excessive drought that is dominant during the recent years throughout the country resulted in slaughtering many animals because of food shortage. It could be hypothesized that disappearance of many contaminated animals followed by scorching and dried environmental situation during those times triggered extraordinary decreases in infected prevalence in the future years. Also it may be linked somewhat to the higher consciousness of farmers of the casualties created by fluke attacks that triggered far better utilization of accessible treatments. These treatments are generally mass chemotherapy of animals by triclabendazole or albendazole. The data revealed a substantial seasonal pattern for dicrocoeliosis in sheep ($P < 0.045$); however, for fasciolosis and hydatidosis in various animals there were no substantial variations with regard to season (Table 3). This is almost similar to the results reported in Khozestan by Ahmadi and Meshkehkar (2010), in Ardabil by Daryani et al. (2006), and Mazandaran by Moghaddam et al.

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(2004). As it is apparent from table 3, because of hydatidosis, fasciolosis and dicrocoeliosis, infections of liver were more common in fall (especially in early fall) for slaughtered but in winter for sheep. The epidemiologic implication of the results might be linked at least somewhat to the resources of slaughtered animals. In winter, generally higher ratio of the slaughtered sheep depended on immigrant tribal people. It is described that the parasites prevalence is somewhat higher in animals depending on this population (Ansari-Lari, 2005; Oryan et al., 1994).

Total condemnation of liver caused by hydatidosis in cattle and sheep was by far more than that observed in fasciolosis and dicrocoeliosis. The results indicated a notable seasonal pattern for *D. dendriticum* in sheep; however, but for *Fasciola* spp. and hydatid, in various animals, there have been no significant differences regarding season. The current survey supplies a preliminary baseline information for the future tracking of these probably important parasitic infections.

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شیوع عفونت های انگلی کبد در گوسفند و گاوهای کشتار شده در کشتارگاه تربیت حیدریه،

شمال شرق ایران

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چکیده:

در این مطالعه بازرسی در کشتارگاه های منطقه تربت حیدریه (شمال-شرق ایران) از ۲۹ اردیبهشت ۱۳۸۸ تا ۱۰ خرداد ۱۳۹۴ برای تعیین میزان شیوع بیماری های انگلی کبد در گوسفند و گاو انجام شد. یک جمعیت ۱۰۰۴۸۵۸ شامل ۸۶۷۰۱۵ گوسفند و ۱۳۷۸۴۳ گاو در یک دوره ۶ ساله کشتار شدند. دیکروسلیوز، فاسیولوز و هیداتیدوز به ترتیب برای ۲٪، ۱/۹۲٪ و ۷/۹۷٪ از کل آلودگی کبدی مسئول بودند. کل آلودگی کبدی ایجاد شده توسط هیداتیدوز در دام های مختلف بسیار بیشتر از فاسیولوز و دیکروسلیوز مشاهده شده، بود. شیوع آلودگی های کبدی به دلیل هیداتیدوز از ۴/۲۳٪ و ۵/۲۱٪ در ۱۳۸۸ به ۱۱/۰۸٪ و ۹/۵۴٪ در ۱۳۹۴ به ترتیب برای گوسفند و گاو افزایش یافته بود. دیکروسلیوز و فاسیولوز از هیداتیدوز کمتر شایع بودند و میزان شیوع دیکروسلیوز از ۱/۸۷٪ و ۲/۳۵٪ در ۱۳۸۸ تا ۱/۱۱٪ و ۰/۶۴٪ در ۱۳۹۴ به ترتیب برای گوسفند و گاو کاهش یافت اما میزان شیوع فاسیولوز از ۰/۷٪ در ۱۳۸۸ تا ۳/۳٪ در ۱۳۹۴ برای گوسفند افزایش یافت و از ۲/۱۲٪ در ۱۳۸۸ تا ۱/۴۵٪ در ۱۳۹۴ برای گاو کاهش یافت. داده ها الگوی فصلی معناداری را برای دیکروسلیوم دندریتیکوم در گوسفند ($p=0/045$) نشان دادند اما برای گونه های فاسیولا و هیداتید در دام های مختلف اختلاف معناداری با توجه به فصل مشاهده نشد. آلودگی های کبدی به دلیل هیداتیدوز، فاسیولوز و دیکروسلیوز در گاوهای کشتار شده در پاییز شایع تر بود، درحالیکه این آلودگی ها برای گوسفند در زمستان بیشتر بود. این مطالعه اطلاعات اولیه برای ردیابی آینده این آلودگی های انگلی احتمالی در منطقه ارائه کرد.

واژه گان کلیدی: شیوع، فاسیولوز، دیکروسلیوز، هیداتیدوز، تربت حیدریه، ایران.