

A Retrospective Survey of Fasciolosis and Dicrocoeliosis in Slaughtered Animals in Meisam Abattoir, Tehran, Iran (2005-2008)

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Abstract

Fasciolosis and dicrocoeliosis are endemic parasitic diseases in Middle East especially Iran, which making significant economic problems. This retrospective survey has been done to evaluate contamination rate of slaughtered animals with fasciolosis and dicrocoeliosis at Meisam abattoir, in Tehran, Iran. In this survey, prevalence rate of fasciolosis and dicrocoeliosis in slaughtered animals in a three-year period (2005-2008) has been analyzed. The prevalence rates of fasciolosis and dicrocoeliosis in cattle were 2.20 % and 2.5 %, and the rates in sheep were 2.01 % and 5.83 %, respectively. The average annual direct economic loss incurred as a result of condemnation of ovine and bovine infected livers due to fasciolosis and dicrocoeliosis were estimated as high as 227,907 USD. The results of current survey revealed the rate of dicrocoeliosis is higher than fasciolosis. Our work proved that the highest frequency rate of the fasciolosis and dicrocoeliosis in cattle was in summer and spring, respectively. Whereas winter and autumn had the highest prevalence rate of fasciolosis and dicrocoeliosis in sheep.

Key words: Prevalence, Fasciolosis, Dicrocoeliosis, Slaughtered animals, Tehran province

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Introduction

Ruminant contamination with parasites can cause reduction of milk production and many disorders such as diarrhea, loss of weight gain, abdominal pain, anemia and cachexia. In some parasitic diseases, liver is an important organ that is infested with parasites.^{1,2}

Liver flukes (*Dicrocoelium dendriticum* and *Fasciola* spp.) have especially economic and public health importance in the world. Due to complicated detection of these diseases, definite recognizing of these parasitic diseases in alive animals is performed in slaughterhouses. Most of mammals are definitive hosts for these parasites among which sheep and cattle are the most important animals. Liver flukes make considerable financial losses in ruminant productivity and thus implicate significant impediments to global food production.³⁻⁷

The main objective of this survey was to determine the prevalence of liver worm infection in cattle and sheep in Meisam slaughterhouse and calculating its economical damage due to condemned livers.

Materials and Methods

In this retrospective survey, the total numbers of slaughtered animals and liver condemnations were recorded in both cattle and sheep. The livers were inspected according to the method described by Ogambo-Ongoma⁸ (1972) to recognize fasciolosis and dicrocoeliosis and the parasites were identified by their morphological characteristics.^{9,10} The recorded data, acquired with visualization, palpation and incision of livers, was used to extract the prevalence rate of these parasites. The prevalence rate was sorted monthly to determine the difference between distribution of infection rate and season. Analysis of data was done, using Epi Info software (Version 6.0). Seasonal pattern was investigated with chi-square

(χ^2) test. The P-value less than 0.05 considered statistically significant.

The direct economic loss due to ovine and bovine fasciolosis and dicrocoeliosis condemnation were calculated by this procedure:

$$DFL = CL \times P \times W$$

DFL: Direct Financial Loss

CL: Number of Condemned Livers due to fasciolosis and dicrocoeliosis

P: Average Liver Price (dollar/Kg)

W: Average Liver Weight (Kg)

The Average weights of bovine and ovine liver (W) were determined by weighting 50 bovine livers and the same number of ovine livers in different ages. The average weights were calculated as 0.8 kg and 5.5kg for ovine and bovine livers in this region, respectively.

The average sell prices (P) for each kilogram of ovine and bovine liver were 130,000 and 85,000 Rial, respectively, acquired by interviewing local butchers in different areas in Tehran province during 2005 to 2008.

Results

Among 109,766 of cattle and 457,793 of sheep was slaughtered at Meisam abattoir from 19 March 2005 to 21 March 2008, 12,864 and 71,055 livers were condemned, respectively. A total of 2,415 (18.77 %) and 2,757 (21.43 %) of cattle condemned livers and 9,218 (12.97 %) and 26,701 (37.57 %) of sheep condemned livers were due to *Fasciola* spp. and *Dicrocoelium dendriticum*, respectively.

As it shown in chart 1, it has a statistically significant seasonal pattern for cattle and sheep fasciolosis and also sheep dicrocoeliosis ($P < 0.05$), but not in cattle dicrocoeliosis ($P > 0.05$).

Average annual direct economic loss due to liver condemnation in cattle and sheep were estimated to be 2,051,162,000 Rial or equivalent to 227,906 USD.

Table 1. Annual prevalence rate (%) of liver condemnation due to fasciolosis and dicrocoeliosis in cattle and sheep at Meisam abattoir in Tehran during 19 March 2005 to 21 March 2008.

	2005-2006	2006-2007	2007-2008
Fasciolosis			
Cattle	393 (1.31 %)	1054 (2.20 %)	968 (3.03 %)
Sheep	4146 (2.50 %)	1482 (0.96 %)	3590 (2.60 %)
Dicrocoeliosis			
Cattle	936 (3.13 %)	1077 (2.25 %)	744 (2.33 %)
Sheep	11129 (6.71 %)	9207 (5.98 %)	6365 (4.61 %)

Table 2. Total number of condemned livers and the prevalence rate (%) of liver condemnation due to fasciolosis and dicrocoeliosis at Meisam abattoir in Tehran during 19 March 2005 to 21 March 2008.

	Fasciolosis		Dicrocoeliosis	
	Total	Infected	Total	Infected
Cattle	109766	2415 (2.20 %)	109766	2757 (2.51 %)
Sheep	457793	9218 (2.01 %)	457793	26701 (5.83 %)
Total	567559	11633 (2.04 %)	567559	29458 (5.19 %)

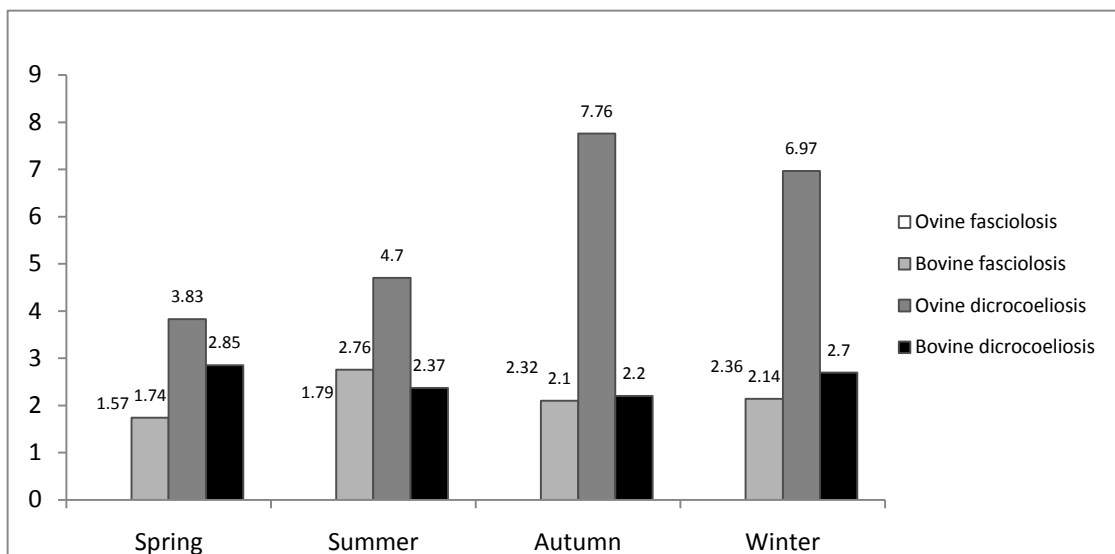


Fig 1. Correlation between season and prevalence rate of fasciolosis and dicrocoeliosis from 19 March 2005 to 21 March 2008 at Meisam abattoir in Tehran

Discussion

The prevalence rate of liver flukes in herbivores varies considerably throughout the world. Study by Jithendran and Bhat (1996) revealed that 8.1 % of sheep and 4.1 % of goats were positive for dicrocoeliosis in Himachal Pradesh in India.¹¹ Gargili *et al.* (1999) reported that the prevalence rate of fasciolosis and dicrocoeliosis in Turkey, were 3.99 % and 23.55 % in sheep, and 0.48 % and 2.65 % in cattle, respectively.¹²

Other studies were carried out in Iran, reported variable prevalence rates of *Fasciola* spp. and *D. dendriticum* in different locations of the country. A study conducted by Daryani *et al.* (2006) reported prevalence rate of fasciolosis in cattle and sheep in Guilan province which were 25.9 % and 5.3 %, respectively, whereas prevalence rate of dicrocoeliosis in cattle and sheep were respectively 10.6 % and 6.8 %.¹³ Sahba *et al.* (1972) informed that 82 % and 27.1 % of cattle and sheep livers were infected in Khouzestan province by *F. hepatica*, respectively.¹⁴ Radfar and Sakha (2000) studied prevalence rate of fasciolosis and dicrocoeliosis in sheep which were 1.5 % and 0.22 % in Kerman slaughterhouse.¹⁵ In a study conducted by Movassagh Ghazani and Valilou (2008) in the northwest region of Iran, 8.57 % and 20 % of sheep livers were infected by *F. hepatica* and *D. dendriticum*, respectively.¹⁶ In Ansari-Lari and Moazzeni's (2006) study the prevalence rate of fasciolosis in cattle and sheep were 2.91 % and 2.10 %, respectively, whereas the prevalence rate of dicrocoeliosis were 1.00 % and 0.80 % in cattle and sheep in Shiraz, respectively.¹⁷ Saffarbani (1999) observed that 20 % and 18.6 % of sheep livers were infected with *F. hepatica* and *D. dendriticum* in a slaughterhouse in Ardabil, respectively.¹⁸ Eslami. (1979) observed that prevalence rate of *F. hepatica* in ruminants of Guilan and Mazandaran provinces was 21.5 % and 12

% and this rate for Tehran province was 25.5 % of cattle, 31.2 % of sheep and 64.3 % of goats were infected with *F. hepatica*.¹

As it shown above, the prevalence rate of fasciolosis is higher than dicrocoeliosis in most studies but the results of this study were different and showed prevalence rate of dicrocoeliosis (5.19 %) higher than fasciolosis (2.04 %) in both cattle and sheep that slaughtered in Meisam slaughterhouse. This high prevalence of dicrocoeliosis can be due to more anti helmenthic resistance of *D. dendriticum* than *Fasciola* spp. in the country.

Fasciolosis, as a reason of liver condemnations, was significant prevalent in slaughtered cattle and sheep during summer (2.76 %) and winter (2.36 %), respectively. Liver condemnations due to dicrocoeliosis in sheep, was significantly high in autumn (7.76 %) whereas liver condemnations due to dicrocoeliosis didn't have significant seasonal pattern in cattle. Therefore it's recommended to commence acting against *D. dendriticum* and its intermediate hosts in sheep before autumn.

Regarding to the economic loss of fasciolosis and dicrocoeliosis in Iran, it is so important to conduct some treatment strategies using albendazole and triclabendazole. These strategies should be inspected regularly by Iranian Veterinary Organization. It's suggested to study about origin of infected animals which are slaughtered, so can give some specific suggestions for preventing fasciolosis and dicrocoeliosis in that specific region. We didn't have any data about milk and weight losses due to fasciolosis and dicrocoeliosis. It's recommended to evaluate these economic losses plus to losses of liver condemnations.

The result of this survey can help to express the advantage of meat inspection records, to monitor the status of these zoonotic diseases. The present survey provides a preliminary baseline data for the future monitoring of these potentially important parasitic diseases.

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