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Prevalence of Liver Fluke Infections in Slaughtered Animals in Ardabil Province, Northwestern Iran

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Abstract: Fasciola spp. and Dicrocoelium dendriticum are common parasites of herbivores in most countries of the Middle East, such as Iran. In chronic infections, these parasites cause biliary cirrhosis in livers of cattle and sheep and lead to economic losses. The aim of this study was to determine the prevalence of fascioliasis and dicrocoeliasis in animals. In a cross-sectional study, the livers of 5381 animals bread with traditional methods and 1848 animals bread with commercial methods, in Ardabil province, northwestern Iran, (2004-2005) were inspected for Fasciola spp. and Dicrocoelium dendriticum. The highest prevalence of Fasciola and Dicrocoelium infections were seen in cattle and goats, respectively. There was a significant seasonal pattern for Dicrocoelium in cattle, sheep and goats ($p<0.001$), but in different animals there were no statistically significant differences with respect to season. The most and the least rates of total condemnation of liver were seen in cattle (19.4%) and goats (0.4%), respectively ($p<0.001$).

Key words: Ardabil province, fluke infections, prevalence, northwestern Iran

INTRODUCTION

Fasciola Spp and Dicrocoelium dendriticum, the common liver flukes are the most likely causes of liver fluke disease in domestic ruminants, especially cattle, buffaloes, sheep and goats in many parts of the world[1-3]. The fluke life cycle requires a snail intermediate host to complete transmission to a new ruminant host. It may affect humans[4]. In ruminants, the liver is damaged and condemned and the subclinical and chronic disease usually results in decreased production of meat meat, milk and wool, secondary bacterial infections, fertility problems and great expenses with anthelmintics[5-8]. In Iran, fascioliasis occurrence rates in cattle, sheep, goats and buffaloes have been reported 25.5, 31.2, 64.3 and 13.3%, respectively[9]. In 1988 and 1999, within a 10 year period, two epidemics have been occurred in Bandar Anzali city, Gilan province, northern Iran that infected more than 10,000 people. Ardabil province is located next to Gilan. Since in northwestern Iran, there is high concentration of pastured livestock on traditional farms and there was not any data about Fasciola and Dicrocoelium in this area, therefore this survey was designed to study the presence and distribution of liver flukes in pastured ruminants living in Ardabil.

MATERIALS AND METHODS

This cross-sectional survey was carried out in the industrial slaughterhouse of Ardabil. This area is one of the biggest territories for training domesticated farm animals in northwestern Iran. The weekly visits were made between April 2004 and March 2005. Livers of 5381 animals bread with traditional methods (928 cattle, 243 buffaloes, 3765 sheep and 445 goats) and 1848 animals bread with commercial methods (152cattle, 2 buffaloes, 1694 sheep) examined according to the method described by Ogamba-Ongoma[10] and the parasites were identified by the morphological characteristics[11,12]. A questionnaire contains kind of animal, gender, season, ownership of animal (traditional or commercial) was completed for every animal.

The rate of total condemnation in different animals was calculated. To determine the difference between distribution of infection rate and season, sex, etc., statistical analysis were performed using SPSS 11 software for windows 2000.

RESULTS

Among 1080 livers of cattle, 25.9 and 10.6% were positive for Fasciola spp and Dicrocoelium, respectively.

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Table 1: Prevalence of Fasciola Spp and dicrocoelium Ddendriticum infection in male and female animals slaughtered in Ardabil, northwestern Iran, 2004-2005

Animals	No. of animals examined			No. of animals infected with Fasciola Spp(%)			No. of animals infected with Dicrocoelium(%)		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
Cattle	515	565	1080	63(12.2)	217(38.4)	280(25.9)	31(6)	83(14.7)	114(10.6)
Buffalo	152	93	245	14(9.2)	14(15.1)	28(11.4)	1(0.7)	1(1.1)	2(0.8)
Sheep	951	4508	5459	14(1.5)	273(6.1)	287(5.3)	17(1.8)	354(7.9)	371(6.8)
Goat	153	292	445	7(4.6)	15(5.1)	22(4.9)	9(5.9)	46(15.8)	55(12.4)

Table 2: Prevalence of Fasciola sp. and dicrocoelium dendriticum infection in animals bread with traditional and commercial methods, in Ardabil, northwestern Iran, 2004-2005

Animals/Kind	No. of animals examined	No. of animals infected with Fasciola Spp(%)	No. of animals infected with Dicrocoelium(%)
Cattle			
-traditional	198	278(30)	114(12.3)
-commercial	152	2(1.3)	0(0)
Buffalo			
-traditional	243	28(11.5)	2(0.8)
-commercial	2	0(0)	0(0)
Sheep			
-traditional	3765	278(7.4)	366(9.7)
-commercial	1694	9(0.5)	5(0.3)
Goat			
-traditional	445	22(4.9)	55(12.4)
-commercial	0	0(0)	0(0)

Table 3: Seasonal prevalence of Fasciola Spp and Dicrocoelium dendriticum infection in animals slaughtered in Ardabil, northwestern Iran, 2004-2005

Animals	Fasciola Spp								Dicrocoelium dendriticum							
	Spring		summer		Autumn		Winter		Spring		summer		Autumn		Winter	
	Ex.	Inf. (%)	Ex.	Inf. (%)	Ex.	Inf. (%)	Ex.	Inf(%)	Ex.	Inf.(%)	Ex.	Inf.(%)	Ex	Inf.(%)	Ex	Inf(%)
Cattle	259	62(23.9)	322	89(27.6)	5	0(0)	494	29(26.1)	259	29(11.2)	322	22(6.8)	5	0(0)	494	63(12.8)
Buffalo	71	10(14.1)	64	9(14.1)	0	0(0)	110	9(8.2)	71	0(0)	64	1(1.6)	0	0(0)	110	1(0.9)
Sheep	1070	87(8.1)	836	43(5.1)	1522	55(3.6)	2031	102(5)	1070	70(65)	836	31(3.7)	1522	69(4.5)	2031	201(9.9)
Goat	117	9(7.7)	70	3(4.3)	176	7(4)	82	3(3.7)	117	4(3.4)	70	3(4.3)	176	23(13.1)	82	25(30.5)

5x = No of examined animals Inf =No inf ected animals.

The highest prevalence of Fasciola and Dicrocoelium infections were seen in cattle and goats, respectively. The infection rate of Fasciola spp and Dicrocoelium in female cattle and sheep was higher than males (Table 1).

In all cases, infection rate of liver trematodes in animals breed with traditional methods was higher than those breed with commercial methods (Table 2).

Data showed significant seasonal pattern for Dicrocoelium in cattle, sheep and goats ($p<0.001$), but for Fasciola hepatica in different animals there were no statistically significant differences with respect to season (Table 3).

The highest co-infection was found in cattle (3.5%), followed by sheep (0.6%) and goats (0.4%). No buffalo showed co-infection.

The most total condemnation of liver caused by liver trematodes was seen in cattle (9.4%), followed by buffaloes (2.9%), sheep (1.5%) and goats (0.4%).

DISCUSSIONS

Fasciola Spp and Dicrocoelium are common parasites of ruminants in different parts of Iran. Human fascioliasis is usually observed in the northern regions of Iran, where it has an endemic nature. Bandar Anzali city, in Gilan province is an endemic area. Ardabil province is located in northwestern Iran, next to Gilan province. In this study prevalence of Fasciola spp in cattle, buffaloes sheep and goats was 25.9, 11.4, 5.3 and 4.9%; on the other hand prevalence of Dicrocoelium in those animals was 10.6, 0.8, 6.8 and 12.4%, respectively.

Sahba *et al.*[13] in a study in Khuzestan province reported that 12% of buffaloes, 82% of cattle, 10.55% of goats and 27.1% of sheep were infected with Fasciola hepatica. Eslami *et al.*[14] showed that 2% of wild sheep were infected with Fasciola hepatica and Dicrocoelium dendriticum was found in 0.4% of them. In a survey carried out on sheep slaughtered in Kerman, prevalence of Fasciola hepatica and Dicrocoelium was 1.5 and 0.22%, respectively. Co-infection rate has been reported 0.35% that 0.27% of them showed intense infection to result in total condemnation of liver[15].

In a study performed in slaughterhouse of Khorram Abad in Lorestan province, 9.5% of sheep and goats were infected with liver trematodes and 1.6% of liver were condemned[16]. Almost 4.1% of sheep slaughtered in Shahr-e-Kord were infected with Fasciola hepatica and infection rate in female animals was more than males[17], which was in agreement with the data obtained in our study.

Prevalence of Fasciola hepatica in ruminants of Gilan and Mazandaran provinces was 21.5 and 12%, respectively[9].

In a slaughterhouse survey in ruminants of Tehran, 25.5% of cattle, 31.2% of sheep and 64.3% of goats were infected with Fasciola hepatica[9]. Using feces examination, 38.7% of buffaloes in west Azarbaijan were infected with Fasciola hepatica[9].

Studies carried out in the neighbouring countries of Iran have reported various prevalences in different animals. In Pakistan (Keshmir), infection rate of Fasciola hepatica in cattle, sheep and goats was 85.1, 51.3 and 14.8%, respectively[18].

In Iraq, 14% of sheep, 0.6% of goats, 18.2% of cattle, 72% of camels and 8.3% of buffaloes were infected with Fasciola hepatica[19].

In Turkey, 3.99% of sheep and 0.48% of cattle were infected[1].

In Brazil, 10.34% of cattle and 20% of buffaloes were infected with liver trematodes[20].

In a survey carried out in 7 provinces of Kenya within a period of 10 years (1990-1999), infection rate of Fasciola hepatica in cattle was 0.8%[21].

On the whole, infection with Fasciola hepatica in ruminants of Ardabil was less than Khuzestan and in comparison with neighboring countries of Iran such as Pakistan, has shown less rate, but its prevalence was more than Turkey. Infection with Fasciola in big ruminants (cattle and buffaloes) of Iran and Iraq was almost the same, but its prevalence in small ruminants (sheep and goats) of Iran was more than those in Iraq.

In this study prevalence of Fasciola and Dicrocoelium in all animals bread with commercial methods was less than those bread with traditional methods ($p<0.001$). Slight prevalence of liver trematodes in commercial animal husbandry may be explained by using grass cultivated in surrounded farms, where is prevented from entrance of ruminants and periodic treatment in animal husbandry.

CONCLUSION

Since Ardabil province is a territory of animal husbandry and production of meat is the initial aim of owners of ruminants and regarding prevalence of Fasciola hepatica (25%) and liver condemnation (9.4%) that result in decreased production of meat, milk and wool, studying on snails as intermediate hosts of this parasite, for control of animal fascioliasis and breaking off life cycle of Fasciola hepatica in this area is necessary.

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