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Prevalence, Macroscopic and Microscopic Lesions of Bovine Fasciolosis at Ahvaz Abattoir, Khozestan Province, Iran

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ABSTRACT: This survey reports the prevalence of fasciolosis in slaughtered cattle of Ahvaz abattoir, Khozestan Province, Iran. A total of 3000 cattle were randomly sampled and examined after slaughter. The livers of 114 cattle (3.8 %) were positive for fasiolosis. Depending on the degree of pathological lesions, 58 (50.88%), 41 (35.97%), and 15 (13.15%), were lightly, moderately and severely affected, respectively. The findings indicated that *Fasciola hepatica* was more prevalent (67.54%) than other flukes and infections including *Fascicle gigantica* (14.91%) and mixed infection (17.55%). Histopathological changes in infected livers were chronic portal hepatitis (14.91%), eosinophilic hepatitis (21.91%), cirrhosis (17.53%), migratory canals (21.1%), bile duct hyperplasia (14.91%), mild hepatitis (9.64%), respectively.
Keywords: Fasciolosis, Ahvaz, Macroscopic, Microscopic, Liver lesions

INTRODUCTION

Fasciolosis is a liver parasitic infection affecting mainly both domestic and wild ruminants, but monogastrics and even humans can be infected (Knubben-Schweizer 2010; Mas-Coma *et al.* 1999; Qureshi *et al.* 2005). The two most important species that cause fasciolosis are *Fasciola hepatica* and *Fasciola gigantica* (Mungube *et al.* 2006; Rapsch *et al.* 2006; Terefe *et al*. 2012; Tolosa and Tigre 2007). These species are the causative agents of fasciolosis of animals and human, are reported from different regions in Iran (Ashrafi *et al.* 2006; Moghaddam et al. 2004; Rokni *et al.* 2002). The disease is responsible for considerable economic losses in the cattle industry, mainly through mortality, liver condemnation, reduced production of meat, milk, and wool, and expenditures for anti-helmintics (Dargie 1987). In Asia the most human cases were reported from Iran, mainly from Guilan Province, (Mas-Coma *et al.* 1999; Moghaddam *et al.* 2004; Rokni *et al.* 2002), but one report exists only on animal fasciolosis in this region (Sabokbar 1960). Prevalence rate of fasciolosis in ruminants of Tehran province reported in cattle, sheep and goats were 25.5 %, 31.2 % and 64.3 %, respectively (Eslami *et al.* 2009). Other studies were carried out in Iran, reported variable prevalence rates of *Fasciola* spp. in different locations of the country (Eslami *et al.* 2009; Khosravi and Babaahmady 2012). A survey 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. The epidemiology of fasciolosis depends on the grazing habitat preference of the animal metacercariae can survive upto 3 months after harvesting in hay from endemic high land areas that are consumed by ruminants in arid and low land areas. The main goal of present study that has been conducted for first time in considered Province, was the survey of fasciolosis prevalence, gross and microscopic lesions among cattle at Ahvaz Abattoir, Khozestan Province, Iran.

MATERIAL AND METHODS

This study was conducted at the Ahvaz abattoir, Khozestan Province, Iran. The study was a retrospective abattoir survey, undertaken for a period of 2-years from March 2011 to February 2012. During this period a total of 3000 cattle were slaughtered and their records formed a source of data for the current study.

During sampling of the study animals in the present study, sex and age of all the sampled cattle from the selected animal were recorded (Table 1). Slaughtered cattle were examined macroscopically for mature and immature *Fasciola* flukes. Each liver was placed in a large basin; all the flukes in the gall bladder and the major bile ducts were collected into a small glass. The liver was then sliced into strips of about 1 cm in thickness and soaked in normal saline for about 1 h. Flukes emerging from the cut bile ducts were put into the small glass and each sliced strip was thoroughly squeezed from end-to-end, washed in saline, and discarded. The contents of the basin were sieved; placed in a Petri dish; and the adult, immature, and cut pieces of flukes were added to the glass. Identification of the live flukes was performed according to Andrews (1999).The number of *Fasciola* worms was counted as Anderson et al. (1999). Cattle were classified into *Fasciola*-infected and *Fasciola*-free groups. Samples of liver were sent for histopathological studies and tissue samples were fixed in 10% neutral buffered formalin, embedded in paraffin wax, sectioned at 4–6 µm and stained with haematoxylin and eosin (H & E).

Table 1: Prevalence of bovine fasciolosis on sex and age basis.

Sex	**No of examined samples**	**sample**	**No of sample Positive**	**No of sample Negative**
Male	2280	89	2191	3.9
Female	720	25	695	3.47
Age				
< 2	867	23	844	2.65
2- 4	1281	75	1206	5.85
< 4	852	19	833	2.23

RESULTS AND DISCUSSION

From 3000 slaughtered cattle, 114 cattle found infected with *Fasciola* spp. Of a total 114 infested livers, *F. hepatica* was the most commonly encountered parasite with prevalence rate of 67.54% while *F. gigantica* 14.91%, mixed infestation 17.55% and immature flukes 6.14% with statistically significant different(Table 2). Macroscopic analysis revealed that 13.15% of the infections were severe, 35.97% moderate and 50.88% were lightly (Table 3). The results of examination of livers for the histopathological of the Livers are illustrated in Table 4. Fasciolosis is an economically important parasitic disease, which caused by digenean trematodes of the genus *Fasciola*, commonly referred to as liver flukes. The two species most commonly implicated as the aetiological agents of fasciolosis are *F. hepatica* and *F. gigantica* (family Fasciolidae). *F. hepatica* has a worldwide distribution but predominates in temperate zones while *F. gigantica* is found on most continents, primarily in tropical regions (Dalton 1998). Bovine fasciolsis exists in almost all region of Iran. However, the prevalence, epidemiology of *Fasciola* species involved varies with locality.

Table 2: Species of *Fasciola* encountered in affected livers.

Species of *Fasciola*	Number of livers	Percentage
F. hepatica	77	67.54
F. gigantica	17	14.91
Mixed infection	20	17.55
Total	114	100.00

Table 3: Intensity of liver lesion affected by *fascioloa*.

Severity of infection	**Number of livers infected**	**Percentage**
Light	58	50.88
Moderate	35.97	41
Sever	15	13.15
Total	100.00	114

Table 4: The results of examination of livers for the histopathological of the livers.

Pathological lesions	Number of livers	Percentage
Chronic portal hepatitis	17	14.91
Eosinophilic hepatitis	25	21.91
Cirrhosis	20	17.53
Migratory canals	24	21.1
Bile duct hyperplasia	17	14.91
Mild hepatitis	11	9.64
Total	114	100.00

This is mainly attributed to the variation in the climate and ecological condition such as altitude, rainfall, temperature and livestock management system. The outstanding change that occurs during *F. hepatica* infection in all host species is a dramatic peripheral. The prevalence rate of liver flukes in herbivores varies considerably throughout the world. Study by Terefe et al. (2012) revealed that prevalence rate of *F. hepatica* and *F. gigantica* in cattle 45.20% and 26.54% were in Ethiopia respectively. Post mortem examination on the 114 *Fasciola* infested livers of the current results indicated that *F. hepatica* and *F. gigantica* were the main *fasciola* species in the survey regions, however, *F. hepatica* were found to be the predominant *facsiola* species causing bovine fasciolsis in the survey areas. Similar studies conducted Meisam abattoir in Tehran reported 2.20% of the liver harbored *F. hepatica*. The mean number of flukes found in severely, moderately, lightly affected livers was 33, 51, 17 respectively.

This could be due to the fact that the severely affected liver bile duct is fibrosed and calcified which impaired the further passage of young flukes (Ramato 1992). The finding of more than 50 flukes per liver implies very high pathogenicity of flukes according to Soulsby (1982). The gross pathological changes of the liver in chronic fasciolosis characterized by increase in the size of the organ due to inflammatory changes in the parenchyma and fibrosis of the bile ducts containing adult flukes. In acute form, the livers were slightly swollen or enlarged with rounded edges and the color became paler than normal with numerous small and large hemorrhagic patches scattered over the parietal surface of the left, right and caudate lobe. Both acute and chronic forms of fasciolosis have been detected in this study, the gross pathological changes in acute fasciolosis described by other surveys authors may be summarized as light hemorrhagic spots, elongated tracks occurring on the surfaces of the liver (Acosta-Ferreira *et al.* 1979); Dow *et al.* (1967); (Dow *et al.* 1968; 1968; Ross 1967; Sinha *et al.* 2005). The histopathological examination revealed the presence of eosinophils , hemorrhage, bile duct hyperplasia and mild hepatitis in acute fasciolosis (Fig. 2, Fig. 5, Fig. 1, Fig. 4,). This study partially correlated the findings of (Dow *et al.* 1967); Dow *et al.* (1968) who recorded the changes of liver in experimentally produced fasciolosis in calves.

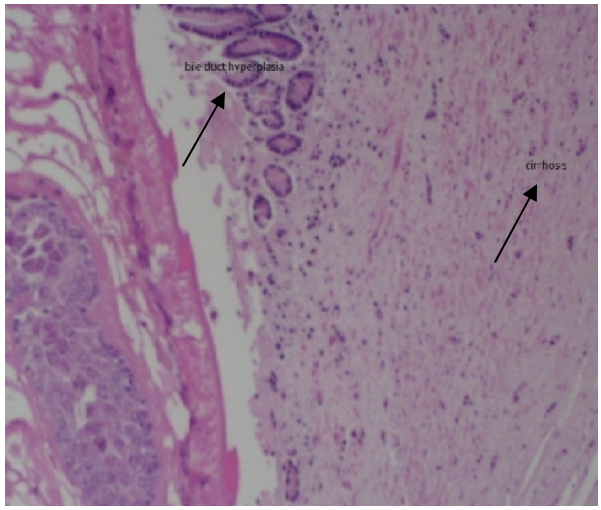

Fig. 1. Bile duct hyperplasia in liver of infected cattle by *Fasciola gigantica* (H&E,400x).

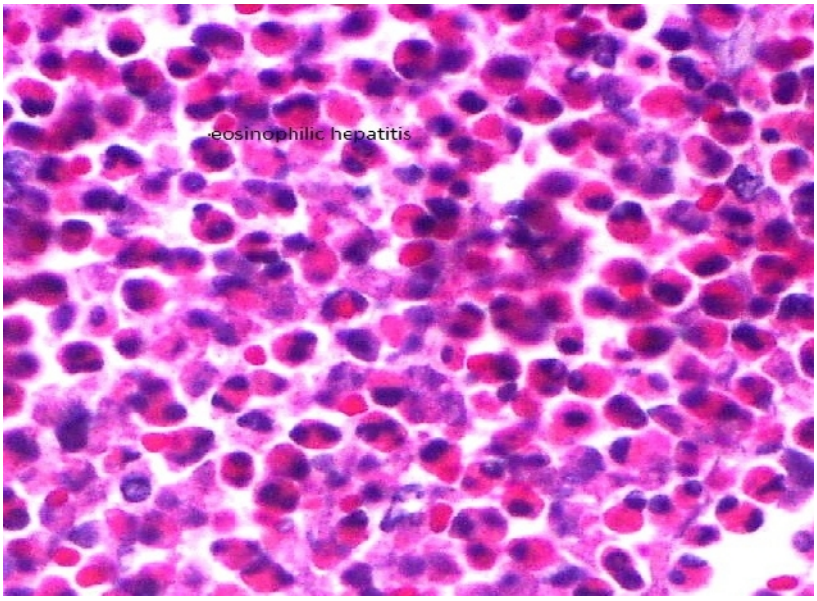

Fig. 2. Eosinophils in cattle liver infected by *Fasciola gigantica* (H&E,400x).

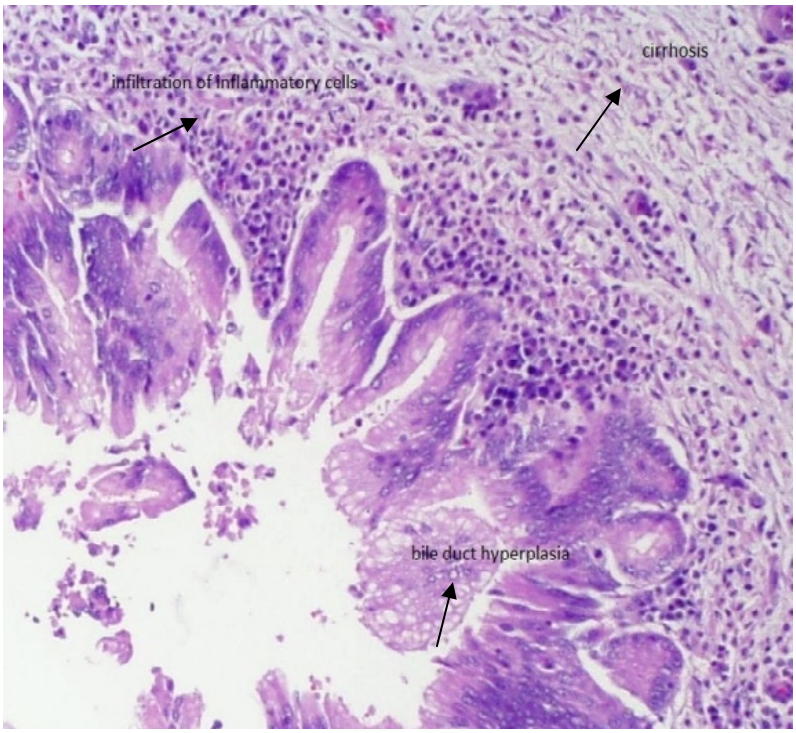

Fig. 3. Inflammatory cells, bile duct hyperplasia and cirrhosis in liver of cattle infected by *Fasciola gigantica* (H&E,400x).

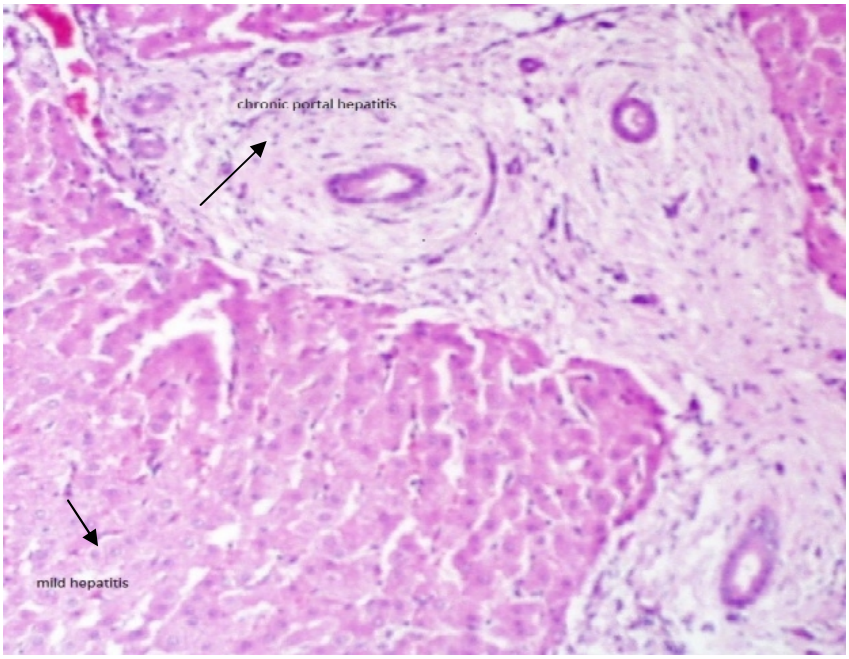

Fig. 4. Chronic portal hepatitis and mild hepatits in liver of cattle infected by *Fasciola gigantica* (H&E,400x).

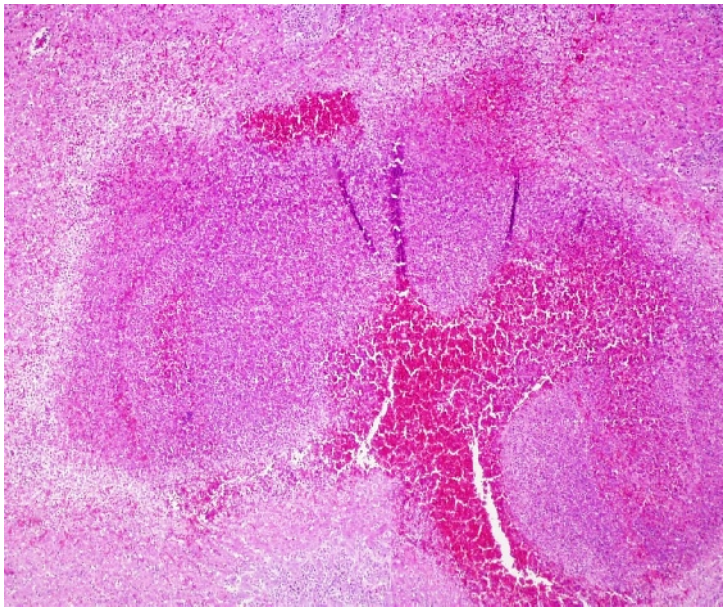

Fig. 5. Migratory canals in liver of cattle infected by *Fasciola gigantica* (H&E,400x).

The histopathological changes in chronic fasciolosis were characterized by Chronic portal hepatitis and Cirrhosis (Fig. 4 and Fig. 3) which was in agreement with the report of (Dow *et al.* 1967; Smith *et al.* 1972; Upadhayay *et al.* 1987). The present study confirmed that fasciolosis is an important disease entity causing considerable loss of revenue due to condemnation of affected liver and carcass weight reduction at Ahvaz abattoir. This may be due to the fact that the area has suitable ecological condition to the existence and multiplication of the intermediate host snail (*L. truncatula*).

Therefore, based on the aforementioned conclusion, the following recommendations are forwarded: Application of good drainage and building of dams at appropriate sites in marshy and low laying areas may reduce the snail problem, keeping the animals off from marshy areas inhabited by intermediate host or by fencing of these dangerous zones.

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