

Research Article

Study on the Prevalence and Gross Pathology of Liver Fluke Infestation in Sheep in and Around Quetta District, Pakistan

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Abstract | The study was conducted to determine the prevalence of fascioliasis in sheep in Quetta district from January to June 2007. Two hundred and fifty liver samples along with gall bladder and bile ducts were collected from sheep. Over all prevalence of liver fluke infestation in sheep was recorded as 30% in young and adult and 32% in aged sheep. Out of these positive samples *Fasciola hepatica* was found 50% and *Fasciola gigantica* 10% in case of young whereas in adults 20% with *Fasciola hepatica* and 14% with *Fasciola gigantica* and in aged sheep the prevalence was recorded as 33.33% and 13.33% with *Fasciola hepatica* and *Fasciola gigantica* respectively. Variable degree of gross lesions were noted in affected livers included cholangitis (63.15%), biliary obstruction (57.89%), fibrosis (68.42%), hyperplasia (60%), haemorrhages (47.36%), enlargement (52.63%), fibrinous exudates (63.15%) and oedema (57.0%) in sheep during the study period. From this study it is clear that fascioliasis is a serious problem for sheep in Pakistan with highest percentage of *Fasciola hepatica* followed by *Fasciola gigantica* which causes damaging of liver with variable degrees of inflammation, haemorrhages, hyperplasia and enlargement of livers.

Keywords | Fascioliasis, Infestation, *Fasciola hepatica*, Susceptibility

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INTRODUCTION

The economic impact of helminth diseases on livestock encompasses morbidity losses, mortality losses, enhanced susceptibility to bacterial and viral diseases and losses from high cost of drugs and veterinary care. Among various parasitic diseases of sheep, fascioliasis causes severe economic losses by damaging vital body organs such as liver and lungs (Iqbal et al., 1996). Spithill et al. (1999) have shown tremen-

dous losses by *Fasciola gigantica* in many countries of the world. The prevalence of fascioliasis is not uncommon in the country particularly in the province of Balochistan where sheep rearing is the biggest economic resource of rural population (Nawaz and Nawaz, 1987). Economic losses in sheep and cattle has also been recorded by (Njeruh, 2004).

The liver flukes are commonly known as *Fasciola hepatica* and *Fasciola gigantica* which are recognised in

Pakistan. The *Fasciola hepatica* is the most important fluke of sheep and cattle particularly both in temperate and cooler areas whereas *Fasciola gigantica* occurs in goats and buffaloes only in tropical areas. All the species of fasciola causes morbidity, mortality in ruminants and are associated with weight loss, anaemia and hypoproteinaemia (Horoloder and Haq, 1997). Clinically Fascioliasis is manifested by dullness, lack of appetite, weakness and oedematous distension of mucous surface of conjunctiva and pain on pressure exerted over liver in acute phase of infection. Chronically even *Fasciola* is also resistant to triclabendazole as studied by (Mitchell et al., 1998) and Moll et al. (2000). Fascioliasis affected animals show submandibular oedema, diarrhoea and shedding of wool especially in sheep. Gross pathological lesions included swollen friable liver with congestion and affected liver is covered with fibrinous exudates.

Livestock is an important sector of Agriculture and plays a vital role in the economy of Pakistan, which accounts for 50% of the agricultural value added and about 11.4% of the GDP. It is estimated that the milk is produced more than 28 billion liters per year. The role of livestock in rural economy may be realized from the fact that 30-35 million rural populations is engaged in livestock raising, which help them to derive 30-40% of their income from it. Livestock produces a number of vital products and services. These can be classified into three broad groups: Energy, Food and Raw materials. Rapid economic development puts pressure on the livestock sector to increase its output, as to meet the demand of meat and milk.

Livestock plays a crucial role in the economy of Pakistan from the ground level. It provides a vital and often most marginal economy to rural poor, such as pastoralists, share-croppers and widows. Unfortunately in Pakistan the animals are not on the priority list of owners too. Due to improper care, unhygienic environment and climate and close contact with infected animals they get infested with a variety of parasites.

Production potential of livestock development programs is plagued in tropical and subtropical areas as a result of prevalence of helminthes causes countless death and insidious economic losses (Al-quaisy et. al., 1987), The prevalence of gastrointestinal helminthes parasites is related to the agro climatic condition like quantity and quality of pasture, temperature, humidity and grazing behaviour of the host (Pal and Qayyum, 1993).

The losses have been observed due to low quality of wool, hides and skin by various parasitic infestations in livestock (Irfan, 1984). Heavy rate of eggs in feces of sheep has also been detected by (Duménigo et al., 2000). A lowered profitability up 15% and 50% weight loss, due to gastrointestinal parasitism (Hussain, 1985) have been reported.

All the above mentioned losses adversely affect the economic status of the farmers and economy of the country. Endoparasites results in huge economic losses amounting to Rs. 19.7 million per year (Iqbal et al., 1996) and the estimated losses due to lowered meat and wool production in slaughtered sheep and goats in Faisalabad were 31.4 million per year (Javed et al., 1992). The geo-climate condition of Pakistan is conducive for the optimum growth and proliferation of parasites, posing challenge for the veterinarians.

MATERIALS AND METHODS

SURVEY OF ABATTOIRS AND BUTCHERS SHOPS

Survey was conducted for prevalence of Fascioliasis in Quetta district from different age groups of sheep from January to June 2001. The age of each animal was confirmed by looking at the physical appearance of body and examining the dental pad and incisor teeth (Cockrill, 1974). The data was collected according to predesigned proforma.

1. Young (up to one year)
2. Adult (up to 5 years)
3. Aged (Above 5 years)

COLLECTION OF SAMPLES

The abattoir and butcher shops were visited in the morning regularly for collection of liver flukes from sheep brought for slaughter purpose. One hundred livers along with gallbladder including bile ducts were collected at random numbered and kept in separate plastic bags.

EXAMINATION OF SAMPLES

The samples of whole liver were placed in tray and immediately after opening, the gross pathological lesions such as discolouration, congestion, enlargement, haemorrhagic patches on the surface and nature of exudative fluid were recorded in sheep.

RECOVERY OF LIVER FLUKE/OVA

The samples of whole liver were placed in a tray and

incised longitudinally deep to expose portal vessels, gall bladders and bile ducts. The liver flukes were removed with the help of fine forceps taking all necessary precautions to avoid any damage to the parasites. All the parasites thus collected were washed in physiological saline solution and then fixed in formaline acetic alcohol (formaline commercial 06 parts, glacial acetic acid 01 part, alcohol 95 percent and distilled water 40 percent).

Faecal samples were collected from affected animals directly from rectum in a screw capped bottles and examined immediately. The smears were examined for presence of ova, with techniques as described by Ewing (1967).

Table 1: Prevalence of Fascioliasis in different age groups of sheep in district Quetta, Pakistan

Age of Animals	Number of livers examined	Number of positive cases
Young	250	75 (30)
Adult	250	75 (30)
Aged	250	80 (35)

Figures in parenthesis indicates percentage.

RESULTS

The prevalence of Fascioliasis in sheep was observed as 12.66% which varied in different age groups as 12.0% in young, 12.0% in adult and 14.0% in aged sheep during present study. Two hundred and fifty liver samples along with gall bladder and bile ducts were collected from all the three age groups of sheep. Prevalence of liver fluke infestation in sheep was recorded as 75 (30%) in young and adult 75 (30%) and 80 (32%) in aged sheep because of low immunity and more wear and tear phenomena in aged sheep out of 250 samples (Table 1). Out of these positive samples *Fasciola hepatica* was found 50% and *Fasciola gigantica* 10% in case of young whereas in adults 20% with *Fasciola hepatica* and 14% with *Fasciola gigantica* and in aged sheep the prevalence was recorded as 33.33% and 13.33% with *Fasciola hepatica* and *Fasciola gigantica* respectively. Variable degree of gross lesions were noted in affected livers included cholangitis (63.15%), biliary obstruction (57.89%), fibrosis (68.42%), hyperplasia (60%), haemorrhages (47.36%), enlargement (52.63%), fibrinous exudates (63.15%) and oedema (57.0%) in sheep during the study period. From this

study it is clear that fascioliasis is a serious problem for sheep in Pakistan with highest percentage of *Fasciola hepatica*, because the conditions are more conducive to *Fasciola hepatica* followed by *Fasciola gigantica* which causes damaging of liver with variable degrees of inflammation, haemorrhages, hyperplasia and enlargement of livers.

DISCUSSION

During present study overall prevalence of fascioliasis was found to be 30.66% which is almost identical to the findings of Handemir (1977) who observed 30.45% of sheep infected with liver flukes. Similar study was conducted by Khan et al. (1986) reported 32.80% in Kovak valley in upland district of Balochistan. During the present study prevalence of different species of liver flukes i.e; *Fasciola hepatica* was found 50% and *Fasciola gigantica* 10% in case of young whereas in adults 20% with *Fasciola hepatica* and 14% with *Fasciola gigantica* and in aged sheep the prevalence was recorded as 33.33% and 13.33% with *Fasciola hepatica* and *Fasciola gigantica* respectively. In agreement to the findings of Gargilli et al. (1999) who reported the prevalence of *Fasciola hepatica* as 3.99% in sheep. This variation could be due to change of season, breeds, location and feeding to the animals. During the present study the low prevalence of *Fasciola gigantica* 10% are in agreement to the study of Islam et al. (1999) who recorded 8.7% of *Fasciola gigantica* in sheep. During the present study it was observed that there is lower prevalence of fascioliasis in younger and adult sheep as compared to aged sheep group 30 % which is very much similar to the findings of Assanji, 1988 this is probably due to high acquired immunity which increases in young and adults. During the present investigations the overall increase prevalence of fascioliasis are due to increased population of intermediate hosts i.e; snails due to rainy season which survive more in rainy season, these findings are in close agreement to the previous findings of Ahmed et al. (2007) who recorded similar observations.

In present study Fascioliasis in sheep was confirmed through fecal examination for flukes eggs which were counted and ranged from 200-300 eggs per gram of faeces in case of sheep. Clinically *Fasciola* infested sheep were looked dull, weak and with submandibular edema, distension of submucosal surface of conjunctiva, chronic diarrhea and shedding of wool particularly

in sheep were observed in the present study. The above findings are in line with the study made by Akerejola et al. (1979) who reported heavy weight loss and diarrhoea mostly in rainy season in addition to distension on dependant parts of the animals. Similar findings were recorded by Radostitis et al. (1994) who reported chronic Fasciola infestation in sheep with "Fluky" sheep lose weight, developed submandibular oedema (Bottle jaw) and paler mucosal surface of conjunctiva, and shedding of wool.

The gross pathological changes produced in the affected parts of the livers were mostly congestive and hyperaemic but in certain areas varied from red to greyish white in colouration. The affected areas were friable, enlarged and some surface area was covered with greyish white fibrinous exudates and showed areas of consolidation in the peripheral region in some of the cases in present study are partially identical to the findings of Egbe-Nwiyi and Choudari (1996) who recorded pale and anaemic discolouration along with enlargement and necrotic foci at some affected parts of the liver. In present study some of the dependent parts of the different lobes were affected and showed the areas of consolidation along with congestion. In some of the cases fibrinous exudates were found in vessels and ducts and still other lobes revealed some parts of coagulated cheesy exudative fluid material. Similar findings were reported by Youkhana (2002) who recorded variety of changes in sub-acute and chronic phase of Fascioliasis. In early stage the affected lobes of liver were highly congested and haemorrhagic but later on consolidation and hydrated cyst were seen in severely affected parts of the liver along with necrotic lesions, abscesses and cirrhotic changes.

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REFERENCES

- Ahmed EF, Markvichtr K, Tumwason S, Koonawootrittriron S, Choothesa A, Jittapalapong S (2007). Prevalence of Fasciola spp. Infections of sheep in the Middle awash River Basin, Ethiopia. Southeast Asian J. Trop. Med. Public Health. 38(Suppl 1): 51-57.
- Al-Quaisy HHK, Al-Zubaidy AJ, Altaf KI, Makkawi

- TA (1987). The pathogenicity of haemonchosis in sheep and goat in Iraq. Clinical, parasitological and haematological findings. Vet. Parasitol. 24(3-4): 221-228.
- Assanji FM, 1988. Helminth infection in livestock. J. Helminthol. 62: 243-249.
- Akerejola OO, Veen TWS, Van-Njoku CO (1979). Ovine and caprine diseases in Nigeria: a review of economic losses. Bull. Anim. Health protec. Africa. 27(1): 65-70.
- Cockrill WP (1974). The husbandry and health of domestic animals. F.A.O: U.N. Rome 49.
- Duménigo BE, Espino AM, Finlay CM, Mezo M (2000). Kinetics of Antibody-Based Antigen Detection in Serum and Faeces of Sheep Experimentally Infected with Fasciola hepatica. Vet. Parasitol. 89(1-2): 153-161.
- Egbe-Nwiyi TN, Choudari SR (1996). Observation on prevalence, hematological and pathological changes in cattle, sheep and goats naturally infected with Fasciola gigantica in arid zone of Borno-Nigeria. Pak. Vet. J. 16(4): 174-175.
- Ewing SA (1967). Examination of parasites in Vety. Clinical Pathology Coles. E. H., W. B. Saunders Co., Philadelphia.
- Gargilli E, Tuzer E, Gulanber A, Toparlak M, (1999). Prevalence of liver fluke infections in slaughtered animals in Trakya. Turk. Vet. Hay. Dergisi. 23(2): 115-116.
- Handemir E (1997). Liver fluke parasitic infections in sheep slaughtered in Kony. Acta Parasitologica Turkey. 21(3): 311-316.
- Horoloder MMR, Haq MM (1997). Haemoglobin concentration and hematocrit value of black Bengal goats infected with Fasciola gigantica. Asian-Aus. J. Anim. Sci. 10(1): 118-121.
- Hussain Q (1985). Studies on the incidence of gastrointestinal parasites and efficacy of Banmth-II against nematodes in buffalo calves. M.Sc. Thesis, Univ. Agri., Faisalabad.
- Irfan M (1984). Key note address on effect of parasitism in lowering livestock production. Pak. Vet. J. 4: 25-27.
- Iqbal Z, Hayat CS, Hayat B (1996). Natural infection of helminthes in livers and lungs of sheep and goats. Pak. J. Agri. Sci. 23(3-4): 136-140.
- Islam KBMS, Bhat MJFA (1999). Helminthic and protozoan internal parasitic infections in free ranging small ruminants of Bangladesh. Slov. Vet. Res. 45: 67-72.
- Javed MS, Iqbal Z, Hayat B (1992). Prevalence and economics of haemonchosis in sheep and goats. Pak. Vet. J. 12: 36-38.
- Khan MN, Hayat CS, Chaudhry AH, Iqbaland Z,

- Hayat B (1986). Prevalence of gastrointestinal helminthes in sheep and goats at Faisalabad abbatoir. Pak. J. Vet. Sci. 9 (4): 159-161.
- Mitchell GB, Maris L, Bonniwell MA (1998). "Triclabendazole-resistant Liver Fluke in Scottish Sheep". Vet. Rec. 143(14): 399. PMID:9802201
 - Moll L, Gaasenbeek CP, Vellema P, Borgsteede FH (2000). "Resistance of Fasciola hepatica Against Triclabendazole in Cattle and Sheep in the Netherlands". Vet. Parasitol. 91(1-2): 153-8. [http://dx.doi.org/10.1016/S0304-4017\(00\)00267-3](http://dx.doi.org/10.1016/S0304-4017(00)00267-3)
 - Njeruh I (2004). "Prevalence and Economic Importance of Fascioliasis in Cattle, Sheep and Goats in Kenya." Kenya Veterinarian 27.
 - Nawaz M, Nawaz Y (1987). Problem of Fascioliasis in sheep and goats in the province of Balochistan, Pakistan. Seventh Pak. Cong. Zool. 84-85.
 - Pal RA, Qayyum M (1993). Prevalence of gastrointestinal nematodes of sheep and goats in upper Punjab, Pakistan. Pak. Vet. J. 13(3): 138-141.
 - Radostits OM, Blood DC, Gay CC (1994). Veterinary Medicine. A text book of diseases of cattle, sheep, pig, goat and horses. 7th edition. Bath press Anov, Great Britain. Pp 38-106, 1311-1367.
 - Spithill TW, Smooker PM, Copeman DB (1999). Fasciola gigantica: Epidemiology, control, immunology and molecular biology. In Fascioliasis (ed. Dalton J.P.). CAB International, Oxford. Pp. 465-526.
 - Youkhana SO, Sultan II, Ismail (2000). Hepatic lesions in sheep and cattle in Mosul. Iraq. J. Vet. Sci. 13(1): 21-25.