Incidence of amphistome infection in sheep from Mhow, Madhya Pradesh

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Abstract A total of 445 faecal samples and 128 rumens of sheep collected from Slaughter house, Mhow (Madhya Pradesh) were examined for a period of 1 year from February 2011 to January 2012. Faecal sample examination based, incidence of amphistomes was found to be 23.37% from the study area. The incidence of amphistomes was significantly higher ($p < 0.01$) during summer (36.75%) than winter (27.74%) and monsoon (3.52%). Age-wise, non-significantly higher infection was observed in ≥ 1 year-old animals (23.61%) than < 1 year-old animals (23.11%). Non-significantly higher rate of infection was recorded in case of females (25.63%) than that of males (19.64%). Out of 128, 49 (38.28%) rumens were found positive for amphistomes. The prevalence of *Paramphistomum cervi* (27.34%) was found to be significantly ($p < 0.01$) higher than *Gastrothylax crumenifer* (10.94%).

Keywords Incidence · Amphistomes · Sheep · Mhow · Madhya Pradesh

Introduction

The parasitic diseases are known to cause colossal monetary losses and amphistomosis is widely prevalent in India causing heavy losses in terms of morbidity, mortality, reduced productivity along with cost of treatment (Kaur et al. 2008, 2009). Amongst the several trematodes of ruminants, amphistomes are responsible for huge economic losses (Khan et al. 2008) and very high mortality rates (80–90%) are due to immature amphistomosis (Bal et al. 2009). Owing to its economic significance, the disease has been well studied and hence reported from different states of the country (Banerjee and Agrawal 1992; Prasad and Varma 1999; Hassan et al. 2005; Chourasia et al. 2014; Godara et al. 2014). However, the prevalence data of amphistomosis in sheep in association with risk factors, viz. season, age and sex is lacking from Malwa region of Madhya Pradesh. Therefore, the study was carried out to record the season, age and sex-wise incidence of amphistomosis in sheep slaughtered at Slaughter house, Mhow (Madhya Pradesh).

Materials and methods

The study was carried out in the Department of Veterinary Parasitology, College of Veterinary Science and Animal Husbandry, Mhow (M.P.). A questionnaire was prepared to record the details of sheep, viz. age and sex of the animal along with date of the collection. The rectal or freshly laid faecal samples were collected individually in polythene bags and each bag was numbered as per the serial no. of the questionnaire. For collection of rectal faecal samples, clearance certificate was obtained from Institutional Animal Ethical Committee of the college. The faecal samples

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of 445 sheep slaughtered at Slaughter house, Mhow were randomly collected during a period of 1 year from February 2011 to January 2012. Collected samples were examined by sedimentation technique as described by Soulsby (1982). Additionally, rumens of 128 sheep were collected from the same slaughter house and amphistomes were retrieved from the rumen in the laboratory. The collected parasites were stained by acetic alum carmine stain and permanent slides were prepared for genus and species level identification (Bhalerao 1935). The generated data were analysed by Chi square test (Snedecor and Cochran 1994).

Results and discussion

The data pertaining to season, age and sex-wise incidence of amphistomosis in sheep is described in Table 1. The present survey evidenced 23.37% incidence of amphistomosis in sheep. Significantly ($p < 0.01$) higher incidence of amphistomes was recorded during summer season (36.75%) followed by winter (27.74%) and monsoon (3.52%). Snails being an intermediate host and their accumulation around the water bodies and availability of most palatable grass around the water bodies during summer season results in aggregation of animals, snails and metacercariae over a small area which might be the reason for heavy infection during dry months of the year (Soulsby 1982). Similar findings were reported by Mir et al. (2008), Tariq et al. (2008) and Lone et al. (2013) in sheep. Swarnakar et al. (2014) also opined that, the geographical and climatic conditions like temperature, rainfall, humidity, etc. play a major role in epidemiology of amphistomes.

In case of age-wise incidence, the infection rate was non-significantly higher in adult (≥ 1 year) animals than

young ones (< 1 year) which is in consonance with the findings of Mohiuddin et al. (1986) and Tehmina et al. (2014) who reported heavy infection of amphistomes in more than 2 year old sheep. The difference in age-wise prevalence is attributable to the exposure of animals to the source of infection, as young ones are being kept at home while adult ones are taken out for the grazing purpose.

The incidence of amphistomes was found to be non-significantly higher in females (25.63%) than that of males (19.64%). Similar pattern of infection was documented by Saifuzzaman (1996) in case of cattle with higher infection in females (55.56%) when compared with males (45.54%). Uddin et al. (2006) also documented same pattern of amphistome infection in Black Bengal goats. Similar trend of amphistomosis was also documented by Godara et al. (2014) in sheep and goats of Jammu region of India. According to Tariq et al. (2008), the higher rate of amphistomosis in case of female than male sheep could be due to genetic predisposition and differential susceptibility owing to hormonal effects. Additionally, it could be due to stress during the pregnancy and lactation and lack of feed supplements required for reproductive and productive activities which might have resulted in lowered immune status of females and thereby increased incidence of amphistomes in case of females than their male counterparts (Bilbo and Nelson 2001).

The rumen examination of sheep collected from slaughter house of Mhow revealed 38.28% animals were harboring amphistomes amongst which the incidence of *Paramphistomum cervi* (27.34%) was found to be significantly ($p < 0.01$) higher than *Gastrothylax crumenifer* (10.94%). Similar findings were also recorded by Uddin et al. (2006) from Bangladesh. Probably, the snail intermediate host of *P. cervi* is abundant in the study area and

Table 1 Season, age and sex-wise incidence of amphistome infection in sheep at Slaughter house, Mhow

Parameters		Examined	Positive	Incidence (%)
Season	Summer	166	61	36.75
	Monsoon	142	5	3.52
	Winter	137	38	27.74
Chi square value	–	–	49.27**	–
Age	< 1 year	212	49	23.11
	≥ 1 year	233	55	23.61
Chi square value	–	–	0.01 (NS)	–
Sex	Male	168	33	19.64
	Female	277	71	25.63
Chi square value	–	–	1.19 (NS)	–
Total		445	104	23.37

NS non significant

** $p < 0.01$

which might have resulted in higher incidence of *P. cervi* in slaughtered sheep of Mhow, Madhya Pradesh. The *P. cervi* recorded in the present study is in line with the findings of Chauhan (2014), Chourasia et al. (2014) and Chaoudhary et al. (2015) from Gujarat state of India. The incidence of *G. Crumenifer* documented in the present investigation corroborate the findings of Ghatani et al. (2012) and Kumar et al. (2014) who confirmed the parasite by molecular characterization from North-east India and Western part of India, respectively. Owing to high incidence of amphistomes in the study area, development of sustainable cost effective control strategies against amphistomes becomes mandatory and in order to formulate the control strategies, further studies are required.

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Compliance with ethical standard

Conflict of interest Authors would hereby like to declare that there is no conflict of interests that could possibly arise.

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