



ISSN (E): 2277- 7695

ISSN (P): 2349-8242

NAAS Rating: 5.23

TPI 2021; SP-10(9): 25-28

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Received: 16-07-2021

Accepted: 18-08-2021

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## Parasitic infestation in liver of sheep in southern region of Rajasthan

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### Abstract

The study was carried out from January 2017 to December 2017 in Udaipur, Dungarpur and Chittorgarh districts of Southern Rajasthan. Total number of 1275 sheep liver samples, irrespective of sex, age, and breeds were examined. Out of these representative samples, 347 liver samples showed gross lesions, were subjected to histopathological examinations. Out of 347 samples 70 samples showed pathological lesions of liver parasitic infestation was observed i.e. fascioliasis 42 (12.10 per cent), schistosomiasis 20 (5.76 per cent), hydatid cyst 8 (2.30 per cent).

**Keywords:** sheep, liver, fascioliasis schistosomiasis, hydatid cyst

### Introduction

Sheep are often reared by small farmers, for their definite advantages as effective utilizers of feed resources. They have been associated with human since the dawn of history and this reflected in their wide distribution throughout the tropics. The economic importance of sheep depends on the value of its production and services which include meat, milk, wool and skins. Their importance appears in rural communities in pastoralist and agriculturalist societies. It may be kept as a source of investment and as an insurance against unforeseen exigency. India ranks 3<sup>rd</sup> in sheep population and majority of Indian sheep breeds are medium satire. The sheep population in the country is 65.06 million (12.71 per cent) of total livestock population in India, contributing 529.08 million kg meat and 48.13 million kg wool production, (2012) [13]. As liver is the most important organ of the body, total blood volume which circulate throughout the body passes through the, kidney, liver and lung, so any infection or toxic element present in the blood directly affect or injures the liver. The study was undertaken with objectives to find out the occurrence of parasitic infestation in liver of sheep in Southern region of Rajasthan.

### Material and Method

For the present study a total of 1275 samples of the liver were collected from sheep of either sex, irrespective of age and breeds. Out of these, 347 samples of liver of sheep showing gross lesions were used for further study. The tissue specimens for proposed investigation were collected from carcasses of sheep subjected to post-mortem examinations to various veterinary clinics and slaughter houses of Udaipur, Dungarpur and Chittorgarh districts of southern Rajasthan. All the samples examined grossly for alterations in morphology in terms of shape, size, colour, consistency, odour, location and type of the lesion in individual part of liver, as far as possible the colour of tissue was noted immediately after collection and prior to fixation. The samples were collected in all the seasons during the period of study from January, 2017 to December 2017. Following collection, all the samples were properly preserved in 10 per cent formal saline after cutting in to individual parts. The parts tissues measured 5-10 mm. in thickness, presenting the lesions along with normal tissue were used for fixation and pathological examinations. For histopathological examinations, processing of tissue was carried out by paraffin embedding using acetone and benzene technique (Lillie, 1965) [19]. The tissue section of 4-6 micron were cut and stained with haematoxylin and eosin staining method. (Luna *et al.* 1968) [20].

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## Results and Discussion

The occurrence of liver infestation found in Udaipur, Dungarpur and Chittorgarh as 42 out of 443 (12.10%), 20 out of 411 (5.76%) and 8 out of 421 (2.30%) respectively. As we

have seen a wide range of difference between the incidence reported at India and other parts of world that may be possibly due to seasonal variation, nutritional status, stress factors, management practices, geographical and climatic differences.

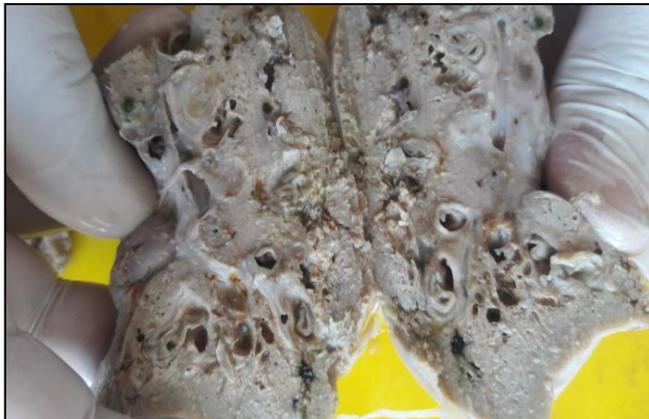
**Table 1:** Parasitic infestation in liver of sheep (*Ovis aries*) in southern region of Rajasthan.

S. No	Parasitic Conditions	Name of districts						Total no. of sample	Percentage %
		Udaipur (N=443)		Dungarpur (N=411)		Chittorgarh (N=421)			
		No. of Conditions	%	No. of conditions	%	No. of conditions	%		
1.	Fascioliasis	18	13.64	11	9.32	13	13.40	42	12.10
2.	Schistosomiasis	8	6.06	9	7.63	3	3.09	20	5.76
3.	Hydatid Cyst	4	3.03	3	2.54	1	1.03	8	2.30

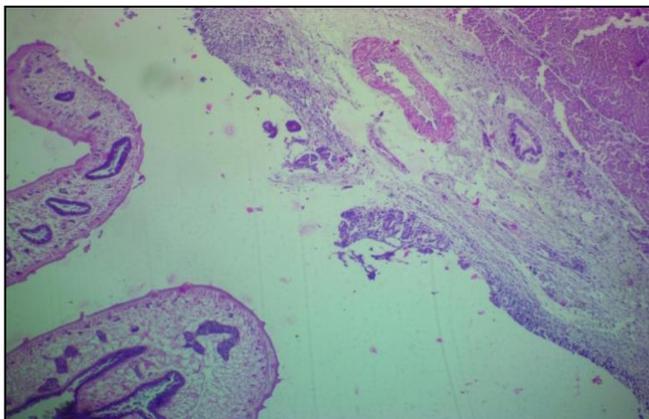
### 1. Fascioliasis

The overall occurrence of this condition was observed in 42 cases (12.10 per cent) and individually occurrence of this condition was observed in Udaipur, Dungarpur and Chittorgarh 13.64%, 9.32% and 13.40% respectively. A similar occurrence 12.5 per cent was recorded by Shahnawaz (2012) [26] and a higher occurrence 18.75 per cent was recorded by Mohamed (2013) [22].

**Gross Examination:** Lesions noticed in the liver were enlarged, friable, icteric with areas of necrosis, hemorrhages and mottling that showed few hemorrhagic tracts under the capsule. Cut section revealed large number of flukes. In some cases liver was found shrunken, pale, firm and hard to cut, which on section revealed thickened bile ducts with few flukes. (Fig.1)



**Fig 1:** Gross photograph of liver showing fascioliasis, hard indurated liver and formation of hard tract in the liver (pipe stem liver), also presence of parasite in the tract.



**Fig 2:** Microphotograph of liver showing fascioliasis, presence of parasite in bile duct & degenerative changes in bile duct - H&E-4x.

**Microscopic Examination:** Multiple areas of necrosis and hemorrhage in the hepatic parenchyma that contained sections of the parasite surrounded by exudate consisting of polymorphs, macrophages, eosinophils, R.B.C and fibrin were observed along with hemosiderin pigment in the hemorrhagic tracts. Some tracts were devoid of the parasite, presence of parasite in bile duct & degenerative changes in bile duct. There was severe congestion of blood vessels and hepatic sinusoids. Bile ducts revealed desquamation of epithelium with infiltration of inflammatory cells comprising of eosinophils, macrophages and lymphocytes in the portal area (Fig.2). The Glisson's capsule showed infiltration of mononuclear cells. The recorded gross and microscopic observations are in well accordance with those described by Arora (1967) [1], Jithenderan (1996) [14], Rao and Madhubala (1998) [23], Haridy *et al.* (1999) [11], Dhand *et al.* (2004) [7], Scott *et al.* (2005) [25], Ghazani *et al.* (2008) [9], Hanna and Abdel-Aziz (2012) [10], Shahnawaz *et al.* (2012) [26, 15] Mohamed (2013) [22], Khan *et al.* (2014) [16].

### 2. Schistosomiasis

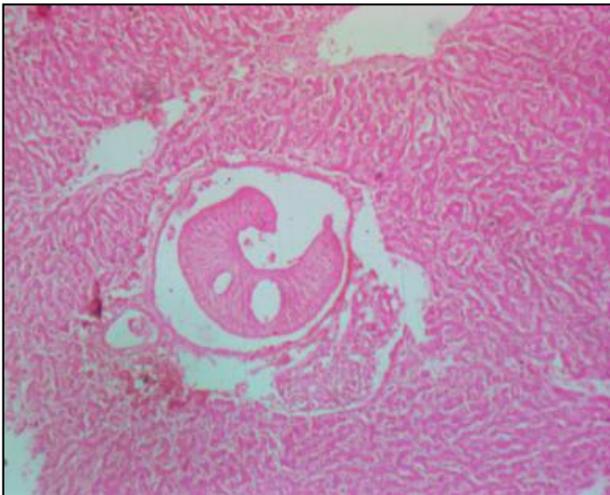
The overall occurrence of this condition was observed in 20 cases (5.76 per cent) and individually occurrence of this condition was observed in Udaipur, Dungarpur and Chittorgarh 6.06%, 7.63% and 3.09% respectively. A higher occurrence 19.70 per cent was recorded by Arora (1967) [1] and a lower occurrence 0.56 per cent was recorded by Bhavya Priyanka *et al.* (2017) [3].

**Gross Examination:** Liver was enlarged, yellowish and hard to cut. (Fig.3). Petechial hemorrhages were noticed on the surface of the capsule.

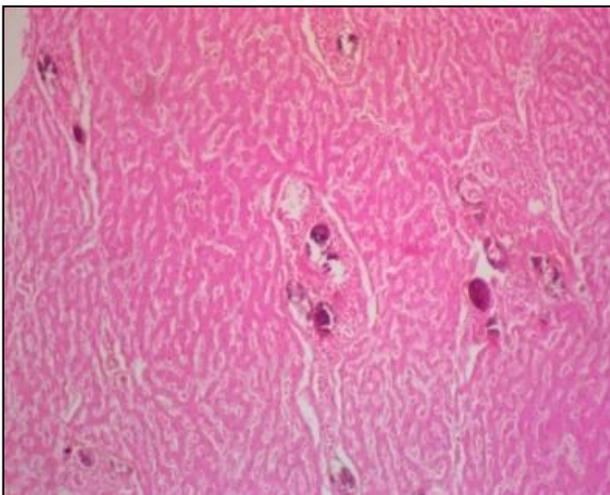
**Microscopic Examination:** Sections of liver showed multiple egg granulomas in the parenchyma and portal tracts that contained characteristic ova with terminal spine at the centre surrounded by macrophages, lymphocytes, a few eosinophils and fibroblastic proliferation (Fig.4). Surrounding hepatic cells showed atrophy, mild fatty change and necrosis. Proliferation of connective tissue was observed in the portal areas that contained schistosome egg in the portal vein (Fig.5). Biliary epithelial hyperplasia with focal areas of papillary projections into the lumen was noticed in some cases. The recorded observations are similar to those described by Cherian *et al.* (2010) [4], Sreelaskshmi and Rao (2011) [28] and Zangana and Aziz (2013) [30].



**Fig 3:** gross photo of liver showing schistosomiasis



**Fig 4:** Microphotograph of liver showing schistosomiasis transverse sections of Schistosomes in blood vessels H&E -10X



**Fig 5:** Microphotograph of liver showing schistosomes in blood vessels, infiltration of inflammatory cells & coagulative necrosis in surrounding areas, forming an egg granuloma H&E 10X

### 3. Hydatid cysts

The overall occurrence of this condition was observed in 8 cases (2.30 per cent) and individually occurrence of this condition was observed in Udaipur, Dungarpur and Chittorgarh 3.03%, 2.54% and 1.03% respectively. A similar 3.45 per cent was recorded by Mohamed (2013) [22] and a

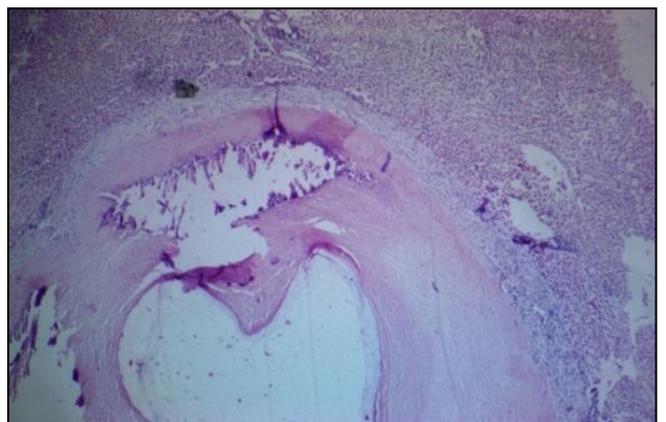
higher occurrence 43.33 per cent was recorded by Kilinc and Saglam (2016) [18]

**Gross Examination:** Affected liver showed small to large sized with unilocular cysts filled with liquid and surrounded by two layered shell of significant sizes (Fig.6).

**Microscopic Examination:** Necrotic zone was formed around the cyst with cellular infiltration of eosinophils, plasma cells, lymphocytes, macrophages and fibroblasts. The pathological changes appeared clearly in regions close to the cyst wall and showed that the hepatocytes were deformed in size and shape due to reduced cytoplasmic contents and many gaps were seen around the fibrous cyst wall, also showed nuclear pyknosis and elongated cells in some area of tissue (Fig.7). Also there were some fibrotic tissue near the cyst wall with some areas of calcifications. It is in conformity with the findings of Khajuria *et al.* (2013) [15], Valiyeva *et al.* (2013) [29], Salim (2009) [24], Sissay *et al.* (2008) [27], Bayu *et al.* (2013) [2], Khaniki *et al.* (2013) [17], Getaw *et al.* (2010) [8], Das and Sreekrishnan (1998) [6], Ghazani *et al.* (2008) [9], Mohamadin and Abdelgadir (2011) [21], Kilinc and Saglam (2016) [18], Hasona *et al.* (2017) [12] and Daryani *et al.* (2007) [5].



**Fig 6:** Gross photograph of liver showing cut section of hydatid cyst in liver



**Fig 7:** Microphotograph of liver showing hydatid cyst, laminated hyaline layer infiltrated with leucocytes and surrounded by thick coat of granulation tissue causing fibrosis. H&E-4x

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